



“Do they fit together like the Joker and Harley Quinn?”: Joking, laughing, humor styles, and dyadic adjustment among people in long-term romantic relationships

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ABSTRACT

While people value a good sense of humor in their potential romantic partners, we know comparatively less about the function of humor in long-term relationships. Using the survey method, we measured the production, appreciation, and quality of humor along with humor styles and dyadic adjustment in long-term relationships among 149 heterosexual couples. Men produced more jokes than women, but the sexes responded to their partners' jokes at the same frequency. Men also rated their jokes as funnier than the jokes of their partners. Partners were matched in aggressive and self-defeating humor styles. Laughing and humor quality ratings as well as humor styles had effects for men's and women's dyadic adjustment. We conclude that in long-term, romantic relationships, a sense of humor is part of the mechanisms involved in building relationships.

1. Introduction

Most people want their romantic partners to have a good sense of humor (Brauer & Proyer, 2021). Humor, and accompanying behaviors (e.g., smiling, laughing), may be associated with more intelligence, extraversion, and openness (Greengross & Miller, 2011; Hall, 2015; Howrigan & MacDonald, 2008). Those with a good sense of humor are rated as less neurotic and more agreeable (Cann & Calhoun, 2001). In courtship, humor may be an honest signal of possessing the qualities desired by potential mates (Higham, 2014). Similarly, the appreciation of humor (e.g., smiling, laughing) is desirable in romantic partners (Cowan & Little, 2013; Li et al., 2009) and may even increase romantic interest (Hall, 2015).

Men and women differ in their reproductive costs and benefits, so they also differ in the goals of courtship (Buss & Schmitt, 1993) and humor may be one way that men intrasexually compete to impress women (Miller, 2000). In fact, men are more inclined than women to produce humor in a situation with a potential romantic partner, and women are more inclined than men to exhibit humor appreciation and evaluate the humor of potential mates (Wilbur & Campbell, 2011). Moreover, women seem to evaluate a partner's production of humor as much as they evaluate a partner's receptivity to their own humor

whereas men evaluate a partner's receptivity to their humor more than a partner's production of humor (Bressler et al., 2006). Therefore, when attracting the interest of potential partners, men are more likely to produce humor, and women are more likely the recipients and judges of men's humor. These results support the evolutionary model, which says that in courtship situations humor serves as an indicator of desired psychological traits (Miller, 2000) and an interest indicator (Li et al., 2009).

Humor, and related behaviors, may also indicate the level of similarity of potential partners in terms of cultural background, values, and attitudes (Flamson & Barrett, 2008). Laughing at jokes together can alert people to a potentially compatible partner who understands the joke and finds it funny. Humor, therefore, has also a qualitative aspect related to its content. Men and women may engage in several types of humor like affiliative, self-enhancing, aggressive, and self-defeating (Martin et al., 2003). In courtship situations, men and women evaluate potential mates with benign humor styles (i.e., affiliative, self-enhancing) more positively than potential mates with injurious humor styles (i.e., aggressive, self-defeating; Zeigler-Hill et al., 2013).

When searching for potential partners, production and reaction to humor may have evolutionary functions. However, humans employ both short-term and long-term reproductive strategies (Buss & Schmitt,

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1993). Higher levels of humor production and appreciation were related to more relationship satisfaction in romantic relationships (Hall, 2017). In addition, romantic couples seem to assortatively mate on humor styles (Hahn & Campbell, 2016).

While there is good evidence for sex differences in humor production and responses in courtship stages, there is less so in more established couples. We contend that humor is used primarily to attract partners which means there should be less frequent jokes and fewer responses to those jokes and the humor styles may not be so affiliative. Thus we predict no-to-weak differences between long-term partners in frequency of joking, laughing, and humor styles. However, we predicted differences in the quality of jokes as men usually more freely express humor that is considered of high quality (Greengross et al., 2020). We also explore the relationships between the aspects of joking, laughing, and evaluating jokes and the humor styles and partners' adjustment in the relationship. The greater the dyadic adjustment, the greater the frequency of jokes and laughing in pairs because laughter may have a function of reward for meeting one's expectations (Wood et al., 2017).

2. Method

2.1. Participants and procedure

One hundred forty nine adult Polish, heterosexual couples who had been together for an average of 84.67 ($SD = 63.35$) months ($Mdn = 67$ months) and living together for an average of 56.87 ($SD = 55.03$) months ($Mdn = 37$ months), with men ($M = 29.99$, $SD = 6.38$) about one year older ($t = -6.16$, Cohen's $d = -0.52$) than women ($M = 28.78$, $SD = 6.18$), took part in an online study via Lime Survey platform and the Polish survey platform "Ariadna".¹ The participants recruited via Lime survey participated as volunteers without remuneration and participants recruited via Ariadna received points that could be exchanged for prizes.² The inclusion criteria for the participation in the study were: (1) to be a heterosexual couple, (2) to be a couple for at least six months, and (3) to live together for at least three months. The participants were informed of the topic of the study, its length and inclusion criteria and gave informed consent. The participants filled the questionnaires related to their own and their partner's frequencies of joking and laughing as well as quality of jokes. Subsequently, the participants filled in measures of humor styles and dyadic adjustment. Upon completion, participants were thanked and had an opportunity to contact one of the authors via e-mail in case of questions or concerns. Participants recruited via Lime Survey were asked to code their answers to let us merge the data from both members of one couple. Participants recruited via "Ariadna" were asked to fill the questionnaires apart from their partner, subsequently during the same session.

2.2. Measures

We measured the frequency of joking and laughing as well as quality of jokes by asking participants how often ($1 = never$; $9 = always$) they joke when they are with their partner, how often they laugh at their partner's jokes, and how often they perceive their own jokes as funny. They also indicated how often their partner jokes, how often their

¹ A G-power analysis showed that the sample size was sufficient to detect the small size of the effects in planned 2×2 and 2×4 mixed-model ANOVAs (f_s subsequently = 0.15 and 0.12) assuming α is 0.05 and $1-\beta$ is 0.95.

² Men recruited via Lime Survey were younger ($t = -3.34$, $p = .001$, $d = -0.57$), and had more self-enhancing humor style ($t = 2.21$, $p = .029$, $d = 0.36$) than men recruited via "Ariadna". Women recruited via Lime Survey were younger ($t = -4.09$, $p < .001$, $d = -0.67$), had more affiliative ($t = 3.29$, $p = .001$, $d = 0.54$) and less aggressive ($t = -2.72$, $p = .007$, $d = -0.45$) humor style, and were more dyadically adjusted ($t = 2.35$, $p = .020$, $d = 0.39$) than women recruited via "Ariadna".

partner laughs at their jokes, and how often they think their partner's jokes are funny.

We measured humor styles using the Polish translation (Hornowska & Charytonik, 2011) of the Humor Styles Questionnaire (Martin et al., 2003). Participants were asked how much they agreed ($1 = strongly disagree$; $7 = strongly agree$) with 32 items corresponding the affiliative humor (e.g., "I enjoy making people laugh.", Cronbach's $\alpha = 0.87$), self-enhancing humor (e.g., "If I am feeling depressed, I can usually cheer myself up with humor.", $\alpha = 0.82$), aggressive humor (e.g., "If someone makes a mistake, I will often tease them about it.", $\alpha = 0.82$), and self-defeating humor (e.g., "I let people laugh at me or make fun at my expense more than I should.", $\alpha = 0.80$). The items were summed to form indexes for each type of humor.

We measured the participants' adjustment ratings using the Polish translation (Cieślak, 1989) of the Dyadic Adjustment Scale (Spanier, 1976). The scale includes 32 statements related to dyadic satisfaction (e.g., "How often do you discuss or have you considered divorce, separation, or terminating your relationship?"), dyadic cohesion (e.g., "Do you and your mate engage in outside interests together?"), dyadic consensus (e.g., "Please indicate the approximate extent of agreement or disagreement between you and your partner for philosophy of life.") and affectional expression (e.g., "Please indicate the approximate extent of agreement or disagreement between you and your partner for sex relations."). Fifteen items asked people to report their agreement ($0 = always disagree$; $5 = always agree$), nine items asked them to report frequency (seven items: $0 = never$; $5 = always$; two items: $0 = never$; $4 = every day$), two were on a dichotomous scale ($0 = yes$; $1 = no$), and one rated relationship satisfaction ($0 = extremely unhappy$; $6 = perfect$). Higher scores indicate a higher level of match between partners in dyad ($\alpha = 0.94$).

3. Results

We begin with testing relationships between men's and women's perception of the frequency of joking (see Fig. 1). A 2 (sex) \times 2 (frequency of joking) mixed-model ANOVA revealed an interaction [$F(1, 148) = 51.36$, $p < .001$, $\eta_p^2 = 0.26$], a main effect of sex [$F(1, 148) = 5.41$, $p = .021$, $\eta_p^2 = 0.04$], and main effect of frequency of joking [$F(1, 148) = 20.95$, $p < .001$, $\eta_p^2 = 0.12$]. Men said they joked more than their partners ($p < .001$, $d = 0.66$) and women agreed ($p < .001$, $d = 0.29$). Women reported their partners joked more than men reported about their partners ($p < .001$, $d = -0.62$) and men agreed with this assessment ($p < .001$, $d = -0.37$).

In the next step, we tested the relationships between men's and

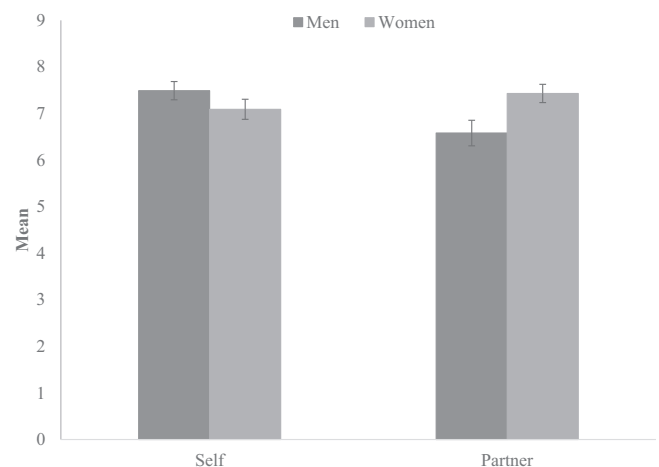


Fig. 1. Participants ratings of the frequency of their jokes and their partner's jokes

Note. Error bars are 95 % confidence intervals.

women's declarations related to the frequency of laughing at their jokes and their partner's jokes. A 2 (sex) \times 2 (frequency of laughing) mixed-model ANOVA revealed a main effect of frequency of laughing [$F(1, 148) = 8.02, p = .005, \eta_p^2 = 0.05$]. Participants thought they laughed at their partner's jokes ($M = 7.10, SE = 0.11$) more than their partner laughed at their jokes ($M = 6.71, SE = 0.11, d = 0.25$).

Then we tested relationships between men's and women's declarations related to the quality of their jokes and their partner's jokes. A 2 (sex) \times 2 (quality of jokes) mixed-model ANOVA revealed an interaction [$F(1, 148) = 10.04, p = .002, \eta_p^2 = 0.06$]. Men rated the quality of their own jokes higher than women rated their own jokes ($p = .021, d = 0.24$). Men also thought their jokes were better than they thought their partners were ($p < .001, d = 0.30$, see Fig. 2).

We also observed positive correlations between men's and women's self-ratings and their partners ratings of frequency of joking and laughing and the quality of humor (see Table 1). The biggest one was between men's and women's ratings of the frequency of men's joking, and the smallest one was between men's and women's ratings of men's quality of jokes. However, most correlations were moderate. For frequencies of dyads with different levels of partners' actual similarity and self-partner agreement see Table S.1 in Supplementary material.

Subsequently, we tested the participants' humor styles. A 2 (sex) \times 4 (humor style) mixed-model ANOVA revealed an interaction [$F(3, 444) = 9.07, p < .001, \eta_p^2 = 0.06$] and main effects of sex [$F(1, 148) = 17.17, p < .001, \eta_p^2 = 0.28$] and humor style [$F(3, 444) = 134.71, p < .001, \eta_p^2 = 0.48$; see Fig. 3]. Women were more oriented towards affiliative humor than all other styles (p -values $< .001, d_{\text{self-enhancement}} = 0.54, d_{\text{aggressive}} = 1.60, d_{\text{self-defeating}} = 1.26$), were higher on self-enhancing than self-defeating humor ($p < .001, d = 0.71$) and aggressive humor ($p < .001, d = 1.04$), and were higher on self-defeating than aggressive humor ($p = .002, d = 0.33$). Men were more affiliative in their humor than aggressive ($p < .001; d = 1.21$) and self-defeating ($p < .001; d = 1.41$) and were higher on self-enhancing than self-defeating ($p < .001, d = 1.28$) and aggressive humor ($p < .001, d = 1.10$). Men also scored higher than women on affiliative ($p < .001, d = 0.28$), self-enhancing ($p < .001, d = 0.70$) and aggressive humor ($p < .001, d = 0.66$). Moreover, partners' aggressive and self-defeating humor styles correlated positively (see Table 1).

Lastly, we tested relationships between measured variables and dyadic adjustment using Action-Partner Interdependence Model paradigm (APIM; Cook & Kenny, 2005). We conducted independent analyses for frequency of joking, frequency of laughing, and quality of jokes (see Fig. 4) and then we conducted analyses for humor styles (see Fig. 5). We presented correlations of men's and women's dyadic adjustment with other variables included in APIM models in Table S.2. (see Supplementary material); moreover, the sexes were similarly adjusted

dyadically ($t = -1.01, p = .316$). Table 2 contains the results of all APIM analyses. We tested constrained models assuming equal actor and partner effects across sexes. These parsimonious models were well-fitted in most cases; however, in the case of quality of jokes parsimonious model was not well-fitted ($\chi^2(4) = 9.98, p = .041$), so we chose the unconstrained model. The statistical significance of the parameters was evaluated upon two criteria: 95 % confidence intervals (C.I.; 5000 bootstrap samples) and p -values.

Frequency of joking had no effects for dyadic adjustment. On the other hand, actors' self-reported and partners' partner-reported frequency of laughing were associated with more dyadic adjustment. Actors' ratings of the quality of their partners jokes were associated with more dyadic adjustment in both sexes. Moreover, women's dyadic adjustment was associated with higher ratings of their jokes declared by their partners. On the other hand, partners' self-reported quality of jokes reduced men's dyadic adjustment.

Actors' affiliative and self-enhancing humor styles were associated with more dyadic adjustment. Actors' and partners' aggressive humor were associated with less dyadic adjustment. And last, actors' self-defeating humor was associated with less dyadic adjustment.

4. Discussion

4.1. General analyses

People value a good sense of humor in their potential partners (Brauer & Proyer, 2021). In courtship, humor can be an indicator of psychological traits (Greengross & Miller, 2011; Hall, 2015; Howrigan & MacDonald, 2008), romantic interest (Cowan & Little, 2013; Li et al., 2009), and similar values and life goals (Flamson & Barrett, 2008). However, less attention has been given to the function of humor in established couples.

In the current study, we measured humor production, humor appreciation, and humor quality, humor styles, and dyadic adjustment among people in long-term relationships. We revealed that men had a higher frequency of joking than women. Moreover, men perceived their partners as joking less frequently than women made jokes themselves. Further, even in long-term relationships, men produce humor more frequently than women (Wilbur & Campbell, 2011). So, men may still be motivated to communicate with their long-term partners having traits that a good sense of humor manifests (Greengross & Miller, 2011; Hall, 2015; Howrigan & MacDonald, 2008). However, it also suggests that men may underestimate the frequency of their partners' jokes.

Among people who are in long-term relationships were no sex differences in the frequency of laughing at partner's jokes. In long-term relationships, women might lose or lessen their tendencies to respond to humor to attract mates (Li et al., 2009; Wilbur & Campbell, 2011). Moreover, both men and women reported that they laughed at their partner's jokes more often than their partners laughed at their jokes. This result suggests that in long-term relationships, men may be more likely to laugh at their partners' jokes than in the earlier stages of creating a relationship.

Men rated their jokes as better than women rated their jokes. Moreover, men assessed the quality of their own jokes as higher than the quality of their partners' jokes and the correlation of men's and women's ratings of men's jokes was relatively small. These biased perceptions may support men's willingness to act as joke producers (Wilbur & Campbell, 2011) and may create approach orientations that promote men engaging in intrasexual competition for women's attention (Brauer & Proyer, 2021).

Sex differences related to the frequency of humor styles are consistent with previous research (Martin et al., 2003) and may reflect sex differences in social strategies. Men used more affiliative, aggressive and self-enhancing humor styles than women; however the effect size in case of self-enhancing and aggressive humor was seemingly bigger than in the case of affiliative humor. The results suggest both sexes may

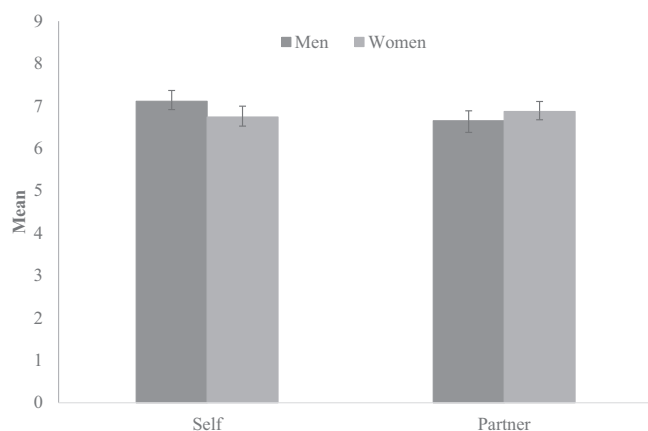


Fig. 2. Participants' ratings of the quality of their jokes and their partner's jokes. Note. Error bars are 95 % confidence intervals.

Table 1
Correlations (Pearson rs) of men's and women's measures of humor production, appreciation, and evaluation, humor styles, and dyadic adjustment.

	Women's self & men's self	Women's self & women's partner	Women's self & men's partner	Men's self & men's partner	Men's self & women's partner	Men's partner & women's partner
Frequency of joking	0.38***	0.59***	0.41***	0.54***	0.60***	0.31***
Frequency of laughing	0.32***	0.68***	0.53***	0.44***	0.46***	0.42***
Quality of jokes	0.25***	0.47***	0.42***	0.43***	0.18*	0.34***
Affiliative humor	0.04					
Self-enhancing humor	0.16					
Aggressive humor	0.33***					
Self-defeating humor	0.34***					
Dyadic adjustment	0.76***					

* $p < .050$.

*** $p < .001$.

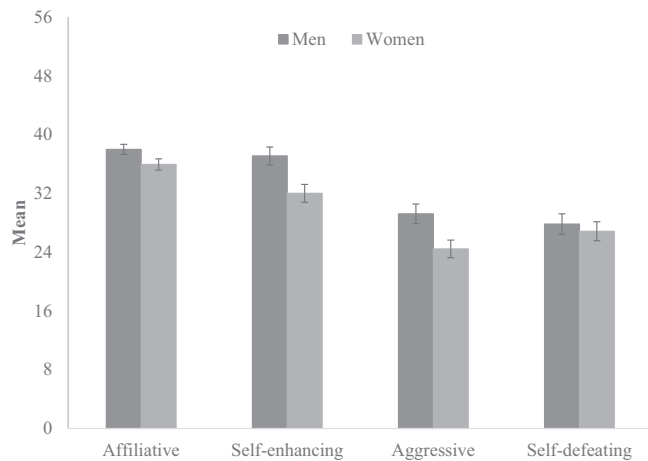


Fig. 3. Humor styles among men and women in long-term romantic relationships

Note. Error bars are 95 % confidence intervals.

similarly use affiliative styles to build social relations and coalitions; however, men may more often use aggressive and self-enhancing styles in intrasexual competition (Griskevicius et al., 2009).

4.2. Dyadic analyses

The members of dyads were moderately similar in self-rated frequencies of joking and laughing, and quality of jokes and moderately agreed with their partner's perceptions of these aspects. These results suggest that a high similarity of sense of humor aspects is not common in long-term relationships. However, average differences between members of the same dyad were low thus the situations when there are distinct discrepancies between partners in frequencies of joking and laughing, and humor quality seem to be rare. On the other hand, humor is a complex, multifaceted phenomenon (Hall, 2017) and men and women perceive humor differently (Bressler et al., 2006), so dyadic ratings of its aspects may be less accurate than other, more unambiguous variables (e.g., personality traits; Kim et al., 2019).

Only aggressive and self-defeating humor styles showed a correlation between members of the same couple. This suggests that long-term partners are generally neither compatible nor incompatible in humor styles (Cann et al., 2011; but see Hahn & Campbell, 2016). People use aggressive humor to enhance the self at the expense of others (Martin et al., 2003). A positive relationship regarding aggressive humor can mean that people using status-building strategies through aggressive domination can form long-term relationships. In fact, partners' Dark

Triad traits (i.e., psychopathy, narcissism, Machiavellianism) scores are positively correlated (Kardum et al., 2017) and our result may relate to the manifestation of Dark Triad traits in everyday joking behavior. Both aggressive and self-defeating humor styles among couples may serve as indirect ways of managing conflict (Campbell et al., 2008).

Prior research showed that humor production and humor appreciation correlated positively with relationship satisfaction (Hall, 2017). Our study also showed that more dyadic adjustment is more common among people who laugh more at their partners' jokes, whose partners more often notice these laughs, and who evaluate the quality of their partners' jokes as better. Moreover, higher dyadic adjustment is more common among men whose partners evaluate the quality of their own jokes as worse but the quality of their partners as better. Perhaps, in pairs, laughing is a reward that signals relationship satisfaction to partners (Wood et al., 2017). In this context, it is interesting that in long-term relationships, laughter seems to perform the same function regardless of the sex of the partners, while at the stage of relationship formation, this function seems to occur mainly in women (Bressler et al., 2006; Wilbur & Campbell, 2011). Our results also suggest that in long-term relationships, members of each sex appreciate the quality of their partner's jokes as an aspect of dyadic adjustment. These results may reflect similarities between long-term partners in their worldviews (Flamson & Barrett, 2008). On the other hand, results suggest that men may feel more dyadically adjusted in relationships with women who underrate their own jokes but overrate their partner's jokes.

Factors related to humor styles similarly affect men's and women's dyadic adjustment. Greater dyadic adjustment coexists with more friendly and more self-enhancing humor and less self-defeating humor. These results are in line with previous studies, where men's and women's positive humor was related to their own and their partners' higher feelings of intimacy (Horn et al., 2019). Moreover, lower dyadic adjustment coexists with either actor's or partner's aggressive humor style.

4.3. Limitations and conclusions

Our study had a few limitations worth mentioning. One of them is that we had no real control, other than honor code, that participants genuinely completed the surveys apart from their partner or that they even had their partner complete it at all. However, given the observedly modest sizes of the correlations, it seems unlikely either of these served as a major source of error. Another limitation concerns the scale of dyadic adjustment. Although the Spanier scale is a commonly used tool (e.g., South et al., 2009), there are doubts about the different ways of scoring the different items (Kurzeja, 2018). In future research, a shorter and less contested tool could be used to measure the perceived quality of relationships. From a different perspective, the obtained internal consistency in the current procedure was satisfactory. Limitations concerns

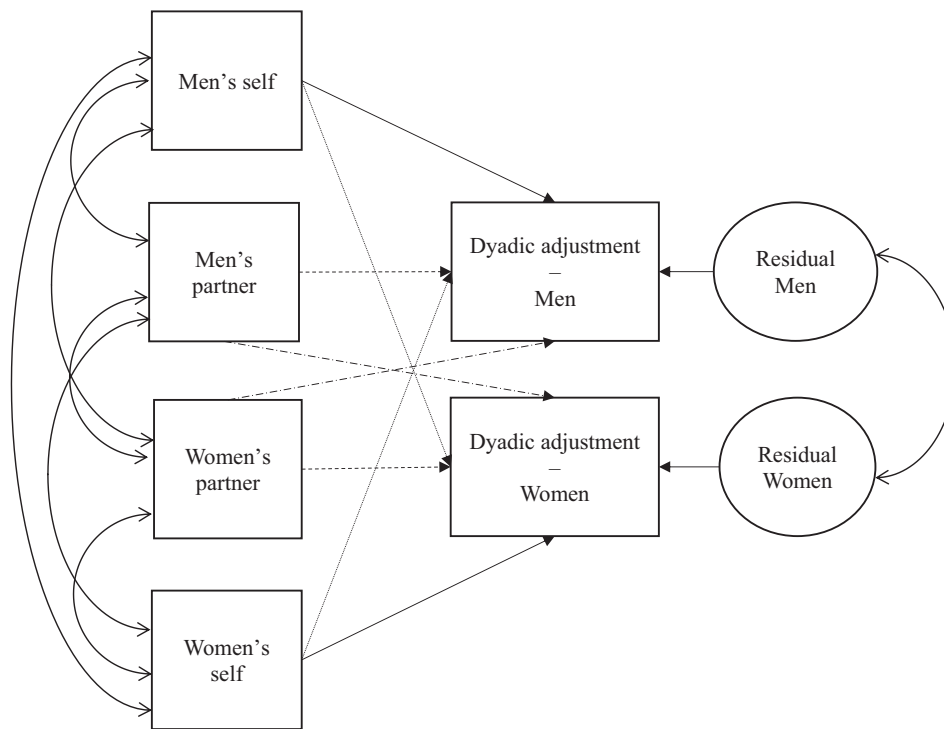


Fig. 4. Action-Partner Interdependence Model schema for relationships between (1) frequency of joking, (2) frequency of laughing, and (3) jokes quality and dyadic adjustment

Note. Regression effects marked with the same one-way arrows were treated as equal in the tested parsimonious models.

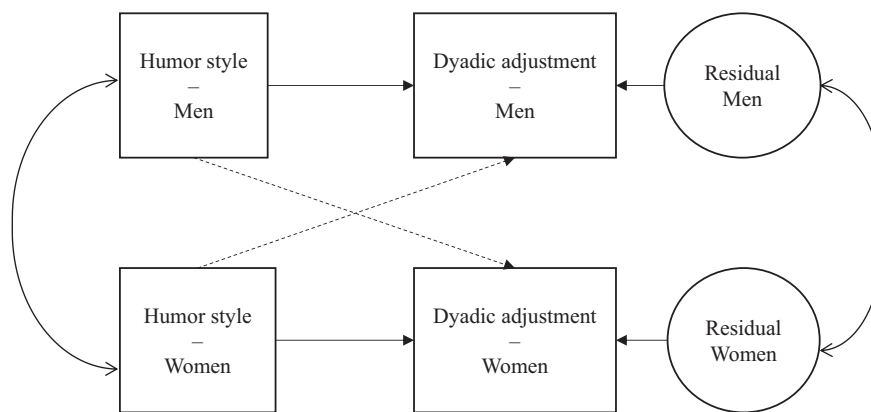


Fig. 5. Action-Partner Interdependence Model schema for relationships between humor styles and dyadic adjustment

Note. Regression effects marked with the same one-way arrows were treated as equal in the tested parsimonious models.

also the scales used to measure humor styles, because the primary source of their variance may be highly affected by non-humorous, contexts (Ruch & Heintz, 2017). Moreover, four scales may not cover all types of humor existing in everyday situations (Heintz, 2017). Another issue was our reliance on single-item metrics to measure aspects related to joking and humor. Although single-item scales give results comparable to multi-item scales (Verster et al., 2021), longer scales with established psychometric properties are worth considering in future research.

Despite these limitations, our study showed that among people who are in long-term relationships, joking and laughing have different dynamics and functions than at the courtship stage. Men produced more jokes than women, but the sexes did not differ in how often they responded to their partners' jokes. Men also rated their jokes as funnier than the jokes of their partners. Scores obtained by partners in aggressive and self-defeating humor styles correlated positively, but otherwise, there were no relationships between affiliative and self-enhancing

humor styles. In both sexes, various aspects related to humor affected dyadic adjustment. This result suggests that jokes, laughter, and humor are still part of the mechanisms involved in building relationships between partners in long-term relationships.

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CRediT authorship contribution statement

Łukasz Jach: Conceptualization, Methodology, Formal analysis, Data curation, Project administration, Resources, Software, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing. **Dominika Kubicus:** Conceptualization, Methodology,

Table 2
Results of APIM analyses predicting dyadic adjustment.

Predictor	$R^2_{M/W}$	Actor					Partner				
		$b_{M/W}$	95 % C.I.	SE	z	$\beta_{M/W}$	$b_{M/W}$	95 % C.I.	SE	z	$\beta_{M/W}$
Frequency of joking – self	0.16/ 0.15	1.74	[−0.88, 3.93]	1.22	1.42	0.12/ 0.13	2.14	[−0.37, 4.36]	1.19	1.79	0.16/ 0.15
Frequency of joking – partner		1.75	[−0.11, 4.05]	1.06	1.65	0.16/ 0.13	1.18	[−0.75, 3.68]	1.14	1.03	0.08/ 0.11
Frequency of laughing – self	0.27/ 0.30	2.96	[1.04, 5.18]	1.08	2.74**	0.26/ 0.23	1.48	[−0.37, 3.82]	1.07	1.38	0.11/ 0.14
Frequency of laughing – partner		1.64	[−0.37, 3.82]	0.92	1.79	0.15/ 0.13	2.02	[0.16, 3.65]	0.89	2.28*	0.15/ 0.20
Quality of jokes – self	0.24/ 0.28	0.67/ −1.27	[−1.20, 2.51]/ [−3.12, 1.54]	0.95/ 1.18	0.70/−1.08	0.06/ −0.11	−2.93/ 0.83	[−4.68, −0.43]/ [−1.34, 2.71]	1.06/ 1.02	−2.76**/ 0.81	−0.25/ 0.07
Quality of jokes – partner		4.18/ 6.03	[1.91, 6.59]/ [3.53, 7.90]	1.19/ 1.08	3.51***/ 5.56***	0.35/ 0.48	4.17/ 1.82	[1.86, 6.06]/ [−0.38, 4.37]	1.04/ 1.20	4.01***/ 1.52	0.32/ 0.16
Affiliative humor	0.04/ 0.05	0.72	[0.24, 1.21]	0.25	2.88**	0.17/ 0.19	0.46	[−0.01, 0.94]	0.24	1.90	0.12/ 0.11
Self-enhancing humor	0.04/ 0.04	0.40	[0.15, 0.67]	0.13	3.08**	0.17/17	0.16	[−0.08, 0.40]	0.12	1.28	0.06/ 0.07
Aggressive humor	0.10/ 0.10	−0.49	[−0.75, −0.24]	0.13	−3.69***	−0.22/ −0.20	−0.40	[−0.63, −0.15]	0.12	−3.35***	−0.17/ −0.19
Self-defeating humor	0.03/ 0.03	−0.28	[−0.51, −0.06]	0.12	−2.42*	−0.13/ −0.13	−0.19	[−0.42, 0.05]	0.12	−1.57	−0.08/ −0.09

Note. M = men; W = women.

* $p < .050$.

** $p < .010$.

*** $p < .001$.

Investigation, Data curation, Project administration, Resources, Writing – original draft. **Peter K. Jonason**: Methodology, Formal analysis, Resources, Software, Validation, Visualization, Writing – original draft, Writing – review & editing.

Data availability

The data and syntaxes are included in [Appendix A](#).

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.paid.2022.111859>.

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