Contents lists available at ScienceDirect

Personality and Individual Differences

journal homepage: www.elsevier.com/locate/paid

Totality model of neuroticism: The sum of spousal neuroticism and marital satisfaction

Jeong Eun Cheon, Hyewon Yang, Inhan Kang, Young-Hoon Kim *

Department of Psychology, Yonsei University, South Korea

ARTICLE INFO

Keywords:
Neuroticism
Satisfaction
Marriage
Totality
Similarity
Synergistic

ABSTRACT

Drawing on studies that have highlighted the adverse effect of neuroticism on marital satisfaction, the present study proposes a totality model of couple neuroticism: the greater the sum of spousal levels of neuroticism, the worse the marital satisfaction. Moreover, in testing the totality model of neuroticism, this study conducts a comparative analysis between the totality model and alternative models, including actor–partner, similarity, and synergistic models, to assess the efficacy of the totality model in capturing marital satisfaction within marital dyads. In two distinct studies, conducted with participants from South Korea ($n_{study1} = 204$ marital dyads, $n_{study2} = 251$ marital dyads), data were collected via online surveys that included assessments of neuroticism and marital satisfaction. The findings reveal a robust negative association between the cumulative neuroticism scores of both spouses and marital satisfaction. Importantly, the findings of the present study suggest that the totality model offers a more parsimonious yet equally effective method for predicting marital satisfaction compared with more complex models. In summary, this study underscores the significance of considering the combined neuroticism levels of both spouses as a pivotal indicator of marital dissatisfaction.

1. Introduction

John, who scores six on a seven-point neuroticism scale, lives with his wife, Jenny, whose neuroticism score is three. Donald, whose neuroticism score is three, has a wife, Dianna, whose neuroticism score is six. Who will have a more satisfying marriage, John or Donald? Scholars who focus on the negative effect of one's own neuroticism on marital satisfaction (i.e., the actor effect [A]; Kelly & Conley, 1987; McNulty, 2008) would expect Donald to fare better because he has lower levels of neuroticism than John. Conversely, from a perspective that emphasizes one's partner's influence on one's satisfaction (i.e., the partner effect [P]; see Kenny & Ledermann, 2010), John may have a more satisfactory marriage because Jenny has a lower level of neuroticism than Dianna.

Though the actor and partner approaches seem reasonable, it is important to note that marriage works like a team sport, suggesting that the dyadic total score will matter more in marriage than each individual's separate score. Building on the empirical framework of the totality hypothesis (Vohs et al., 2011), the present study proposes a totality model of couple neuroticism: the greater the sum of neuroticism in a couple, the worse the marital satisfaction will be. That is, the sum of the actor and partner effects (A + P) should serve as a parsimonious and effective gauge of marital satisfaction. In this regard, both John and Donald (whose total dyadic neuroticism scores are nine) are likely to have similarly tolerable, though not particularly satisfactory, marriages.

1.1. The totality model of couple neuroticism

Neuroticism, characterized by a frequent and intense experience of negative emotions, has been widely demonstrated to yield negative marital outcomes (Kelly & Conley, 1987; Malouff et al., 2010). However, although past research has delineated the negative effects of actor (A) and partner (P) neuroticism (e.g., Fisher & McNulty, 2008), it remains ambiguous as to what effect the *couple's* combined level of neuroticism will have on the two partners. Here, we propose that the sum of both partners' neuroticism (A + P) is negatively associated with the marital satisfaction of both spouses, and that the consideration of the totality model offers a concise yet robust prediction of marital satisfaction.

There are reasons to believe that higher total neuroticism within a couple will lead to reduced marital satisfaction. First, because those with

* Corresponding author at: Department of Psychology, Yonsei University, #209 Yu Eok-gyeom Memorial Hall, 50 Yonsei-ro, Seodaemum-gu, Seoul 120-749, South Korea.
E-mail address: younghoonkim@yonsei.ac.kr (Y.-H. Kim).

https://doi.org/10.1016/j.paid.2024.112726
Received 19 September 2023; Received in revised form 18 April 2024; Accepted 16 May 2024

higher neuroticism have a greater likelihood of displaying negative behaviors and having negative perceptions (McNulty, 2008), greater neuroticism in a couple should lead to a need to cope with more frequent negative behaviors and perceptions. For example, neuroticism is associated with greater interpersonal conflict (Buss et al., 1987). Moreover, individuals with high levels of neuroticism tend to engage less in agreeable behaviors and more in quarrelsome ones (Côté & Moskowitz, 1998). Hence, when John and Dianna, both of whom have high neuroticism scores, come together, their neurotic dynamics are likely to lead to more frequent conflicts and less agreeable behavior, both of which are associated with reduced marital satisfaction. However, if at least one member of the couple has relatively low levels of neuroticism (e.g., if John were to meet Jenny whose neuroticism score is relatively lower than Dianna's), the marriage may fare better as lower net neuroticism in the dyad can lead to fewer conflicts.

Furthermore, neuroticism is detrimental to the marital satisfaction of not only the self but also the spouse (Luo et al., 2008). The existence of effects from both actor and partner neuroticism points to the possibility that their combination may well lead to greater challenges in the marriage. According to the interdependence theory (Kelley et al., 2003; Thibaut & Kelley, 1959), a relationship is often influenced by the joint effect of the actor and partner in addition to the distinct effect exerted by each. Accordingly, the combination of the actor and partner effects should be taken into account when examining relationship outcomes (Wickham & Knee, 2012). The present study suggests that the sum score of the dyad's levels of neuroticism provides a simple yet powerful gauge of the joint effect of the spouses' personalities on their marital dynamics.

1.2. Alternative dyadic models of neuroticism

Several alternative dyadic models have been proposed in an attempt to account for the interactive power a couple exerts in marriage. The first is a similarity model. Studies in social psychology have widely acknowledged similarity as a prominent factor in interpersonal attraction and liking (see Berscheid & Hatfield, 1969). People often like (Byrne & Nelson, 1964) and marry (see Buss, 1985; McCrae et al., 2008) those who are similar to themselves. However, notwithstanding the central role of similarity in liking and attraction, there is little evidence that similarity in neuroticism affects marital functioning, with most studies indicating a nonsignificant relationship between similarity in personality, or more specifically, in neuroticism, and marital satisfaction (Gattis et al., 2004; Malouff et al., 2010). Understandably, although spouses who are similarly high in neuroticism may validate each other's negative emotionality, they may also face more frequent negative events in their marital lives due to their increased sensitivity to negative emotions. Hence, with its capability to influence marital satisfaction both positively and negatively, neuroticism similarity per se is unlikely to provide a precise estimation of marital satisfaction.

The second is a synergistic model. In the synergistic model, or the multiplication model (i.e., considering A*P effects), the actor's personality interacts with their partner's personality to either improve or worsen marital well-being. The synergistic model is grounded in the interactionist perspective (Kantor, 1924; Ekehammar, 1974), which underscores the significance of the external stimulus conditions surrounding an individual. The interactionist perspective posits that an individual's personality traits may become more pronounced or manifest differently in specific contexts. In romantic relationships, a partner's personality can be considered a contextual factor, interacting with the individual's traits to either enhance or mitigate their expression and impact. However, despite the insights offered by the interactionist perspective, empirical support for the synergistic model concerning neuroticism has been equivocal. For instance, Robins et al. (2000) discovered no evidence of synergistic effects from any personality variable they studied, including neuroticism, and concluded that couples' personalities may not synergistically combine to exert a greater impact than each one considered separately. Similarly, studies examining unacquainted dyads, as demonstrated by Cuperman and Ickes (2009), revealed a lack of evidence for the synergistic effect of neuroticism. These findings imply that the combined influence of actor and partner neuroticism may not exceed the aggregate of their individual effects in a synergistic manner.

The totality model, in contrast to the dyadic models previously discussed, precisely takes into account the sum score of a dyad's personalities. It does not operate on the premise that an individual's personality relies on their partner's personality to generate a synergistic effect. Rather, the two partners' contributions are combined to estimate dyadic functioning. For instance, if John loses six points and Jenny loses three points in a game, the dyadic outcome is impacted by a total of minus nine points, and this is exactly what the totality model takes into account; the dyad's separate scores are simultaneously considered to predict the dyadic outcome.

Essentially, the totality model represents a significant conceptual shift in the study of dyadic relationships, particularly in how it conceptualizes the dynamics of personalities within a couple. Unlike traditional models that treat partners as separate entities, the totality model considers the couple as a single, unified entity. This approach is in line with contemporary research that focuses on the couple as the primary unit of analysis rather than an individual (Cruwys et al., 2023; Wang et al., 2023). For instance, research on the concept of "we-ness" suggests that a shared identity within a couple can be predictive of positive relationship outcomes (Cruwys et al., 2023). This emerging body of research highlights the potential of viewing relationship dynamics through a lens focusing on the couple as an integrated unit rather than as two individuals.

However, it is important to note that while the concept of a couple's shared sense of identity has received some attention, the impact of a couple's combined personality on relationship satisfaction remains underexplored. Traditionally, the focus has been on examining the individual contributions of each partner's personality. For instance, many studies independently investigate actor and partner effects of personality (e.g., Dyrenforth et al., 2010; Luo et al., 2008; Robins et al., 2000; Wang et al., 2018), assigning them different weights, as is often seen in research using the actor–partner interdependence model (APIM; Kashy & Kenny, 2000; Kenny & Ledermann, 2010). This approach potentially stems from a belief in the independent contributions of each individual's personality to relationship satisfaction (Robins et al., 2000), leading to distinct theoretical and statistical analyses from those of the totality model.

To clarify this distinction, the difference between the APIM in its original form and the totality model can clearly be seen in taking into account their respective mathematical formulations. The original APIM is represented by a specific equation that accounts for the separate contributions of each partner. In contrast, the totality model's equation reflects the combined influence of both partners' personalities as a single unit. First, the APIM, in its most basic form, takes the following equation.

$$Y = \beta_0 + \beta_1(actor) + \beta_2(parter) + e \tag{1}$$

Here, β_0 represents the intercept, β_1 signifies the slope of the actor effect, β_2 represents the slope of the partner effect, and e accounts for the error term. Conversely, the totality model takes a more simplified form with a constraint $\beta_1 = \beta_2$, as represented below:

$$\begin{aligned} Y &= \beta_0 + \beta_1(actor) + \beta_1(partner) + e \\ &= \beta_0 + \beta_1(actor + partner) + e \\ &= \beta_0 + \beta_1(totality) + e \end{aligned} \tag{2}$$

It is important to note that when considering the interdependence between dyads, the model introduces additional parameters (e.g., random intercepts among dyads). However, for the sake of simplicity in comparison, we have outlined the basic equations that illustrate how the

totality model and the basic APIM may differ. When comparing the most fundamental forms of these equations, it becomes evident that the totality model operates under a different premise (i.e., treating the couple's combined personality scores as a single entity) and is mathematically more parsimonious. Because the sum of the actor and partner effects equals totality, the totality model can be seen as nested under the APIM. If a simpler model can predict satisfaction levels effectively within dyads compared with a more complex model, then it underscores the practicality and efficiency of the simpler model (herein the totality model), making it a valuable tool for both researchers and those seeking to understand and navigate interpersonal dynamics more intuitively. The simplicity of the totality model empowers both researchers and nonspecialists to make concise yet highly effective predictions by aggregating the dyadic scores. Therefore, the totality model's strength lies not only in its theoretical innovation of treating dyadic rather than individual personalities but also in its practicality. It offers a straightforward and efficient method for understanding and predicting dyadic satisfaction.

However, despite its relevance, it is worth noting that the totality model has not, to date, received extensive attention in the literature. Only a handful of empirical studies have focused on its application, primarily within the context of self-control (e.g., Robinson & Cameron, 2012; Vohs et al., 2011). Notably, while Vohs et al. (2011) suggested that the summation of certain characteristics may be indicative of relationship challenges, no empirical studies have investigated this effect. Furthermore, the absence of studies conducting direct comparisons between the totality model and alternative models such as the APIM further underscores a significant gap in the literature. This lack of comparative analysis leaves the practical utility and effectiveness of the totality model largely unverified.

Our study seeks to fill this gap by testing the totality model empirically in the context of neuroticism and its impact on marital satisfaction. We aim to provide valuable insights into its validity and generalizability. By comparing and contrasting the totality model with other prominent models, including the APIM, the similarity model, and the synergistic model, we seek to address its unique advantages and potential contributions to the field of dyadic research.

2. Overview of the present study

The present study tests for a totality model of neuroticism in marriage: the greater the sum of actor and partner effects of neuroticism, the worse the marital relationship will be. To assess the robustness of this totality model, we aim to conduct comparison with other established models, namely, the actor and partner model, the similarity model, and the synergistic model.

Our initial hypothesis posits that the similarity and synergistic models of neuroticism may struggle to effectively capture the levels of relationship satisfaction within dyads. Conversely, we anticipate that both the totality and the actor–partner effects will be significantly linked to relationship satisfaction. However, we expect the totality model to outperform the actor–partner model by offering a more parsimonious yet equally substantial explanation for variations in relationship satisfaction.

To examine these hypotheses, we conducted an online survey involving marital dyads in two distinct studies. In Study 1, a total of 204 dyads shared their neuroticism profiles and corresponding relationship satisfaction levels. These data were analyzed using the four models in question (totality, actor–partner, similarity, synergistic). In Study 2, we expanded our investigation with a cohort of 251 dyads. In Study 2 , the participants were asked to report their own levels of neuroticism and provide their perceptions of their partner's neuroticism. This approach enabled us to examine the totality model through two distinct lenses: (a) the summation of each partner's self-reported neuroticism (dyad report) and (b) the summation of a participant's self-reported neuroticism with their perceived assessment of their partner's neuroticism (perception ratings). Whether the use of distinct response measures for personality traits can be extended to provide empirical support for the totality model is to be examined.

3. Study 1

3.1. Method

3.1.1. Participants and procedure

We conducted our study with a sample of 204 heterosexual married couples from South Korea, recruited through an online panel service in the region. The average age of the wives was 33.39 years, while the husbands had an average age of 35.77 years. This research was part of a more extensive project that focused on understanding various aspects of marital dynamics, which included an empirical investigation into outward characteristics, such as hair and attractiveness, and their potential influence on couples' sex lives. For the specific study at hand, participants were asked to complete assessments related to neuroticism and marital satisfaction. The survey was administered online.

3.1.2. Measures

3.1.2.1. Neuroticism. Neuroticism was assessed using a 10-item measure adopted from the International Personality Item Pool (IPIP) Big Five Factor Markers (Goldberg, 1999; Goldberg et al., 2006). Sample items included statements such as "I get stressed out easily," "I worry about things," and "I often feel blue." Participants rated their agreement with these items on a seven-point Likert-type scale, with responses ranging from 1 (strongly disagree) to 7 (strongly agree). The internal consistency of this measure was high, with Cronbach's α coefficients of 0.92 for both spouses. The scores ranged from 1.00 to 6.80 for husbands and from 1.70 to 7.00 for wives, with mean scores of 3.54 ($SD = 1.11$) and 4.66 ($SD = 1.11$) for husbands and wives, respectively.

3.1.2.2. Marital satisfaction. Participants completed Norton's (1983) Quality of Marriage Index (QMI). The QMI contains six items, such as "We have a good marriage" and "My relationship with my partner makes me happy." Participants provided their responses on a seven-point Likert-type scale, with options ranging from 1 (strongly disagree) to 7 (strongly agree). The QMI demonstrated excellent internal consistency, with Cronbach's α coefficients of 0.96 and 0.95 for wives and husbands, respectively. The scores ranged from 1.00 to 7.00 for both husbands and wives, with mean scores of 5.99 ($SD = 0.91$) for husbands and 5.78 ($SD = 1.11$) for wives.

3.2. Analysis

In our analysis, we employed the APIM within the path analysis framework. Specifically, when estimating the APIM, wherein the neuroticism scores of husbands and wives were considered as exogenous variables and marital satisfaction for both spouses served as endogenous variables, we accounted for the dyadic nature of the data by estimating residual covariances between the marital satisfaction of husbands and wives.

The APIM model without any constraint was first estimated, and we subsequently assessed whether constraining paths to be equal between wives and husbands would not worsen the model fit. All dyads were distinguishable by gender, and tests of distinguishability for all models yielded significant results, indicating that members could be statistically distinguished by gender. Consequently, all dyads were treated as distinguishable in our analysis.

Because the totality model is nested under the APIM, we imposed equal loading constraints on the actor and partner paths when estimating the totality effect. Subsequently, using the chi-squared difference test, we compared the APIM and the totality model. A nonsignificant chi-

square value indicates that the APIM model, which separately estimates actor and partner coefficients, does not perform better than the totality model, which assigns equal weight to the actor and partner effects. Furthermore, given the possibility that the totality effect may not be strictly linear, we conducted additional explorations to investigate potential curvilinear associations between the sum of couple neuroticism and marital satisfaction.

Subsequently, we examined the presence of similarity and synergistic effects. To compute a similarity score, we calculated the absolute difference between the reports of neuroticism provided by wives and husbands (i.e., the similarity effect; |A – P|). We used the absolute difference score because we were interested in measuring trait-level (i.e., neuroticism) similarity rather than overall similarity, and the absolute difference score captures the degree of (dis)similarity in a given domain (Luo & Klohnen, 2005). The synergistic or interaction score was computed by grand mean centering and multiplying the neuroticism scores of husbands and wives (i.e., synergistic effect, A*P). When estimating the similarity and synergistic models, we implemented controls for both actors and partners. This step was taken to mitigate the risk of any potential overestimation of the effects in these models. Kenny et al. (2006) recommended such a control, emphasizing that neglecting to account for the components comprising the scores could result in inflated estimations.

Finally, for a deeper understanding of dyadic neuroticism dynamics, we conducted polynomial regression analysis and dyadic response surface analysis (DRSA; e.g., Humberg et al., 2019; Schönbrodt et al., 2018). This approach allowed us to explore intricate patterns through which dyadic models capture marital satisfaction. The DRSA involves the line of congruence (LOC) and the line of incongruence (LOIC), enabling us to test various dyadic patterns. Specifically, the LOC signifies the diagonal where the neuroticism levels of dyads are precisely congruent, while the LOIC represents the diagonal where the neuroticism levels of dyads are exactly incongruent. Within this framework, the coefficients a_1 and a_2 reflect the linear and quadratic effects along the LOC, respectively. Conversely, a_3 and a_4 represent the linear and curvilinear effects along the LOIC, respectively. The examination of these four coefficients provides valuable insight into the nuanced relationships between neuroticism and marital satisfaction, shedding light on the different ways that dyadic patterns correlate with overall marital satisfaction. If the totality model is to be supported, the a_1 coefficient, which represents the combined influence of spousal neuroticism, should be significant where actor and partner coefficients are constrained to equality. That is, under this constraint, a significant negative a_1 coefficient would indicate that an equal combination of wife–husband neuroticism scores correlates with lower marital satisfaction. For the similarity effect to be supported, the a_4 coefficient should be negative and significant (indicating that a match is better than a mismatch), with the ridge of the surface equaling the LOC. Finally, for the synergistic model to be supported, such that the cross-over interaction effect is present, a_1 and a_3 should equal 0, while $a_2 > 0$ and $a_4 < 0$ (Schönbrodt et al., 2018). However, it is important to note here that the application of equality constraints to actor and partner effects, which is a necessary condition for the totality model, inherently sets to zero the a_3 coefficient (which indicates the difference between actor and partner effects). Thus, the interpretation of the a_3 coefficient was not a focal point of interest for our study where the totality model, which is characterized by equal actor and partner coefficients, was supported. The analyses were conducted using the lavaan (Rosseel, 2012) and RSA (Schönbrodt & Humberg, 2023) packages in R. When plotting the RSA graph, the estimates were standardized beforehand.

We assessed the fit of all models using several commonly employed fit indices, including the Comparative Fit Index (CFI), Tucker–Lewis Index (TLI), Root Mean Square Error of Approximation (RMSEA), and Standardized Root Mean Squared Residual (SRMR). Following the recommendations outlined by Hu and Bentler (1999) and Kline (2011), the model was considered to fit the data well when CFI and TLI > 0.95, RMSEA <0.06, and SRMR <0.08. The model was deemed adequate if CFI and TLI > 0.90, RMSEA <0.08, and SRMR <0.10. All analysis scripts and results can be found at https://osf.io/drq35/?view_only=bb1b8b789787431aa9f97f64f33524dd.

3.3. Results

3.3.1. Path analysis

For all models, there was no gender difference in path coefficients, as constraining the paths to be equal between wives and husbands did not worsen the model fit (APIM: $\Delta\chi^2(2) = 2.81$, $p = .246$; totality: $\Delta\chi^2(1) = 2.55$, $p = .111$; similarity: $\Delta\chi^2(3) = 3.73$, $p = .293$; synergistic: $\Delta\chi^2(3) = 3.27$, $p = .352$). Hence, we report results with the path equality constraint across genders. Table 1 exhibits the model fit for each tested model.

First, the APIM results revealed significant actor and partner effects of neuroticism on marital satisfaction (see Table 2), consistent with previous findings. More importantly, introducing a further constraint to equate actor and partner coefficients (i.e., the totality model) and comparing it with the constrained APIM, the chi-square difference test indicated no significant difference ($\Delta\chi^2(1) = 2.33$, $p = .127$), supporting the totality model. Note that adding this equality constraint on actor and partner effects resulted in a single parameter estimate identical for both husbands and wives (Table 2). Removing outliers and analyzing only those within 1.5 times the interquartile range did not change the pattern of findings. Table 3 summarizes the results from the model comparisons. For additional reference, Akaike's information criterion (AIC; Akaike, 1974) and the Bayesian information criterion (BIC; Schwarz, 1978) values are also included in the table.

On further exploring the potential curvilinear association between the sum of dyadic neuroticism and marital satisfaction, the curvilinear effect was found to be nonsignificant ($b = 0.02$, $SE = 0.02$, $z = 1.04$, $p = .300$). Additionally, adding a quadratic term to the model did not improve its fit ($\Delta\chi^2(1) = 1.07$, $p = .301$).

Next, we assessed whether the similarity and synergistic models could explain variance in marital satisfaction beyond what is accounted for by the actor–partner or the totality model. First, to examine the similarity model, we included the absolute difference term in the original APIM model. The results revealed a nonsignificant effect of similarity. When we entered the synergistic effect into the model, the synergistic effect was also nonsignificant. Table 2 summarizes the results of the findings.

3.3.2. DRSA

We then conducted polynomial regression analysis and DRSA. We first centered predictor variables on the grand mean across genders and calculated higher-order terms based on these centered predictors. Specifically, the quadratic terms of the wife's and husband's neuroticism as well as their interactions were included in the model. Then, we ran a full model without imposing any equality constraints, and then subsequently applied equality constraints to the actor and partner effects to assess whether these effects significantly differed between genders. The chi-squared difference test ($\Delta\chi^2$) revealed no significant difference between the full model (without equality constraints) and the constrained model (with equality constraints) ($\Delta\chi^2(5) = 2.62$, $p = .758$). Consequently, we retained the constrained model, indicating that the actor and partner effects of neuroticism on relationship satisfaction were

Table 1
Model fit summary of all models tested (Study 1).

Model	CFI	TLI	RMSEA	SRMR
APIM	0.995	0.984	0.044	0.023
Totality	0.986	0.973	0.059	0.028
Similarity	0.998	0.992	0.034	0.018
Synergistic	0.999	0.996	0.021	0.020

Table 2
Summary of Study 1 results.

Model			*b*	*SE*	*z*	*p*
1	APIM	Actor	−0.17	0.04	−4.08	<0.001
		Partner	−0.12	0.04	−2.86	0.004
2	Totality	Totality	−0.15	0.04	−3.77	<0.001
3	Similarity	Actor	−0.17	0.04	−4.05	<0.001
		Partner	−0.12	0.04	−2.87	0.004
		Similarity	−0.01	0.06	−0.22	0.828
4	Synergistic	Actor	−0.17	0.04	−4.07	<0.001
		Partner	−0.12	0.04	−2.81	0.005
		Synergistic	0.00	0.04	0.10	0.923

Table 3
Summary of model comparison: APIM vs. totality model (Study 1).

	APIM	Totality
AIC	2266.2	2266.5
BIC	2306	2303
χ^2 Difference Test	$\Delta\chi^2 = 2.33$, $\Delta df = 1$, $p = .127$	

Note. The table provides a summary and comparison of the APIM and the totality model, with an equality constraint applied across genders.

comparable across genders. Following this, we imposed additional constraints to equate the actor and partner paths, which did not impair the model fit ($\Delta\chi^2(1) = 1.78$, $p = .182$). The final, constrained model had an excellent fit to the data (RMSEA = 0.000, CFI = 1.000, TLI = 1.014, SRMR = 0.020).

A bootstrap analysis with 5000 resamples were conducted to estimate the stability of the model parameters. Table 4 displays the polynomial and response surface slope coefficients. As indicated in the table, the actor and partner effects with an equal loading constraint (b_1 and b_2 = −0.14, p = .003) were significant, indicating a negative association with marital satisfaction. Further examination of the overall dyadic pattern using response surface coefficients revealed that the only significant response surface coefficient was a_1, indicating an additive effect of husbands' and wives' neuroticism ($a_1 = b_1 + b_2$) on marital satisfaction with equal actor and partner loading ($b_1 = b_2$). No evidence for similarity or synergistic effect was found. Refer to Fig. 1 for a visual representation of the DRSA plot.

3.4. Discussion

In line with our hypothesis, both actor and partner effects were found to be associated with marital satisfaction. However, it was the totality model that emerged as a more concise yet effective measure of marital satisfaction. Additionally, when examining alternative dyadic models, such as the similarity and synergistic models, it was found that they did not offer predictive value beyond the contributions of the actor and partner effect or the totality effect. This conclusion was further supported by polynomial and DRSA analyses, which revealed no compelling evidence for similarity or synergistic effects. Ultimately, marital satisfaction was best accounted for by considering the cumulative effects of neuroticism in couples. These findings underscore the importance of taking the additive level of neuroticism into consideration when evaluating marital satisfaction.

Table 4
Polynomial and response surface slope coefficients (Study 1).

	b	*SE*	*p*	95 % CI
Response surface slopes				
a_1	−0.29	0.10	0.004	[−0.49, −0.11]
a_2	0.10	0.08	0.235	[−0.08, 0.25]
a_3	0.00	–	–	–
a_4	0.06	0.04	0.148	[−0.03, 0.15]
Polynomial coefficients				
b_1	−0.14	0.05	0.003	[−0.25, −0.05]
b_2	−0.14	0.05	0.003	[−0.25, −0.05]
b_3	0.03	0.03	0.293	[−0.03, 0.08]
b_4	0.02	0.04	0.687	[−0.07, 0.0.10]
b_5	0.05	0.03	0.052	[−0.00, 0.11]

Note. b_1 = actor, b_2 = partner, b_3 = actor squared, b_4 = interaction, b_5 = partner squared.

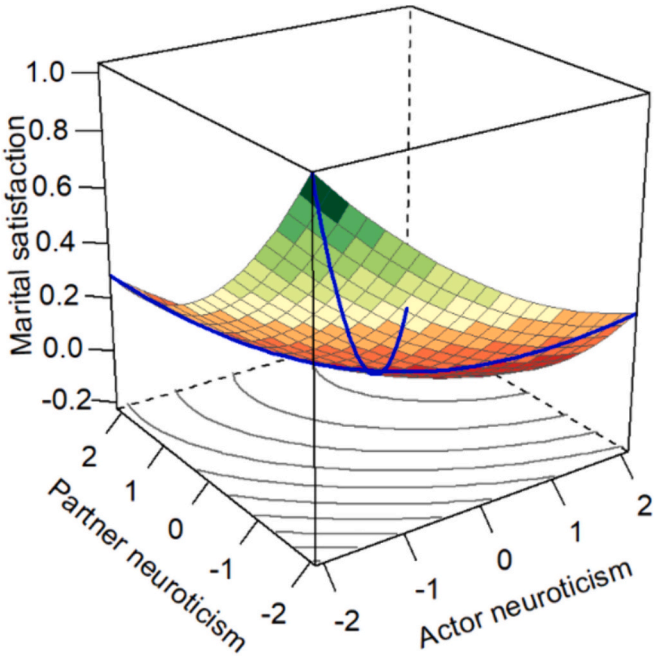

Fig. 1.. DRSA plot (Study 1).

4. Study 2

In Study 2, we aimed to further extend the findings of Study 1 by collecting both the self-reported neuroticism level of the self and perceived spouse's level of neuroticism. By employing two sources of reports, our objective was to examine whether the totality model, determined by one member of the dyad (i.e., the summation of neuroticism levels reported by one individual for both themselves and their partner), yielded similar predictive power as the model based on each spouse's report of their level of neuroticism.

4.1. Methods

4.1.1. Participants and procedure

We recruited a total of 251 heterosexual marital dyads, comprising 502 individuals, from South Korea using the online survey panel managed by dataSpring Korea. The participant composition comprised 54 % females and 46 % males, with an average age of 42.09 years. This study was conducted as part of a broader research project investigating personality, social networks, and marriage. For this study, participants completed assessments related to neuroticism and marital quality. The remaining measures collected as part of the larger project were unrelated to the current study.

4.1.2. Measures

4.1.2.1. Neuroticism. Participants answered the 20-item mini–IPIP developed by Donnellan et al. (2006). For neuroticism, participants rated the extent to which the following four items described themselves and their spouse: 1) have frequent mood swings, 2) am relaxed most of the time, 3) get upset easily, and 4) seldom feel blue. The second and

fourth items were reverse-coded. The items were averaged so that high scores indicate a high level of neuroticism. The Cronbach's α for self-reported neuroticism was 0.69 for wives and 0.68 for husbands. For perceived spouse's neuroticism, Cronbach's α was 0.69 for wives and 0.75 for husbands. The self-reported neuroticism scores ranged from 1.00 to 6.50 for husbands, with a mean score of 3.56 (SD = 1.00), and from 1.50 to 6.50 for wives, with a mean of 4.17 (SD = 1.03). Wife-perceived husband neuroticism scores ranged from 1.00 to 6.25, with a mean of 3.50 (SD = 1.03) whereas husband-perceived wife neuroticism scores ranged from 1.75 to 7.00, with a mean of 4.06 (SD = 1.11).

4.1.2.2. Marital satisfaction. As in Study 1, participants completed the six-item QMI (Norton, 1983). The instrument showed excellent reliability (Cronbach's α = 0.96 for both wives and husbands). Husbands reported marital satisfaction ranged from 1.17 to 7.00, with a mean of 5.58 (SD = 1.17). Wives reported marital satisfaction ranged from 1.00 to 7.00, with a mean of 5.25 (SD = 1.37).

4.2. Analysis

As in Study 1, we initially used the self-reported neuroticism scores from each member of the dyad to estimate the four proposed models: totality, actor–partner, similarity, and synergistic. However, in Study 2, we expanded our approach by incorporating measures of the perceived spouse's neuroticism. This approach involved using neuroticism scores as perceived by wives to estimate the effects of their own neuroticism (wife-perceived self-neuroticism) and their husband's neuroticism (wife-perceived husband neuroticism). Similarly, we used the neuroticism scores perceived by husbands to estimate the effects of their own neuroticism (husband-perceived self-neuroticism) and their wife's neuroticism (husband-perceived wife neuroticism). By employing diverse perspectives (i.e., dyad report, wife perception ratings, and husband perception ratings), we aimed to conduct a more comprehensive evaluation of the four models. As in Study 1, we conducted both path analysis and polynomial regression to estimate the four models in question. Because the test of distinguishability confirmed that gender is a distinguishable factor in our study, we proceeded with a distinguishable model. When plotting the RSA plot, the estimates were standardized. All analysis scripts and results can be found at https://osf.io/drq35/?view_only=bb1b8b789787431aa9f97f64f33524dd.

4.3. Results

4.3.1. Path analysis

First, we report the analysis using dyad reports of each self-reported neuroticism level. Considering that there was no significant gender difference in path coefficients (APIM: $\Delta\chi^2(2) = 4.02$, $p = .134$; totality: $\Delta\chi^2(1) = 2.16$, $p = .142$; similarity: $\Delta\chi^2(3) = 4.15$, $p = .246$; synergistic: $\Delta\chi^2(3) = 3.00$, $p = .392$), we present the results of the constrained model with an equality path constraint across genders. Table 5 exhibits the fit indices for all models. As indicated in Table 5, all models using the dyad report fitted the data well.

Table 6 presents a summary of the results using the dyad report. The results of the APIM indicated a negative actor and partner effect of neuroticism on marital satisfaction. However, when comparing the APIM with the totality model by imposing an equality constraint between actor and partner coefficients, the APIM did not demonstrate a better fit than the totality model ($\Delta\chi^2 = 0.28$, $\Delta df = 1$, $p = .595$). Thus, the more parsimonious totality model was supported. Excluding outliers and restricting the analysis to data points within 1.5 times the interquartile range did not alter the observed patterns of findings. Table 7 summarizes the results from the model comparisons.

Upon further exploration of the quadratic pattern in the totality model, the quadratic effect was significant ($b = -0.04$, $SE = 0.02$, $z = -1.97$, $p = .049$), indicating that the totality effect may not be strictly linear. Nonetheless, the addition of the quadratic term only marginally improved the fit of the data compared with the simple linear model ($\Delta\chi^2(1) = 3.83$, $p = .050$). Neither the similarity effect ($b = -0.03$, $SE = 0.08$, $z = -0.39$, $p = .700$) nor the synergistic effect ($b = -0.09$, $SE = 0.05$, $z = -1.69$, $p = .092$) was significant.

The same analysis was conducted using wife and husband perception ratings, with the results summarized in Tables 8 and 9, respectively. When estimating the APIM using wife perception ratings (i.e., wife self-reported neuroticism and wife-perceived husband neuroticism), a significant gender difference was found, leading us to estimate a saturated model with different coefficients for husbands and wives ($\Delta\chi^2(2) = 8.70$, $p = .013$). As shown in Table 8, there was a significant actor effect for

Table 5
Model fit summary of all models tested (Study 2).

Model	CFI	TLI	RMSEA	SRMR
Dyadic report				
APIM	0.991	0.974	0.063	0.031
Totality	0.994	0.989	0.042	0.032
Similarity	0.996	0.988	0.039	0.023
Synergistic	1.000	1.000	0.000	0.020
Wife report				
APIM	–	–	–	–
Totality	0.977	0.954	0.087	0.047
Similarity	0.988	0.961	0.073	0.029
Synergistic	0.986	0.954	0.071	0.031
Husband report				
APIM	1.000	1.009	0.000	0.020
Totality	1.000	1.010	0.000	0.020
Similarity	1.000	1.010	0.000	0.015
Synergistic	1.000	1.013	0.000	0.013

Table 6
Summary of models using the dyad report.

Model	Path	b	SE	z	p
APIM	Actor	−0.25	0.05	−5.10	<0.001
	Partner	−0.23	0.05	−4.67	<0.001
Totality	Totality	−0.24	0.04	−5.44	<0.001
Similarity	Actor	−0.25	0.05	−5.11	<0.001
	Partner	−0.23	0.05	−4.64	<0.001
	Similarity	−0.03	0.08	−0.39	0.700
Synergistic	Actor	−0.25	0.05	−5.13	<0.001
	Partner	−0.24	0.05	−4.75	<0.001
	Synergistic	−0.09	0.05	−1.69	0.092

Table 7
Summary of model comparison: APIM vs. totality model (Study 2).

	APIM	Totality
Dyadic report		
AIC	2882.2	2880.5
BIC	2924.5	2919.3
χ^2 difference test	$\Delta\chi^2 = 0.28$, $\Delta df = 1$, $p = .595$	
Wife report		
AIC	2889.3	2887.3
BIC	2931.6	2926.1
χ^2 difference test	$\Delta\chi^2 = 0.00$, $\Delta df = 1$, $p = .951$	
Husband report		
AIC	2912.1	2910.6
BIC	2954.3	2949.3
χ^2 difference test	$\Delta\chi^2 = 0.50$, $\Delta df = 1$, $p = .480$	

Note. The table provides a summary and comparison of the APIM and the totality model, with an equality constraint applied across genders.

Table 8
Summary of models using wife perception ratings.

Model	Path	*b*	*SE*	*z*	*p*
APIM	Wife actor	−0.18	0.08	−2.26	0.024
	Wife partner	−0.44	0.08	−5.51	<0.001
	Husband actor	−0.35	0.07	−5.11	<0.001
	Husband partner	−0.13	0.07	−1.87	0.061
Totality	Totality	−0.26	0.04	−6.05	<0.001
Similarity	Actor	−0.26	0.05	−5.42	<0.001
	Partner	−0.26	0.05	−5.44	<0.001
	Similarity	−0.11	0.08	−1.45	0.148
Synergistic	Actor	−0.26	0.05	−5.50	<0.001
	Partner	−0.27	0.05	−5.52	<0.001
	Synergistic	−0.12	0.05	−2.24	0.025

Table 9
Summary of models using husband perception ratings.

Model	Path	*b*	*SE*	*z*	*p*
APIM	Actor	−0.25	0.05	−5.32	<0.001
	Partner	−0.28	0.05	−6.05	<0.001
Totality	Totality	−0.27	0.04	−6.36	<0.001
Similarity	Actor	−0.26	0.05	−5.33	<0.001
	Partner	−0.29	0.05	−5.99	<0.001
	Similarity	−0.03	0.07	−0.40	0.691
Synergistic	Actor	−0.25	0.05	−5.37	<0.001
	Partner	−0.29	0.05	−6.17	<0.001
	Synergistic	−0.06	0.05	−1.31	0.191

both wives and husbands. The partner effect of neuroticism was significant for wives but only marginal for husbands. Importantly, when comparing the APIM with the totality model, the APIM did not fit better than the totality model ($\Delta\chi^2 = 4.99$, $\Delta df = 2$, $p = .082$). The totality score was negatively associated with both husband's ($b = -0.24$, $SE = 0.04$, $z = -5.53$, $p < .001$) and wife's ($b = -0.31$, $SE = 0.05$, $z = -6.17$, $p < .001$) marital satisfaction. Adding equality constraints such that the coefficient is invariant across genders to the totality model marginally worsened the model fit ($\Delta\chi^2(1) = 3.70$, $p = .054$). Upon examining the constraint model, a single totality coefficient explained the negative relationship between neuroticism and marital satisfaction for both wives and husbands (Table 8). Comparing the constrained version of the APIM and the totality model, where path estimates are invariant across genders, also supported the totality model ($\Delta\chi^2 = 0.00$, $\Delta df = 1$, $p = .951$).

Further exploration of the quadratic pattern within the totality model, using wife perception ratings, revealed a significant quadratic effect ($b = -0.03$, $SE = 0.02$, $z = -2.02$, $p = .043$), and the addition of the quadratic term fitted the data better than the simple linear model ($\Delta\chi^2(1) = 4.06$, $p = .044$).

When examining the similarity effect using wife perception ratings, the similarity effect was nonsignificant (Table 8) with no gender difference in path coefficients ($\Delta\chi^2(3) = 7.01$, $p = .072$). However, when examining the synergistic model using wife perception ratings, the synergistic effect was significant (Table 8) with no gender difference in path coefficients ($\Delta\chi^2(3) = 6.82$, $p = .078$). Specifically, the negative actor of neuroticism was greater when the partner had high levels (+1 SD) of neuroticism (wife: $b = -0.79$, $SE = 0.24$, $z = -3.27$, $p = .001$; husband: $b = -0.87$, $SE = 0.28$, $z = -3.14$, $p = .002$) than when the partner had low levels (−1 SD) of neuroticism (wife: $b = -0.55$, $SE = 0.14$, $z = -3.97$, $p < .001$; husband: $b = -0.63$, $SE = 0.17$, $z = -3.66$, $p = .001$).

Using husband perception ratings (i.e., husband self-reported neuroticism and husband perceived wife neuroticism) to examine the four models in question, all findings mirrored those of Study 1 or the dyad report used in Study 2. Specifically, there was no gender difference in the path coefficients for all models (APIM: $\Delta\chi^2(2) = 1.27$, $p = .530$; totality: $\Delta\chi^2(1) = 0.21$, $p = .645$; similarity: $\Delta\chi^2(3) = 2.05$, $p = .561$; synergistic: $\Delta\chi^2(3) = 1.99$, $p = .575$). Hence, we proceeded to test for the constrained model with path coefficient being the same for wives and husbands. Table 9 exhibits that there were significant actor and partner effects of neuroticism. However, when comparing the APIM with the totality model, the latter exhibited performance comparable to the former ($\Delta\chi^2 = 0.50$, $\Delta df = 1$, $p = .480$; see Table 7 for the summary of model comparisons), supporting the totality model. When we further examined the quadratic effect, it was nonsignificant ($b = -0.02$, $SE = 0.02$, $z = -1.45$, $p = .147$), with the addition of the quadratic term nonsignificantly enhancing the model's fit ($\Delta\chi^2(1) = 2.10$, $p = .147$). Neither the similarity nor synergistic effect was significant, as detailed in Table 9.

4.3.2. DRSA

We initially conducted polynomial regression analysis using the dyad reports of each individual's neuroticism level to replicate Study 1. Because the chi-squared difference test revealed no significant difference between husbands and wives in their comparable estimates ($\Delta\chi^2(5) = 6.00$, $p = .306$), we estimated the constrained model. Adding further constraints to equality for actor and partner paths did not worsen the model's fit ($\Delta\chi^2(1) = 0.29$, $p = .591$) and demonstrated a good fit to the data (RMSEA = 0.029, CFI = 0.995, TLI = 0.990, SRMR = 0.021). Consequently, employing the constrained model that does not separately estimate coefficients between genders and sets actor and partner coefficients as equal (i.e., the totality model), we conducted a bootstrap analysis with 5000 resamples to estimate the stability of the model parameters. Table 10 displays the polynomial and response surface slope coefficients. As shown in the table, the actor and partner effects with equal loadings were significant (b_1 and $b_2 = -0.24$, $p < .001$). Further examination of the response surface coefficients revealed a significant a_1 coefficient, lending additional support to the totality model. However, the remaining indexes were nonsignificant, indicating that alternative models of neuroticism, including similarity and synergistic effects, did not capture variations in marital satisfaction. These findings underscore the prominence of the additive effects of individual neuroticism levels and their impact on marital satisfaction. Fig. 2 provides a graphical representation of the DRSA.

Subsequently, we examined the same model using the perceived levels of neuroticism reported by spouses. Specifically, we estimated the polynomial model using wife and husband perception ratings. Table 11 summarizes the results. In both models, the constrained model, where identical estimates were applied to both husbands and wives, revealed no significant difference compared with the full model, as indicated by a nonsignificant chi-square difference test (wife rating: $\Delta\chi^2(5) = 10.61$, $p = .059$; husband rating: $\Delta\chi^2(5) = 4.51$, $p = .478$). Further application of equality constraints to the actor and partner paths did not worsen the model's fit (wife rating: $\Delta\chi^2(1) = 0.00$, $p = .977$; husband rating: $\Delta\chi^2(1) = 0.47$, $p = .494$), and both models demonstrated a good fit to the data

Table 10
Polynomial and response surface slope coefficients using the dyad report (Study 2).

	b	*SE*	*p*	95 % CI
Response surface slopes				
a_1	−0.48	0.10	<0.001	[−0.68, −0.028]
a_2	0.14	0.09	0.092	[−0.31, 0.02]
a_3	0.00	–	–	–
a_4	0.02	0.12	0.864	[−0.19, 0.28]
Polynomial coefficients				
b_1	−0.24	0.05	<0.001	[−0.34, −0.14]
b_2	−0.24	0.05	<0.001	[−0.34, −0.14]
b_3	−0.02	0.04	0.549	[−0.10, 0.06]
b_4	−0.08	0.07	0.265	[−0.23, 0.05]
b_5	−0.04	0.04	0.402	[−0.11, 0.05]

Note. b_1 = actor, b_2 = partner, b_3 = actor squared, b_4 = interaction, b_5 = partner squared.

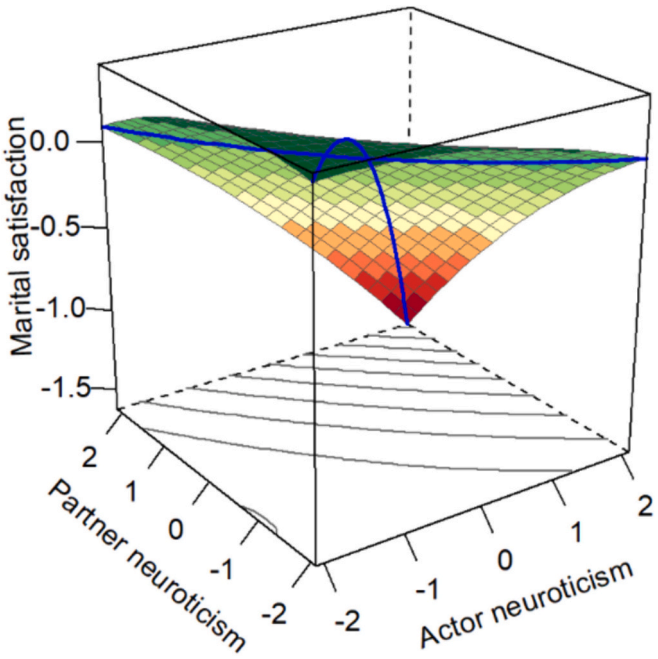

Fig. 2.. DRSA plot using dyad report (Study 2).

(wife rating: RMSEA = 0.061, CFI = 0.977, TLI = 0.957, SRMR = 0.026; husband rating: RMSEA = 0.020, CFI = 0.998, TLI = 0.995, SRMR = 0.015).

As presented in Table 11, our findings indicated significant actor (b_1) and partner (b_2) effects of neuroticism on marital satisfaction, with these effects constrained to equality in the perception ratings for both wife and husband. Moreover, a significant a_1 coefficient supported the totality model, whereas the remaining response surface indexes (a_2, a_3, and a_4) were nonsignificant, regardless of whether the wife perception ratings or husband perception ratings were used. The visual representation of these results is displayed in the DRSA plot in Fig. 3.

4.4. Discussion

The results of Study 2 not only replicate but also expand upon the findings of Study 1, providing further validation of the totality model's effectiveness and its wide-ranging applicability in understanding marital satisfaction. Specifically, by employing each partner's self-reported personality traits in dyads, the totality model effectively captured the variations in marital satisfaction. Moreover, when using the perception ratings from both wives and husbands, the results largely corresponded with those previously observed. This underscores the robustness of the totality model, which proves effective across different data collection methods. Regardless of the method of evaluation, the combined influence of both partners' neuroticism levels consistently emerged as an effective indicator of marital satisfaction. These findings underscore the importance of recognizing the dyadic sum of neuroticism in couples.

5. General discussion

The present study showed that there is a greater net neuroticism in dissatisfied marital relationships. We have coined this phenomenon as the totality model of couple neuroticism, wherein the combined neuroticism levels of both spouses (A + P) serve as a robust predictor of diminished marital satisfaction. While it is noteworthy that the actor (A) and partner (P) effects of neuroticism on marital satisfaction were individually significant, the totality measure of couple neuroticism emerged as a more parsimonious yet potent metric for assessing marital satisfaction. Moreover, the totality model garnered support from the various perspectives and analytical techniques employed in our study. Whether examining self-reported scores from each member of a dyad or a partner's perception of both their own and their spouse's neuroticism, the total dyadic neuroticism score consistently correlated with lower marital satisfaction in two distinct studies.

By contrast with the totality model, alternative measures of dyadic neuroticism, namely, the similarity and synergistic models, have provided only limited and inconsistent associations with marital satisfaction. The lack of substantial evidence supporting the presence of such effects suggests that exploring similarity and synergistic patterns of neuroticism may not significantly enhance our understanding of marital satisfaction. At the same time, however, it is essential to acknowledge that the presence of a nonsignificant effect does not imply the absence of

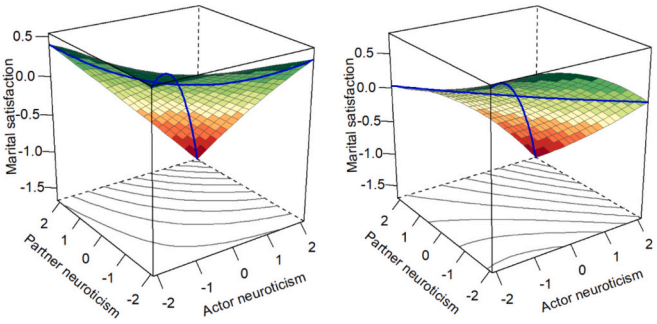

Fig. 3.. DRSA plot using perception ratings (Study 2).
Note. The left panel shows the DRSA plot using wife perception ratings. The right panel shows the DRSA plot using husband perception ratings.

Table 11
Polynomial and response surface slope coefficients using perception ratings (Study 2).

	Wife perception rating				Husband perception rating			
	b	*SE*	*p*	95 % CI	*b*	*SE*	*p*	95 % CI
Response surface slopes								
a_1	−0.52	0.09	<0.001	[−0.69, −0.32]	−0.58	0.09	<0.001	[−0.75, −0.40]
a_2	−0.13	0.07	0.078	[−0.27, 0.03]	−0.11	0.08	0.167	[−0.25, 0.05]
a_3	0.00	–	–	–	0.00	–	–	–
a_4	0.09	0.12	0.454	[−0.13, 0.33]	0.01	0.11	0.941	[−0.20, 0.22]
Polynomial coefficients								
b_1	−0.26	0.05	<0.001	[−0.35, −0.16]	−0.29	0.05	<0.001	[−0.38, −0.20]
b_2	−0.26	0.05	<0.001	[−0.35, −0.16]	−0.29	0.05	<0.001	[−0.38, −0.20]
b_3	−0.00	0.04	0.911	[−0.07, 0.07]	−0.06	0.06	0.278	[−0.18, 0.05]
b_4	−0.11	0.07	0.122	[−0.25, 0.02]	−0.06	0.06	0.369	[−0.18, 0.07]
b_5	−0.02	0.04	0.709	[−0.10, 0.07]	0.02	0.05	0.752	[−0.08, 0.10]

Note. b_1 = actor, b_2 = partner, b_3 = actor squared, b_4 = interaction, b_5 = partner squared.

effects. Various factors could contribute to null findings, including potential oversight of the multifaceted nature of neuroticism. For instance, neuroticism may manifest as high levels of anxiety and tension, or as worry and vulnerability, among other traits (Weiss & Deary, 2020). Further exploration of these distinct dimensions could uncover insights where a synergistic effect between partners becomes more apparent. Nonetheless, generally speaking, the impact of neuroticism on marital satisfaction appears to be best captured through the application of the totality framework (i.e., the sum of both partners' scores).

The findings of our study highlight the importance of evaluating personality at the level of the couple, which has largely been overlooked in previous studies. Traditionally, research on personality has focused predominantly on individual differences (e.g., White et al., 2004); however, our findings suggest that personality traits can manifest at the couple level, significantly impacting relationship satisfaction. The findings and implications of our study align with recent studies that view the couple as a unit of identity (e.g., Wang et al., 2023). As relationships evolve, individuals often blend their identities with those of their partners, forming a new, couple identity. This couple identity has been associated with various outcomes in relationships, such as coping behaviors during relationship conflict (Walsh & Neff, 2018). However, despite some attention given to the concept of a shared couple identity, there has been limited effort in accurately quantifying traits inherent to the couple that predict relationship functioning. For instance, previous research has typically relied on measures of "we-ness" (e.g., "I feel a bond with my partner"; Cruwys et al., 2023) to demonstrate how this sense of shared identity correlates with satisfaction. However, our study takes a significant step forward by comparing and validating the concept of treating personality traits as an integral part of the couple unit, in relation to their well-being. Furthermore, although the totality model has found some support in the context of self-control (e.g., Vohs et al., 2011), its utility has not been fully explored due to a lack of comparison with alternative models in previous research. Our study proposes that personality may indeed reside within the couple, and that acknowledging this couple's personality is as impactful as assessing the individual personalities of each partner in a dyad.

Moreover, the findings of our study significantly contribute to the understanding of neuroticism's impact on couples' satisfaction, aligning with and expanding upon previous research. Previous studies have consistently shown that neuroticism negatively affects marital stability and satisfaction (Fisher & McNulty, 2008; Kelly & Conley, 1987; McNulty, 2008). Neuroticism often leads to more negative perceptions and behaviors (McNulty, 2008), which in turn create challenges within the marital relationship. As such, high levels of neuroticism in a marriage can be considered detrimental for marital satisfaction. Our study builds on previous research by demonstrating that it is not just individual neuroticism but also the combined neuroticism of the couple that provides a more effective assessment of marital satisfaction.

Yet, while this study highlighted the negative impact of couples' collective neuroticism on their marital satisfaction, it is essential to highlight that it was primarily focused on the association between neuroticism and *marital satisfaction*. The dynamics revealed through the combination of a couple's neuroticism scores could differ from those observed when examining different outcome variables. For instance, as neuroticism is linked to a heightened fear of rejection and abandonment (Brookings et al., 2003), reduced levels of marital satisfaction might not be considered problematic when seen through the lens of self-protection. Therefore, the conclusions of this study should be interpreted with a focus on marital satisfaction and should not be extended beyond this domain. The potential presence of other patterns when investigated with respect to self-protection or other perspectives warrants further exploration.

In terms of practical implications, the findings of the present study suggest a shift toward considering a couple's collective personality rather than individuals' separate traits, offering a novel approach that can be employed in intervention and counseling programs. Instead of solely focusing on individual traits, intervention programs can consider collective neuroticism within the couple. By addressing dyadic neuroticism, therapists can more effectively tailor their strategies and interventions to improve the quality and stability of marital relationships. For instance, rather than focusing on processes and triggers of negative perceptions within an individual, therapists could introduce techniques for couples to identify triggers for neurotic behaviors in their interactions and develop strategies to mitigate these responses. Furthermore, by acknowledging the shared aspect of neuroticism, couples can work together to create a more supportive and understanding environment, which can help reduce the overall negative impact of neuroticism on their relationship satisfaction.

Moreover, building upon our findings, the concept of the totality effect, as explored in our study within the realm of couples, could have implications extending beyond romantic relationships. According to the identity fusion theory, group identity can extend beyond the intimate bonds of a couple to encompass larger groups (Swann Jr et al., 2012; Swann Jr & Buhrmester, 2015). In situations where individuals experience a profound sense of unity within a group, a collective identity emerges. This fusion of identities within the group context has been demonstrated to significantly influence behaviors that benefit the group as a whole, encompassing pro-group actions and even self-sacrificing behaviors (Swann Jr & Buhrmester, 2015). In light of identity fusion theory, it is conceivable that the totality model could be applicable in broader group contexts. Just as the combined neuroticism of a couple can predict marital satisfaction, the aggregated personality traits or emotional states of a group might predict group dynamics, cohesion, or performance. Future research should investigate the totality model's applicability in diverse group settings, ranging from pairs of best friends to small social circles and larger entities, such as organizations or sports teams. Further exploration of the totality effect could significantly expand the applicability of the totality model and deepen our understanding of group dynamics.

In terms of methodological practices, this study highlights the significance of aggregating traits in dyadic partners. Previous psychological research has focused almost exclusively on adding scores *within* the self. However, the present study demonstrates that scores added *between* partners may better signpost marital outcomes. In part, this approach aligns with the broader literature that recognizes the robustness and practical utility of unit-weight models; models with unit weighting have shown robustness and higher correlations with criterion variables upon validation (Dawes, 1979; Wainer, 1976). Expanding upon previous work, this study applies the principle of unit weighting to the context of couple dynamics, particularly with respect to the aggregation of actor and partner scores. In this way, our finding illuminates the practical advantages of unit weighting, providing a deeper understanding of how marital satisfaction can be more effectively gauged through the lens of combined partner traits.

It is also worth noting that the totality model can be viewed as a specialized iteration of the APIM framework. The totality model reflects the couple-oriented pattern within the APIM framework, where actor and partner effects are constrained to be equal (Kenny & Ledermann, 2010). Despite the statistical rationale for examining this couple-oriented pattern, empirical research on the topic in the personality context has been scarce. This gap in exploration of the combined effects of partner personalities may stem from methodological challenges or theoretical assumptions that emphasize the independent contributions of each partner's personality on relationship satisfaction (Robins et al., 2000). Recognizing this gap in previous research, this study lays a substantial theoretical and statistical foundation that highlights the value of examining relationship dynamics through the lens of combined partner personalities and stresses the importance of testing for the totality model or the constrained APIM model.

It is also important to acknowledge and elucidate certain limitations. First, the samples were drawn exclusively from South Korea. While the adverse effects of neuroticism on marriage are well-documented across

various cultures (e.g., Cao et al., 2019; Fisher & McNulty, 2008), the universality of the totality effect of couple neuroticism on marital satisfaction requires further investigation. Cultural factors may significantly affect the impact of a couple's neuroticism levels on their relationship satisfaction. For instance, South Korea's collectivist values and their emphasis on interdependent self-construal (Cross et al., 2011) suggest that couples' total neuroticism might be more strongly linked to marital satisfaction in this context, as partners might merge their identities more strongly to cultivate a collective identity as a couple. By contrast, in more individualistic cultures, the totality effect might manifest less strongly, or relationship dynamics might lean toward more individualistic or synergistic approaches, emphasizing the more separate and individual nature of each partner's personality. These considerations underscore the need for additional cross-cultural research to explore the universality of and potential cross-cultural variations in the totality effect.

Second, although our study found limited support for the synergistic model, a significant synergistic effect was identified when analyzing the wife's perception of her own and her husband's neuroticism. This implies a potential, albeit subtle, impact of synergistic neuroticism in marital relationships. The interaction of neuroticism between partners may subtly influence their communication and relational dynamics. Future research should delve into various relationship outcomes to examine how couples' personalities may synergistically affect each other, providing a more nuanced understanding of how neuroticism or other personality traits may interact in marital relationships.

Third, the correlational nature of our data precludes us from asserting a causal relationship in which high net dyadic neuroticism leads to marital dissatisfaction. While many studies have empirically established a pathway from neuroticism to marital dissatisfaction (Kelly & Conley, 1987; Kurdek, 1993), longitudinal analyses are warranted to further elucidate the directionality of the hypothesized relationship. Lastly, our findings provide some support for a curvilinear association regarding the impact of totality neuroticism on marital satisfaction, implying that the effect of the combined neuroticism of a dyad on marital satisfaction may not be strictly linear. Specifically, while the totality model is effective in capturing the aggregate influence of neuroticism on marital satisfaction, its precision may diminish at the higher or lower extremes of the neuroticism spectrum. Future research should aim to recruit and investigate couples with more extreme neuroticism scores to better understand how these groups of individuals might differ.

With these limitations in mind, future studies should further explore the totality model. The finding that characteristics combined or summed within dyads, rather than those of an individual, are able to predict relational satisfaction is a fascinating avenue for further research. Such a simple-to-compute measure gives people an easily accessible way to estimate their *relationship* personalities.

Funding

This work was supported by the Ministry of Education of the Republic of Korea and the National Research Foundation of Korea (NRF-2021S1A5A2A01069279). This research was also supported by the Yonsei Signature Cluster Program of 2023 (2023-22-0013).

CRediT authorship contribution statement

Jeong Eun Cheon: Writing – review & editing, Writing – original draft, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Hyewon Yang:** Writing – review & editing. **Inhan Kang:** Writing – review & editing, Validation, Investigation. **Young-Hoon Kim:** Writing – review & editing, Validation, Supervision, Project administration, Funding acquisition.

Declaration of generative AI and AI-assisted technologies in the writing process

During the preparation of this work, the authors utilized Generative AI technology, namely OpenAI's GPT-4, to enhance the writing process. The primary reason for employing this AI tool was to assist in refining content and ensuring the clarity and coherence of research findings. Subsequently, the authors meticulously reviewed and edited the content produced by the AI tools to align it with the research objectives and methodology. The authors hereby take full responsibility for the content presented in this publication.

Declaration of competing interest

None.

Data availability

Data will be made available on request.

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