

Circadian preference and relationship satisfaction among three types of couples

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Abstract

Mate selection is part of a growing interest in the study of processes by which couples are established, consolidated and/or separated. Similarity in psychological traits has been related to the well-being of couples, but given the possible effect of temporal convergence, it is necessary to control for the relationship length and whether or not both members of the couple live together. The aim of this study was to analyse the association between Morningness/Eveningness (M/E) similarity and relationship satisfaction in young-dating-non-cohabiting, young-married-cohabiting and old-married-cohabiting couples. Participants included 357 heterosexual couples (357 women and 357 men) with a mean age of 38.42 years ($SD = 13.11$; age range between 19 and 69) who completed M/E (Composite Scale of Morningness; Smith, Reilly, & Midkiff, 1989) and relationship satisfaction measures (Comprehensive Marital Satisfaction Scale; Blum & Mehrabian, 1999). Similarity in M/E was positively related to greater relationship satisfaction in both young cohabiting and non-cohabiting couples. In women, their own M/E was related to their own relationship satisfaction, whereas the level of relationship satisfaction in men was related to their partner's M/E. This relationship was observed in young-married-cohabiting couples. M/E similarity may operate differently as a function of the relationship stage.

Keywords: Morningness/Eveningness; assortative mating; couples; relationship satisfaction.

Introduction

For decades, psychological research has been focused on determining if there is a systematic pattern in human mate selection or assortative mating. Research on assortative mating has typically been framed in terms of similarity (or positive assortment) versus complementarity (or negative assortment) of partners' characteristics. Overall, there is consistent evidence for similarity but very little evidence for differences. The degree of similarity observed depends on the particular individual-difference domain studied, with romantic partners showing strong similarity in age, political and religious attitudes; moderate similarity in education, general intelligence, and values; and little or no similarity in personality characteristics (Rammstedt, & Schupp, 2008).

The study of mate selection is part of a growing interest in the study of processes by which couples are established, consolidated and/or separated (Figueredo, Sefcek, & Jones, 2006; Zentner, 2005). One of the most interesting subjects of similarity in psychological traits is how it affects the well-being of couples. Some research has shown that similarity in psychological traits between partners is related to relationship satisfaction and personal subjective well-being (Arrindell & Luteijn, 2000). Other studies have reported that partners' respective individual characteristics seemed to predict relationship satisfaction better than dyadic similarity measures (Arránz, 2013; Furler, Gómez & Grob, 2013). There are several partly overlapping theoretical explanations for similarity-satisfaction effect within couples (Orth, Erol, Ledermann & Grob, 2018). Some of these explanations are based on mutual influence between the two partners at the emotional, cognitive and behavioural levels. Other theories posit that relationship satisfaction within partners is influenced by the shared environment, such as family characteristics, residential area, financial conditions, or the size of one's social

network, without assuming that one partner causally influences the other partner and vice versa (i.e., mutual influence). The third group of theories posits that transitions from dating to cohabiting to marital unions are marked by increasing selectivity in the mate selection or matching process. This group of theories are based in the called "winnowing hypothesis" (Blackwell, & Lichter, 2004).

The well-being of two people in a romantic relationship are highly interdependent, and similarities for traits at the beginning of a relationship could converge (or not) across time, potentially becoming more alike. Gonzaga, Campos and Bradbury (2007) indicated that similarity in personality, attitudes, and values promote attraction and relationship satisfaction, whereas convergence predicts relationship success. Of note, being similar to a partner at a moment in time or converging towards a partner across time seems to have positive effects on relationship functioning. Changes in one spouse's life satisfaction are systematically related to changes in the other spouse's life satisfaction (Schimmack & Lucas, 2010). In this way, a hypothesis could be made that mutual influence between partners is larger at the early stages of romantic relationships (compared to long-standing relationships) because the influence of the partner is still relatively new and, consequently, the influence might be more powerful. For instance, romantic partners have similar levels of well-being (Meyler, Stimpson, & Peek, 2007), and they also converge over time in more dynamic traits, such as emotionality (Anderson, Keltner, & John, 2003). These issues could explain why some other studies have shown that personality similarities are not substantially related to life satisfaction in couples (Furler, Gomez & Grob, 2013). By using a dyadic design in which the couple is the unit of analysis, some studies have found different results because couples' similarities were estimated in different types of relationships (e.g.

dating or married) or regardless of relationship length or convergence effect (e.g. young, old or elderly couples). The present study aims to go one step further than the few previous studies on assortative mating by considering the relationship between Morningness-Eveningness (M/E) and relationship satisfaction (RS) in three types of couples in different relationship stages. The Actor-Partner-Interdependence Model (APIM; Cook & Kenny, 2005) was used to study actor, partner and similarity M/E effects on RS. This method increases our understanding of how women and men jointly influence each other in interpersonal contexts.

Assortative mating for Morningness-Eveningness (M/E) and Relationship Satisfaction (RS)

One of the characteristics for which couples can be similar or converge over time is their daily preferences for activities. Circadian preference reflects individual differences in temporal preferences for waking and sleeping times, as well as the preferred time of day for accomplishing demanding intellectual and physical tasks (Adan et al. 2012). Morning types prefer early sleep and wake times and perform best early in the day, while evening types prefer later wake and sleep times and perform best in the afternoon, evening, or at night. There are substantial differences between morning and evening types (Adan et al., 2012). Morning types reach their maximum levels for temperature, cortisol and melatonin circadian rhythms earlier in the day, report better health indicators and are considered conscientious, trustworthy and emotionally stable (DeYoung, Hasher, Djikic, Criger, & Peterson, 2007). They are in sync with the dark-light cycle and social timetables. Evening types tend to be more creative and innovative and adapt better to changes in the environment (Díaz-Morales, 2007); they are less synchronised with the dark-light cycle and social timetables.

Little research has been carried out comparing the RS of couples who are synchronised (e.g., morning or evening matched couples) or desynchronised in their circadian preference (e.g., morning-evening and evening-morning couples). There is evidence that couples report greater enjoyment during activities done together than during those done separately, that they try to coordinate their schedules and that shared time is important for marital well-being (Barelds, & Barelds-Dijkstra, 2007). Research on time distributions in couples indicates that when men and women were with their partners, they reported being happier, finding more meaning, and experiencing less stress (Flood & Genadek, 2016). This suggests the relevance of shared time with a spouse for married individuals' well-being, which is consistent with assortative mating research. Both lines of research (assortative mating and time use) propose that similarity in individual characteristics and time spent together affect RS.

A number of previous studies have found that couples with an M/E mismatch reported poorer marital adjustment and more conflicts than couples who matched. Cromwell, Keeney and Adams (1976) initiated a series of studies in which they found that couples were aware of their respective circadian tendencies and of the consequences they had for their family or partner relationships. It seems that synchronised couples (i.e., with matched M/E) argue less (Adams & Cromwell, 1978), while desynchronised couples (i.e., with mismatched M/E) have worse marital adjustment, fewer deep conversations, share fewer activities and have less sex (Larson, Crane & Smith, 1991). Hur, Bouchard and Lykken (1998) investigated M/E similarity between twins and their partners and found a moderated relationship ($r = 0.25$) within couples, suggesting that it might be an initial preference rather than an effect of cohabitation during the marriage (convergence effect).

More recently, a series of studies have been conducted on M/E similarity and its consequences for RS. Randler and Kretz (2011) found a high M/E correlation within 87 couples ($r = 0.55$) with a relationship length of 15.6 years, a mean age of approximately 37-39 years and an age range of 14 to 79. Couples who were similar in M/E did not report higher satisfaction with their relationships. Subsequently, following this line of research, two studies in which women reported the timing of their own and their partner's activities found a high similarity level ($r_s = 0.40-0.79$) between partners in their sleep times, e.g., mid-sleep on free days (Leonhard & Randler, 2009). In another study about ideal partners with whom to have a long-term relationship in terms of circadian preference, it was found that women would prefer their partners to be more synchronised with their own diurnal preferences, i.e., shifted towards Morningness (Randler et al., 2014). Finally, Jocz, Stolarski and Jankowski (2018) found low M/E similarity among 91 couples ($r = 0.09$) with an average relationship length of 4.5 years who were between 18 and 38 years of age ($M = 25.96$, $SD = 3.66$).

Aims and hypothesis of the present study

The results of these studies indicate that some couples are desynchronised in M/E (low M/E similarity) and that, in general, people prefer partners with similar M/E. M/E similarity was found to be greater in old (Randler & Kretz, 2011) than in young couples (Jocz et al., 2018), which could indicate that there is a convergence effect on M/E. Given the possible effect of temporal convergence on personality characteristics (Botwin, Buss & Shackelford, 1997; Gruber-Baldini, Schaie & Willis, 1995), it is necessary to control for the relationship length. Gaunt (2006) indicates that the degree of similarity may be more or less relevant for RS depending on the stage of the relationship. Additionally, Blackwell and Lichter (2004) detected a slight increase in ethnic and religion similarities across the continuum of commitment in sexually

intimate dating, cohabiting, and married couples, even though these traits were associated with substantial homogamy (i.e., similarity at the beginning of the relationship, when the couple is getting to know each other). Since few studies have been conducted with couples who do not live in the same household (Botwin et al., 1997; Figueredo et al., 2006; Zentner, 2005), Watson et al. (2004) recommended analysing couples at the beginnings of their relationships, since the key factors for the success of the relationship could be identified at that stage.

The aforementioned studies about assortative mating in M/E have been carried out in couples with different relationship lengths, a wide age range and very heterogeneous demographic characteristics. Additionally, the small number of couples studied in previous studies makes it necessary to investigate these issues in larger samples of couples. Finally, it could be interesting to determine if the asynchrony in M/E has a greater effect on RS in young dating and married couples or if the effect dissipates in older couples with longer relationships who could converge or complement each other based on their temporary preferences (Jocz et al., 2018).

Therefore, the aim of this study is to analyse the importance of M/E similarity between partners in heterosexual romantic relationships by comparing three types of couples according to the following criteria: age (young vs. old), relationship status (dating vs. married) and cohabitation status (they live together or cohabit vs. they live in different homes or not-cohabiting). Using a dyadic design in which the couple is the unit of analysis, we used the Actor-Partner-Interdependence Model (APIM; Cook & Kenny, 2005) to study M/E similarity and RS in young-dating-non-cohabiting, young-married-cohabiting and old-married-cohabiting couples. We hypothesise that couple's similarity for M/E will be positively related to greater RS, especially among young couples with shorter relationship lengths.

Methods

Participants

The sample of the present study was composed of 357 heterosexual couples (357 women and 357 men) with a mean age of 38.42 years old ($SD = 13.11$; range between 19 and 69). The educational level of participants was predominantly high: 16.7% completed primary studies, 10.4% completed technical studies, 24.2% completed high school and 48.6% earned college degrees. Eleven participants (1.5%) did not indicate their level of education. The following types of couples were recruited: the first and second couple groups included 160 young couples (20-36 years old) of whom 65 (40.6%) were dating and non-cohabiting ($M = 24.25$ years old, $SD = 3.55$), and 95 (59.4%) were married and cohabiting ($M = 25.67$ years old, $SD = 4.35$) with similar relationship lengths of 44.77 months ($SD = 28.44$; range = 9-168 months) and 51.46 months ($SD = 42.94$; range = 12-276 months), respectively. The difference in relationship lengths was not significant ($t(317.7) = -1.68, p = .45$). The third couple group consisted of 197 married and cohabiting couples ($M = 49.18$ years old, $SD = 6.15$; range = 37-69 years old) with an average relationship length of 290.35 months ($SD = 95.43$, range = 12-492 months). This third group of couples was significantly different from the young couples in relationship length ($Z_U = -21.08, p < 0.001$), and the "old" term was used to differentiate them from "young" couples.

Measures

Demographic data. Participants provided information by a self-report questionnaire on their age, sex, relationship duration, number of children, education, and profession.

The *Composite Scale of Morningness (CSM)* (Smith, Reilly, & Midkiff, 1989) was used as a measure of M/E. The *CSM* consists of 13 questions regarding the times at which individuals wake up and go to bed, preferred times for physical and mental activities, and subjective alertness. Five of the elements of the scale refer to different times of the day. The score is obtained by adding the items and ranges from 13 (extreme Eveningness) to 55 (extreme Morningness). The total score of the Spanish version of the *CSM* was used (Díaz-Morales & Sánchez-López, 2004; Díaz-Morales & Parra-Robledo, 2018). A high score in *CSM* indicates a high morningness. The validity of the scale has been repeatedly supported (see Di Milia, Adan, Natale, & Randler, 2013). In the present study, Cronbach's alpha was 0.86.

The *Comprehensive Marital Satisfaction Scale (CMSS)* (Blum & Mehrabian, 1999) was used to evaluate marital satisfaction, which was called RS in this study. This scale is composed of 35 items, and participants are asked to rate the degrees to which they agree with positive statements (-4 = disagree strongly; 4 = agree strongly). The items on the scale are clear descriptions of positive and negative aspects of satisfaction in a marital situation such as "My spouse and I agree on how we handle our finances " and "My marriage is not as good as most marriages". To use non-sexist language, we replaced the terms wife, husband and marriage with partner. The *CMSS* has a highly satisfactory internal consistency coefficient of 0.94 and a satisfactory test-retest reliability coefficient of 0.83 over a six-week interval (Blum and Mehrabian, 1999). In the present study, Cronbach's alpha was 0.91.

Procedure

Adult participants were recruited through a group of trained students ($n = 47$), who gave all scales (in counterbalanced order) to people from their circle of older

friends, with the next inclusion criteria: age > 18 years, being involved in a heterosexual romantic relationship and the romantic partner's participation. All participants filled in a paper-and-pencil questionnaire and they were instructed to complete the questionnaire independently from their partner. Participants could opt to receive feedback on their similarity degree and RS via e-mail.

Data analysis

First, the Mann-Whitney U test was used to test sex differences for M/E and RS scores, and Pearson correlation coefficients were used to test relationships among all of the variables in the study in a between-couples analysis. Second, a similarity degree index was calculated by creating dyadic difference scores between men's and women's M/E scores (Watson et al., 2004). In this within-couples analysis, one subject's M/E score was subtracted from their partner's score to calculate their degree of dissimilarity; a positive score indicated that woman was more morning-oriented than the man, and a negative score indicated that the man was more morning-oriented than the woman. The maximum difference between partners was 24 points. The absolute value of the M/E similarity degree index was related to RS using the Pearson correlation coefficient. Second, we calculated a demographic variable using a combination of age (younger: 20-36 years old vs. older: 37-69 years old) and marital status (dating non-cohabiting vs. married cohabiting). The final result is a grouping variable with the following levels: young-dating-non-cohabiting, young-married-cohabiting and old-married-cohabiting couples.

In order to simultaneously tests actor, partner effects, and the effect of the M/E similarity on RS, we used the Actor-Partner Interdependence Model (APIM). The APIM was estimated by Structural Equation Modelling (SEM) for distinguishable

couples. To estimate parameters we used Maximum Likelihood (ML) and Full Information Maximum Likelihood (FIML) for missing value treatment (Garcia & Kenny, 2018). The contribution of M/E to RS was estimated in terms of intra- and interpersonal associations (i.e. actor/partner effects; see Figure 1). The unique associations of partners' M/E and M/E similarity with RS were tested in three separate APIMs (see Figure 2), one for each type of couple. A three-step approach was used to calculate the APIMs. We tested the saturated model with all effects freely estimated, without parameters' restrictions and a nested model, setting the two actor effects and the two partner effects equal for both couple members. To compare these models, and test if the couples were distinguishable or indistinguishable, we used the χ^2 -difference test (Cook & Kenny, 2005). Finally, we tested the model with the asynchrony couple score as a covariate. To create this variable, we used the absolute M/E difference between women and men, following Rogers, Wood and Furr (2018) recommendations.

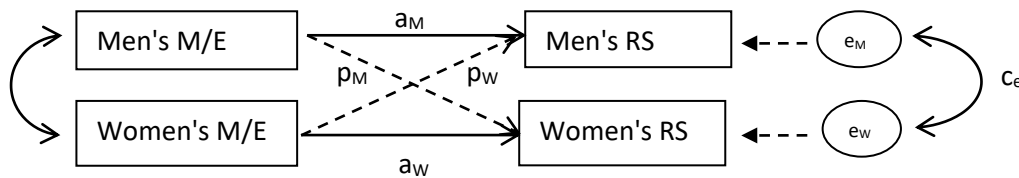


Figure 1: Actor-Partner-Interdependence Model Analysis Predicting Relationship Satisfaction (RS) by Actor and Partner Morningness/Eveningness (M/E) Scores. Paths labelled as *a* indicate actor effects and paths labelled as *p* indicate partner effects. *c_e* indicates covariance of errors between men and women.

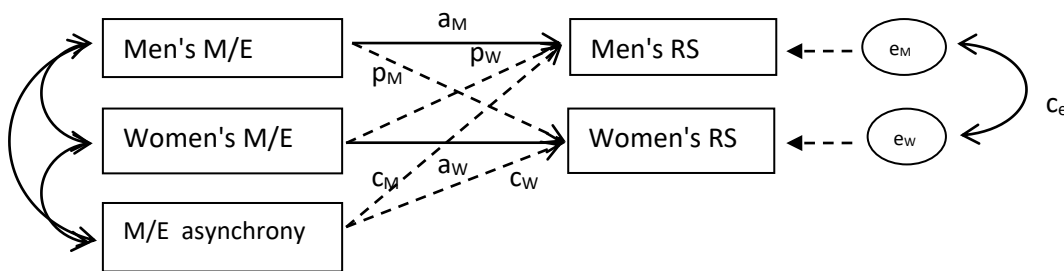


Figure 2: Actor-Partner-Interdependence Model Analysis Predicting Relationship Satisfaction (RS) by Actor, Partner and Asynchrony Morningness/Eveningness (M/E) Scores. Paths labelled as *a* indicate actor

effects, paths labelled as p indicate partner effects and paths labelled as c indicate covariate effects. c_e indicates covariance of errors between men and women.

Data analyses were carried out using the SPSS-20 (SPSS Inc., Chicago, IL, USA) and RStudio v.1.1.456 on R v. 3.5.1 (R Core Team, 2018), specifically “lavaan” package (Rosseel, 2012, 2018).

Results

A preliminary analysis indicated no significant sex and marital status differences in RS ($Z_U = -1.15, p = .25$; $Z_U = -0.78, p = .43$, respectively). Regarding M/E, men reported higher M/E than did women ($M = 34.80, SD = 7.22$ vs. $M = 33.19, SD = 6.50$; $Z_U = -3.50, p < 0.001, \eta^2 = .017$); additionally, married couples reported higher M/E than did dating couples ($M = 34.77, SD = 6.74$ vs. $M = 30.49, SD = 6.61$; $Z_U = -6.08, p < 0.001, \eta^2 = .052$). Men reported higher mean ages than did women in young dating and non-cohabiting couples (25 vs. 23.51, $t(128) = -2.44, p < 0.05$) as well as in young (26.45 vs. 24.91; $t(186) = -2.47, p < 0.05$) and old (50.17 vs. 48.18; $t(392) = -3.24, p < 0.01$) married and cohabiting couples.

Between-couples analyses for women and men

The relationships among M/E, RS, age and relationship length were tested for women and men separately. In women in the young-dating-non-cohabiting group (see Table 1), M/E was not associated with any variable, whereas in women in the young-married-cohabiting group, M/E was positively associated with RS ($r = 0.29, p < 0.01$). In the old-married-cohabiting group (see Table 2), M/E was positively associated with age only ($r = 0.14, p < 0.05$).

Table 1: Pearson correlations coefficients between Morningness/Eveningness (M/E), relationship satisfaction (RS), age and time of relationship in women of the young-married-cohabiting (n = 95, above the main diagonal) and of the young-single-non-cohabiting groups (n = 65, below the main diagonal).

	M/E	RS	Age	Time of relationship
M/E	-	.29**	.19	.19
RS	.10	-	-.05	.03
Age	.09	.01	-	.50***
Time of relationship	.14	.11	.31*	-

Note. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Table 2: Pearson correlations coefficients between Morningness/Eveningness (M/E), relationship satisfaction (RS), age and time of relationship in women of the old-married-cohabiting group (n = 197).

	M/E	RS	Age	Time of relationship
M/E	-	.05	.14*	.09
RS		-	.08	-.03
Age			-	.54***
Time of relationship				-

Note. * $p < 0.05$; *** $p < 0.001$

In men in the non-cohabiting group, M/E was not associated with any variable, whereas in men in the young cohabiting group (see Table 3), M/E was positively associated with age ($r = 0.25$, $p < 0.05$). In men in the old cohabiting group (see Table 4), M/E was positively associated with age ($r = 0.16$, $p < 0.05$).

Table 3: Pearson correlations coefficients between Morningness/Eveningness (M/E), relationship satisfaction (RS), age and relationship time in men of the young-married-cohabiting (n = 95, above the main diagonal) and of the young-single-non-cohabiting groups (n = 65, below the main diagonal).

	M/E	RS	Age	Time of relationship
M/E	-	.09	.25*	.16
RS	-.05	-	.01	.10

Age	-.04	-.05	-	.50***
Time of relationship	-.02	.10	.13	-

Note. * $p < 0.05$; *** $p < 0.001$

Table 4: Pearson correlations coefficients between Morningness/Eveningness (M/E), relation satisfaction (RS), age and time of relationship in men of the old-married-cohabiting group (n = 197).

	M/E	RS	Age	Time of relationship
M/E	-	.10	.16*	.13
RS		-	-.00	-.03
Age			-	.53***
Time of relationship				-

Note. * $p < 0.05$; *** $p < 0.001$

Within-couples analyses: Similarity and asynchrony in M/E and RS

Consistent with previous research, correlations among partners in M/E were positive ($r = 0.23$, $p < 0.001$), so women whose partners were higher in M/E displayed greater M/E. Considering the type of couple the relationships were: young-dating-non cohabiting, $r = -0.09$, $p = 0.50$; young-married-cohabiting, $r = 0.12$, $p = 0.23$; old-married-cohabiting couples, $r = 0.18$, $p < 0.05$. After controlling for relationship length, the M/E correlation coefficients for all couples was lower ($r = 0.12$, $p < 0.05$), but not statistically different ($Z = 1.51$, $p > 0.05$), and for old-married-cohabiting couples the correlation didn't change ($r = 0.17$, $p < 0.05$; $Z = 0.83$; $p > 0.05$).

Asynchrony in M/E only negatively correlated with women' M/E ($r = -0.28$, $p < 0.001$), in other words, women who were not synchronized with her partner, displayed less M/E, even after controlling for the relationship length ($r = -0.27$, $p < 0.001$).

Considering the type of couple the relationships were: young-dating-non cohabiting

women, $r = -0.27$, $p < 0.05$, and men, $r = -0.08$, $p = 0.54$; young-married-cohabiting women, $r = -0.16$, $p = 0.13$, and men, $r = 0.07$, $p = 0.50$; and old-married-cohabiting women, $r = -0.33$, $p < 0.001$, and men, $r = 0.04$, $p = 0.56$. After controlling for relationship length, the correlations stayed with the same results.

Actor, partner and asynchrony M/E effects in RS

First, in order to test distinguishability, a model comparison was performed between a model with distinguishable members (first step model) and a model with indistinguishable members (second step model). Because this result was not statistically significant ($\chi^2_{diff} = 0.07$, $df = 2$, $p = 0.96$), we could not conclude that members could be statistically distinguished.

Second, we tested the APIM (figure 1) in the three types of couples. The results of APIM in young-married-cohabiting couples revealed a significant actor effect in women RS ($b_{aw} = 1.63$, $p < 0.01$) and a significant partner effect in men RS ($b_{pw} = 1.17$, $p < 0.05$). Women who were high in M/E exhibited high levels of RS. On the other hand, men whose partners were higher in M/E displayed greater RS. In the others groups, actor and parent effects were not statistically significant (see Table 5).

Table 5. Actor-Partner-Interdependence Model Analysis Predicting Relationship Satisfaction (RS) by Actor and Partner Morningness/Eveningness (M/E) Scores.

	All the sample	Young-single-non-cohabiting	Young-married-cohabiting	Old-married-cohabiting
<i>Women RS</i>				
women M/E (a_w)	0.15	0.12	1.63**	0.13
men M/E (p_M)	-0.01	0.27	0.63	0.31
<i>Men RS</i>				
Men M/E (a_M)	0.15	0.12	0.04	0.75
Women M/E (p_w)	-0.01	0.27	1.17*	-0.33

Correlated Errors RS (c_e) 901.15*** 450.98*** 542.41*** 1123.18***

Note: a = actor effect, p = partner effect.

* $p < .05$, ** $p < .01$, *** $p < .001$.

Finally, we tested the actor, partner and covariate (asynchrony in M/E) effects for RS in the three types of couples (Figure 2). In the same way as in model 1, in young-married-cohabiting couples, there was a significant actor effect in women RS ($b_{aw} = 1.42$, $p < 0.05$) and partner effect in men RS ($b_{pw} = 1.04$, $p < 0.05$). The covariate (asynchrony in M/E) effect was significant ($b_{cw} = -1.39$, $p < 0.05$) in women RS, indicating that women high in asynchrony reported low RS (see Table 6).

Table 6. Actor-Partner-Interdependence Model Analysis Predicting Relationship Satisfaction (RS) by Actor, Partner and Asynchrony Morningness/Eveningness (M/E) Scores.

	All the sample	Young-single-non-cohabiting	Young-married-cohabiting	Old-married-cohabiting
<i>Women RS</i>				
women M/E (a_w)	0.13	0.04	1.42*	0.14
men M/E (p_M)	-0.06	0.16	0.72	0.31
Asynchrony (c_w)	-0.34	-0.32	-1.39*	0.01
<i>Men RS</i>				
men M/E (a_M)	0.13	0.04	0.10	0.78
women M/E (p_w)	-0.06	0.16	1.04*	-0.42
Asynchrony (c_M)	-0.44	-0.58	-0.90	0.31
Correlated Errors RS (c_e)	896.96***	443.65***	514.74***	1123.24***

Note: a = actor effect, p = partner effect, c = covariate.

* $p < .05$, ** $p < .01$, *** $p < .001$.

Discussion

In the current study, more evidence regarding the role of M/E similarity on RS was provided. The aim of the study was to analyse whether M/E similarity among couples was associated with higher RS by considering young-dating-non-cohabiting,

young-married-cohabiting, and old-married-cohabiting couples. The results indicate that M/E similarity may operate differently as a function of the relationship stage. In couples with a relationship length of approximately 3.5 years, being similar to their partner is related to RS, whereas, in couples with a relationship length of approximately 24 years, the similarity-satisfaction effect was not relevant. In young-married-cohabiting couples, the effects of both their own and partners' individual M/E on RS were analysed and indicated that the M/E of women increased their own RS, as well as RS of their male partners. Also, when M/E similarity (covariate effect) was tested, women high in M/E synchrony reported higher RS.

M/E similarity effect on RS was observed only among young-married-cohabiting couples. At this stage of the relationship, young-married-cohabiting couples could benefit from the greater similarity in M/E since they could have fewer chances of spending time together. Additionally, at this stage of the relationship, both members of the couple matching their preferences for the time of day when they do different activities may be relevant to RS. Previous research has indicated that couples who perform a greater number of activities together report greater satisfaction compared to couples who do more activities alone. Flood and Genadek (2016) indicated that when men and women were with their partners, they reported positive benefits for each member of the couple, such as greater happiness and less stress. These findings suggest the relevance of shared time with a partner at the beginning of the cohabitation, and the results of the present study indicate that if they match in their preferred time of day (i.e., circadian preference or M/E), their RS will be greater. Demands of work and family at the beginning of the coexistence under the same roof could reduce the availability of time that the couple would have to be together, and in this stage of the relationship, the similarity in M/E would be more relevant than in the young-dating-non-cohabiting

couples. An example could be when the two members of the couple are morning and they go to bed and get up at the same time. Being similar in circadian preference, the satisfaction will probably be greater than if one member of the couple is morning and the other is evening type. One possible explanation was proposed by Jocz et al. (2018) who argued that similarity in M/E within couples create “common temporal spaces” that facilitate various activities important for relationships as the phases of internal motivation for these actions should occur simultaneously in both partners. In this sense, cohabitation brings out the effect of M/E similarity on RS. It seems that the critical stage is the beginning of the cohabitation, not the beginning of the relationship. Recent studies have indicated that work and family demands, as well as the competing devotions they require, constrain the time couples can spend together and that couples’ joint engagement in daily activities is positively associated with marital well-being (Blair-Loy, 2003). An important applied question is whether M/E similarity is beneficial for relationships given that it has moderate effects on partners’ RS. Theory suggests that similarity contributes to relationship quality because it increases relationship functioning and reduces conflicts in daily life and because similar partners share more similar emotional responses (Dyrenforth, Kashy, Donnellan, & Lucas, 2010).

In contrast, M/E similarity for old-married-cohabiting couples with long relationships was not associated with greater RS. One possible explanation is that a longer relationship time could provide the couple with a greater ability to adapt to each other. Asynchrony in schedules can be associated with conflicts that can threaten the relationship. However, some couples are able to address these disagreements successfully. Several authors claim that desynchronised couples can be more flexible and make an effort to adapt to each other, thus presenting a greater ability to resolve possible conflicts that may arise (Adams & Cromwell, 1978; Larson, et al., 1991).

Specifically, Vaughan, Meadows, Archer, Skene and Arber (2006) observed that women whose preferences differed from those of their partners' changed their bed and rise times in order to adjust to their partners' schedules. It is likely that M/E similarity could be more relevant for the satisfaction of the couple in the first stage of the relationship (in our study, when couples start living together), and with the passage of time, the effect of the similarity dissipates. Previous studies have included relationship length as a potential moderator in the similarity-satisfaction relationship. It has been considered that the length of life as a couple affects similarity in personality traits since each partner would tend to become more similar to the other over time. This finding is the so-called convergence effect, and it is reflected in the popular Spanish proverb "*Dos que duermen en el mismo colchón se vuelven de la misma condición*", which can be translated into English as "*Two who sleep together in the same bed become of one mind*". This proverb means that living under the same roof makes people (each partner) become more similar to each other. However, previous studies have not considered the stage of the relationship (i.e., young dating couples, young newly married couples, or older married couples). In the present study, we not only consider the length of the relationship but also the stage of the relationship among the different couples.

The moderate level of M/E similarity (controlling for relationship length) found in the older couples could be considered an effect of age (people tend to become more morning-oriented with age and those in longer relationships tend to be older in age). Nevertheless, one should take into consideration how this result matches those of previous studies. Specifically, this result was similar to the results obtained by Hur, Bouchard and Lykken (1998) in couples with an average age of 47 years, less than the results reported by Randler and Kretz (2011) in couples ages 37-39 years with an average relationship length of 15.6 years, and greater than the results found by Jocz,

Stolarski and Jankowski (2018) in couples ages 18-38 years with an average relationship length of 4.5 years. Thus, the magnitude of the assortative mating effect for M/E is similar to the effect obtained for personality traits, and it occurs in older, more committed relationships but not in younger ones. In a dyadic relationship, individuals may be affected by their own personalities, their partner's personalities, and the similarities between both personalities (actor, partner and similarity effects in the APIM used in this study). Studies have shown that people in long-term relationships tend to converge through adaptive processes, such as through emotions experienced in interactions or behavioural skills, which are considered proximal mechanisms by which more stable traits impact RS (Anderson, Keltner, & John, 2003; Gonzaga et al., 2010).

There are also sex differences according to the M/E actor, partner and similarity (synchrony) on RS. Among young-married-cohabiting couples, women's M/E increased their own RS as well as their partner's, and also women who share a common M/E tendency with their partner tend to be happier in their romantic relationship than women in similar couples. The APIM allowed us to analyze how M/E actors, partners and similarity jointly influence each other in relation to RS (Campbell, Simpson, Kashy & Rholes, 2001; Luo et al., 2008). This shows that RS is not only a function of individuals' and their partner's M/E but also a function of the extent to which the two partners rank M/E similarly. This result confirms previous results in the social sciences about the fact that men benefit more from their relationships than women do; in this case, they benefit by having a morning-oriented partner (Monin & Clark, 2011). Previous studies have indicated that an ideal partner would be one with the same circadian preference (Randler et al., 2014). The present study adds to previous results that when the mutual influence of M/E in couples that had cohabited for an average of 3.5 years was analysed, the RS of the men was higher if his partner tended to be

morning-oriented. Vaughan et al. (2006) found that women tend to adapt to their partners' schedules, and Jocz et al. (2018) found that M/E was associated with a higher quality relationship, in line with previous results that indicated that M/E is generally associated with greater satisfaction with life (Díaz-Morales, Jankowski, Vollmer, & Randler, 2013). Future studies could analyse if the high RS of the men associated with his partner's higher M/E could be due to gendered activities that occur inside and outside the relationship (Monin & Clark, 2011). In a study using longitudinal data from dating, cohabiting, and married couples, Orth et al. (2018) found that romantic partners tended to be interdependent in their well-being due to both mutual influence between partners and the effects of their shared environment. A recent study analysing the effects of personality traits on RS indicated that partners reporting dissimilar neuroticism levels was associated with male partners reporting lower satisfaction, whereas both partners reporting modest levels of openness was associated with female partners reporting higher satisfaction (Weidmann, Schönbrodt, Ledermann & Grob, 2017). Another study found that similarity was positively associated with female RS when controlled for the personality traits of both partners, showing partial support for the positive association between similarity and RS (Decuyper, De Bolle, DeFruyt, 2012). These findings have important implications because they show that the level of well-being of a person's partner has a long-term influence on the person's own well-being. However, we still have to discover how this mutual influence in couples operates.

There were no sex differences when the levels of RS of couples (i.e., dyadic data) were compared. Although many studies have found that wives' marital satisfaction is significantly lower than their husbands', mediation analyses have indicated that this difference was due to the inclusion of clinical samples, with wives in

marital therapy 51% less likely to be satisfied with their marital relationship than their husbands (Jackson, Miller, Oka, & Henry, 2014).

Additionally, regarding sex and age differences on M/E, the results of the present study confirm recent findings that indicated that over the age of 40 years, men were more morning-oriented than women (Díaz-Morales & Parra-Robledo, 2018; Duarte et al., 2014; Merikanto et al., 2012).

Among the limitations of our study, we could point out that M/E was evaluated without taking into account working hours during the week and weekend. It is likely that asynchrony in M/E has a different impact when considering weekdays and weekends (Wittman, Dinich, Merrow & Roenneberg, 2006). Although the results of this study indicate that the effect of M/E similarity on RS depends on the stage of the relationship, the impact of asynchrony could be analysed comparing weekdays (with the distribution of most scheduled time dictated by work responsibilities, etc.) and weekends (greater freedom to organise the use of time). Additionally, having or not having children is another factor to consider (Leonhard & Randler, 2009). Moreover, future studies could consider accounting for sexual orientation or the social and cultural factors specific to each society or country (Dyrenforth et al., 2010). The current research makes a further contribution to our understanding of the effect of M/E similarity on RS by taking into account a dyadic perspective. We believe this study provides a more nuanced insight into the links between M/E similarity and RS by using three types of couples in different relationship stages.

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