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Adult Attachment, Love Styles, Relationship Experiences and Subjective Well-Being: Cross-Cultural and Gender Comparison between Americans, Portuguese, and Mozambicans

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Abstract Attachment security, love styles, and romantic relationship experiences are closely associated with subjective well-being (SWB). A few studies have empirically observed significant relations between these variables. However, no studies have included all of these predictors to analyze the unique contribution of each to SWB, and no cross-cultural studies have analyzed these variables simultaneously. This article examined (a) the relations between attachment security, love styles, romantic relationship experiences and subjective well-being, (b) the unique contribution of each to predict SWB, and (c) cross-cultural and gender differences in the predictors of SWB across three samples of 1,574 university students: 497 from North Carolina (US), 544 from Maputo (Mozambique), and 533 from Lisbon (Portugal). We found cross-cultural differences in the three samples. The main predictor of SWB was attachment security in the US and Portuguese samples, while in the Mozambican it was eros love style. Storge love style positively predicted SWB in the US and Portuguese samples, but not in the Mozambican. In contrast, mania love style predicted the SWB of Mozambicans but not that of Americans or Portuguese. We found

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gender similarities and differences: the association between attachment security and SWB was not gender-specific; the associations between love styles, relationship experiences and SWB were gender-specific.

Keywords Adult attachment · Love styles · Relationship experiences · Subjective well-being · Cross-cultural · Gender

1 Introduction

Close relationships are central to humankind and have a great impact on individuals' lives and overall subjective well-being (SWB; Diener and Biswas-Diener 2008). There are studies that significantly associate attachment styles, love styles (e. g. Levy and Davis 1988; Remshard 1999), or relationship experiences with SWB (e. g. Frazier and Esterly 1990; Kim and Hatfield 2004). However, there are important gaps in the literature about the relations between these variables and an absence of studies that analyze how all of these variables conjointly affect SWB. It is important to have a deeper knowledge of the relations between these variables and their precise role in predicting SWB. Attachment (an early trait variable), love styles (conceptual/attitudinal variables), and relationship experiences (objective conditions and satisfaction with relationships) are different categories of variables that may affect SWB differently. Further, understanding these relations may allow us to know how—and at what level—to better intervene in order to promote relationship quality and human well-being. It is also important to investigate possible gender and cultural differences. Few studies have focused on how attachment, love styles and relationship experiences contribute to SWB in samples other than European or North American, and none include cross-cultural comparisons.

The pertinence of this study is, therefore, to address some of these gaps in the scientific literature, such as: what type and how strong are the associations between attachment style, love styles, and romantic relationship experiences? How do these variables predict SWB in three different cultures? Are these relations universal or culture-specific? In particular, the contribution of this study relies on the cross-cultural analysis and comparison of the predictors of SWB in three different cultures: North American, Eastern African and South European. We examined the structural relations among love styles, attachment styles, relationship experiences, and SWB among Americans, Portuguese, and Mozambicans. The US is largely accepted as an individualistic country; Mozambique is probably a collectivistic society (Triandis 1989). Portugal is also considered a collectivistic society, although probably in between the American and the Mozambican in the continuum of individualism-collectivism (Hofstede 1980; House et al. 2004). We start our literature review by defining attachment security, love styles, relationship experiences, and SWB before presenting the empirical results available in the scientific literature about the association between these variables.

1.1 Attachment Security

The concept of attachment was first studied in children by Bowlby (1969), followed by Ainsworth (1989). These authors developed the theory of attachment based on empirical studies. Briefly, the theory states that according to relationship experiences during infancy,

such as those with caregivers and significant others (who may be more or less responsive and available), children develop a secure or insecure attachment style. These dispositional types of attachment influence children's views and expectations (more or less positive) about others, about the self and, consequently, about the way the self should relate to others. These secure or insecure attachment styles are rooted in internal working models (schemas or conceptual frameworks) that develop from infancy to adulthood. In adulthood, the attachment style of an individual still influences his expectations (positive or negative) about future relationships and, consequently, the outcomes of these relationships (Ainsworth 1989; Bowlby 1969). These initial studies were continued and expanded, and currently prevails the belief that the responsiveness of primary caregivers in childhood and significant others throughout life promotes secure attachment—which in turn facilitates healthy and caregiving relationships in adulthood (Collins and Ford 2010; Mikulincer and Shaver 2007).

Hazan and Shaver (1987) specifically developed the study of adult attachment in the context of romantic relationships. They considered love itself to be a process of becoming attached that shares important similarities with child-caretaker attachment. They suggested that although romantic love is partly an attachment phenomenon, it involves additional behavioral systems such as care giving and sex, which are empirically intertwined with attachment but theoretically separable. They were the first to develop a measure of adult attachment with three styles (secure, avoidant and anxious). Later, Collins and Read (1990) developed a measure of adult attachment with three dimensions, defined as *close* (the individual's comfort with closeness), *depend* (the ability to depend on others) and *anxiety* (low anxiety about rejection in the context of love relationships). Attachment theory suggests that people with secure attachment are more likely to adequately mobilize the care giving system when confronted with another person in need and to respond with compassion. The insecure avoidant style, on the other side, is characterized by unresponsiveness, and the insecure ambivalent style is characterized by anxiety—both of which will probably supply less adequate support (Mikulincer and Shaver 2007).

1.2 Love Styles

Lee (1973, 1977), based on an empirical study using interviews, concluded that people experience, show and think about love differently. He developed an instrument that measures six different categories of love. He described the main features of each category or love style, namely, eros, mania, ludus, storge, pragma and agape. *Eros* love style (passionate love) is characterized by having a physical ideal and by the desire for affective and sexual intimacy. The experience of love is highly emotional and intense, but not obsessive or overly jealous. That is, eros is characterized by being secure in love, able to commit to a relationship and to communicate about the relationship. *Mania* love style (possessive/dependent love) is an obsessive, jealous, and very emotional love style. It is further characterized by desiring intimacy quickly and intensely. However, the individual with a mania love style tends to be insecure about relationships, often fearing that their feelings will not be reciprocated and needing a lot of reassurance. *Ludus* love style (or game-playing love) is characterized by enjoying having variety in partners and dating more than one person at a time. Ludic lovers believe one can love two or more people simultaneously and don't have an ideal physical type. They are not very emotional and their relationships do not get "serious". They try not to spend too much time with any one person, or discussing the relationship, so as to avoid commitment. They would prefer telling partners that they are dating other people but they may not do so if they know

partners will be jealous. *Pragma* love style (practical love) is characterized by the pursuit of compatibility in terms of social and personal characteristics (e.g., religion, education, family background), whereas physical appearance is unimportant. Pragmatic lovers are not very emotional. They want the relationship to be a success, so they have established criteria for a partner and want to know someone well before making a commitment. *Storge* love style (friendship love) places value on companionship and stability. Love develops over time as an extension of a friendship relationship. Storgic lovers are intimate, sharing activities and common interests. Physical attraction is relatively unimportant; common interests are more important. They like to feel comfortable in a relationship, which is not very emotionally charged. *Agape* love style (or altruistic/selfless love) is the belief that all persons deserve one's love, combined with the absence of an expectation of love in return (although reciprocation would be appreciated, it is not expected). Agapic lovers are not very emotional, they do not have physical preferences and they are generally very tolerant and supportive. According to Lee, these categorical love styles should be considered a relationship characteristic or an emotional experience, relating to a specific partner and romantic relationship, more than an individual trait characteristic.

The relationship between love styles and attachment styles is already documented in the literature, although the results are not always consistent. According to Hazan and Shaver (1987), the fundamental difference between these theoretical approaches is that adult attachment describes a tendency towards adult love that is firmly rooted in early experiences of attachment, and related to intimacy and trust. Love styles, on the other hand, offer rich descriptions of the current beliefs adults hold about love, rather than emphasizing developmental issues. Hendrick and Hendrick (1989) defend that attachment styles can be seen as the building blocks of interpersonal relationships, while love styles reflect beliefs and attitudes about love.

Attachment security, characterized by trust and positive expectations about relationships, has been positively associated with eros and agape love styles (Frazier and Esterly 1990; Levy and Davis 1988) and with views of love that are more romantic and less practical (Collins and Read 1990). Individuals comfortable with closeness are less likely characterized by ludus, storge or pragma love styles and are more likely characterized by agape love style (Collins and Read 1990). Attachment security is negatively associated with ludus love style (Levy and Davis 1988). *Attachment insecurity (avoidant/dismissing),* characterized by being uncomfortable with closeness and by difficulty in depending on others, is positively associated with ludus and negatively correlated with eros and agape love styles (Levy and Davis). It is negatively associated with compassionate love (Sprecher and Fehr 2010) and positively related to utilitarian love (Remshard 1999). *Attachment insecurity (ambivalent/anxious),* characterized by anxiety about being abandoned or unloved, is strongly and positively related to mania (Collins and Read 1990; Kanemasa et al. 2004; Levy and Davis 1988). This attachment style was unrelated to agape love style in a study by Levy and Davis (1988), but positively related to agape in a study by Feeney and Noller (1990), suggesting that the altruistic style of agapic lovers may also be a way of expressing an intrusive and compulsive caring.

1.3 Objective and Subjective Romantic Relationship Experiences

In the present study, we defined *objective romantic relationship experiences* as factual variables, such as the number of relationships a person had, the maximum duration of a relationship, the number of times a person considered himself or herself to have been in love and the number of simultaneous relationships a person reported having. We also

measured *subjective romantic relationship experiences*, such as general satisfaction with romantic relationships and satisfaction with one's current romantic relationships.

The scientific literature shows, although not abundantly, an association between objective romantic relationship experiences, attachment styles and love styles. For example, to have casual sex partners, outside one's primary relationship, is less likely among securely attached individuals (Bogaert and Sadava 2002; Feeney and Noller 2004). Also, not having many serious relationships is more common among ludic lovers (Hensley 1996; Montgomery and Sorell 1997). To have more romantic and sexual experiences is more common in erotic lovers and thinking of sex as a tool is more common among ludic and pragmatic lovers (Wada 1994). Having longer, enduring and stable sexual relationships is not significantly associated with secure attachment (Remshard 1999). Couples that remained together, in one study, were more frequently categorized by the style of eros and less frequently by ludus (Hendrick et al. 1988).

Past research on subjective romantic relationship experiences—for example, romantic relationship satisfaction—establishes a strong positive association with attachment security (Collins and Read 1990; McCarthy and Maughan 2010) and a strong negative association with avoidant or anxious attachment insecurity (Birnbaum 2007; Butzer and Campbell 2008; McCarthy and Maughan 2010; Mikulincer and Shaver 2005). On the other hand, the association between satisfaction with relationships and love styles has also been documented. Relationship satisfaction was associated with and predicted by eros and agape love styles (Frazier and Esterly 1990; Hendrick et al. 1988; Lin and Huddleston-Casas 2005; Meeks et al. 1998) and also by storge love styles (Hendrick and Hendrick 1993; Meeks et al. 1998). Yet, in another study, marital satisfaction was predicted when eros and ludus love styles were not accentuated (Skolski and Hendrick 1999). Other studies have found negative associations between relationship quality and ludus (Frazier and Esterly 1990; Inman-Amos et al. 1994; Hendrick et al. 1988; Kanemasa et al. 2004), as well as mania love styles (Hendrick et al. 1988).

1.4 Subjective Well-Being

SWB is a broad construct that includes three dimensions: satisfaction with life as a whole and with various life domains (the cognitive dimension); the frequent experience of positive affect and the relatively infrequent experience of negative affect (the affective dimension; Diener and Ryan, 2009; Galinha and Pais-Ribeiro 2008). Some studies show the association of SWB with attachment style, love styles and romantic relationship experiences. Theory and research suggest that involvement in and the quality of romantic relationships is an essential correlate of well-being (Myers, 2000; Berscheid, 2003; see Diener and Biswas-Diener, 2008, for a review). Love is positively associated with happiness and satisfaction (Diener and Lucas, 2000) and after controlling for personality, romantic relationship satisfaction still accounted for 3 % of the variance in happiness (Demir, 2008). The association between SWB and attachment security is also well documented. Secure attachment is associated with greater happiness, lower negative affect, and fewer psychiatric symptoms (see Mikulincer and Shaver 2007, for a review). Attachment insecurities, anxiety or avoidance, are associated with heightened distress and diminished well-being (Tomlinson et al. 2010).

Subjective well-being seems to be related with love styles in different ways. The cognitive dimension of SWB is positively associated with companionate (friendship) love (Kim and Hatfield 2004), while the emotional dimension of SWB is associated with eros and passionate love style (Kanemasa et al. 2004; Kim and Hatfield; Özer and Tezer 2008).

The affective dimension of SWB is negatively associated with mania, ludus and pragma love styles. Agape showed a similar pattern to mania, a result not consistent with the theory (Kanemasa et al.).

1.5 Gender Differences

Van Ijzendoorn and Bakermans-Kranenburg (2010) found no gender differences in the distribution of attachment styles, dismissive or preoccupied attachment. However, males and females seem to experience romantic love differently. Some studies have found empirical evidence of gender differences in the relationship between attachment styles, love styles and relationship satisfaction. However, some of these differences are not consistent across samples. Generally, research on gender differences has described a pattern for college-age men reporting more avoidant attachment, erotic and agape love styles, to be more permissive about casual sex and to have a higher number of sexual partners, in comparison with women. In the formation and maintenance of sexual relationships, the recognition of affectional needs is often overlooked by men (Remshard 1999). For women, the best predictor of relationship quality was the fact that their male partner was comfortable with closeness, while for men it was the fact that their partner was anxious about being abandoned or unloved (Collins and Read 1990).

Ludus love style is more common in males than in females (Canary et al. 1997; Hendrick and Hendrick 1995) and it is the least preferred love style in a partner, regardless of gender (Hensley 1996). Ludus was positively related to life satisfaction in young men but negatively related to life satisfaction in women (Yancey and Eastman, 1995; Yancey and Berglass 1991). Mania love style was found to be more common among men (Hendrick and Hendrick 1991) and, for women, is more likely a negative predictor of satisfaction with relationships than for men (Hendrick et al. 1988). Yet, in another study, mania love style was negatively associated with life satisfaction in both genders (Yancey and Berglass 1991).

Agape love style is also more common among men (Hendrick et al. 1998; Davies 2001; Lin and Huddleston-Casas 2005), but was the only love style that was positively related to life satisfaction in women (Yancey and Berglass 1991). Other studies didn't find gender differences related to agape (Dion and Dion 2006; Montgomery and Sorell 1997). Passionate love was more strongly associated with positive and negative affect in men than in women, while companionate love (friendship) was more strongly associated with satisfaction with life in women than in men (Kim and Hatfield 2004). Females are sometimes found to be more storgic and pragmatic than males (Hendrick and Hendrick 1995). However, pragma love style varies in many ways by gender. Although defined as a non-emotional love style, female pragma lovers do pursue closeness in their relationships (Hendrick and Hendrick 1991). In a small sample of men, storge was positively—while pragma was negatively—related to life satisfaction (Yancey and Berglass, 1991).

1.6 Overview of the Present Study

It is theoretically plausible that an individual's internal working models of attachment may influence and be influenced by the person's attitude toward love (or love style). Attachment styles and love styles may also contribute to an individual's objective (e.g. number and duration of relationships) and subjective relationship experiences. As we have seen, attachment styles and love styles are also relationship-specific, and influenced by the individual's specific relationship context. Furthermore, it is theoretically expectable that

each of these variables contributes independently to the individual's overall SWB. To test these predictions, we designed a structural model where attachment security, love styles and romantic relationship experiences are correlated and each is specified as a predictor of global SWB.

The general objectives of this study are to understand the relations between the variables of the study and the main predictors of SWB, and to compare these relations across three samples from three different countries and cultures. The specific objectives are: (a) to analyze the measures used in the study across the three samples; (b) to analyze the amplitude of the associations between attachment style, love styles, and romantic relationship experiences; (c) to analyze the ability of these variables to conjointly predict SWB; (d) to compare and analyze the differences and similarities of the structural relations in three different countries and cultures (US, North American; Mozambique, Eastern African; and Portugal, South European); (e) to analyze mediating effects of love styles and satisfaction with relationships, between attachment security and SWB, in each country; and, finally, (f) to compare and analyze gender differences in the predictors of SWB in each country. According to previous theories and empirical results it is possible to formulate some hypotheses for our results:

1. Attachment security is predicted to be significantly related to the individual's love styles; specifically, secure attachment will be positively correlated with emotional love styles (e.g., eros love style) and negatively correlated with less emotional or possessive/dependent love styles (e.g., ludus and mania love style);
2. Attachment security is predicted to be significantly related to romantic relationship experiences and SWB: specifically, we predict that attachment security will be positively correlated with satisfaction with relationships and SWB, and negatively correlated with the number of simultaneous relationships;
3. Love styles are predicted to be significantly correlated with satisfaction with relationships and SWB; specifically, emotional love styles (e.g., eros love style) will be positively correlated with satisfaction with romantic relationships and SWB; less emotional love styles and possessive dependent love styles (e.g., ludus and mania) will be negatively correlated with satisfaction with relationships and SWB.
4. We hypothesize that, when testing the relative contribution of each independent variable of the model, satisfaction with actual and past romantic relationships will be the strongest predictor of SWB in the three samples, since it is an important domain of life satisfaction, and consistently found to be highly correlated with SWB.

2 Methods

2.1 Participants

Our sample was comprised of 1,582 university students from three different countries: North America (North Carolina, USA), Africa (Maputo, Mozambique) and Europe (Lisbon, Portugal). Of the total number of participants, 497 were students at East Carolina University, aged between 18 and 54 years old ($M = 19$; $SD = 0.13$; 64.3 % female), 544 were students at Eduardo Mondlane University, aged between 17 and 45 years old ($M = 25.18$; $SD = 0.23$; 42.8 % female), and 541 were students at several universities in Lisbon, aged between 17 and 66 years old ($M = 23$, $SD = 0.35$; 56.4 % female). All three samples of the study were collected by the convenience sampling method.

2.2 Measures

To measure the variables in the present study, we used six scales. In the American sample we used an English version of the scales. In the Portuguese and the Mozambican samples we used a Portuguese version of the scales. While the measures we employed have not been culturally validated in a Mozambican population, Portuguese is the official language of Mozambique and university students speak, read and write in Portuguese every day. Thus, we opted to use the Portuguese version of the scales with the Mozambican sample. Additionally, we performed a pre-test to evaluate the comprehension of the questionnaire by the Mozambicans. We opted to use short versions of the scales when available because they showed good psychometric properties, the questionnaire included several variables and we wanted to limit the overall length of the questionnaire to 30–40 min. Below we present the measures used in the study and their characteristics. In the results section, we present a detailed analysis of the outcomes for the confirmatory factorial analysis (CFA) performed for each measure and the psychometric properties of the latent and observed variables used in our study.

1. Subjective Well-being in this study is measured by a composite of three scales (Fig. 1): (a) the Satisfaction with Life Scale (SWLS: Diener et al. 1985; Portuguese Version: Neto 1990) measures global life satisfaction through five items (ideal life; conditions of life; satisfaction with life; important things in life; change things in life), on a seven-point Likert scale, ranging from *Strongly Disagree* to *Strongly Agree*; (b) the Positive and Negative Affect Schedule (PANAS; Watson et al. 1988; Portuguese version: Galinha and Ribeiro 2005) measures how much the individual feels a list of ten positive and ten negative specific emotions (during the last few days) using a five point response scale, from *Very slightly or not at all* to *Extremely*. The structure of the scale is composed of two dimensions—Positive Affect (positive emotions), and Negative Affect (negative emotions). For the purposes of this study, we used the Positive Affect dimension of the PANAS; and (c) Personal Well-being Index (PWI; International Wellbeing Group 2006; Portuguese version [BEP]: Ribeiro and Cummins 2008). The PWI measures personal satisfaction with eight life domains (Standard of living; Health; Achieving in life; Relationships; Safety; Community connectedness; Future security; Spirituality/Religion), on an eleven point scale, from 0 (*Completely Dissatisfied*) to 10 (*Completely Satisfied*).
2. Adult Attachment Scale–R [AAS-R; Collins and Read 1990; Portuguese version (EVA): Canavarro, 1999]. The AAS-R measures attachment in adult relationships on three dimensions: *close* (evaluates comfort in establishing close and intimate relationships), *depend* (evaluates the feeling of being able to depend on others in situations of need, level of trust in others), and *anxiety* (evaluates an individual's level of worry about the possibility of being abandoned, rejected or not loved). Attachment security is defined by Collins and Read as comfort with closeness, the ability to depend on others and low anxiety. The scale consists of eighteen items, answered using a 1 (*Not at all characteristic*) to 5 (*Very characteristic*) response format.
3. Love Attitudes Styles Short-Form (LAS-SF; Hendrick et al. 1998; Portuguese Version, Neto 1993, 1994). The LAS-SF is a measure of love attitudes/styles in six dimensions, as previously defined: *eros*, passionate love; *storge*, friendship love; *ludus*, game-playing love; *agape*, altruistic love; *mania*, possessive, dependent love; and *pragma*,

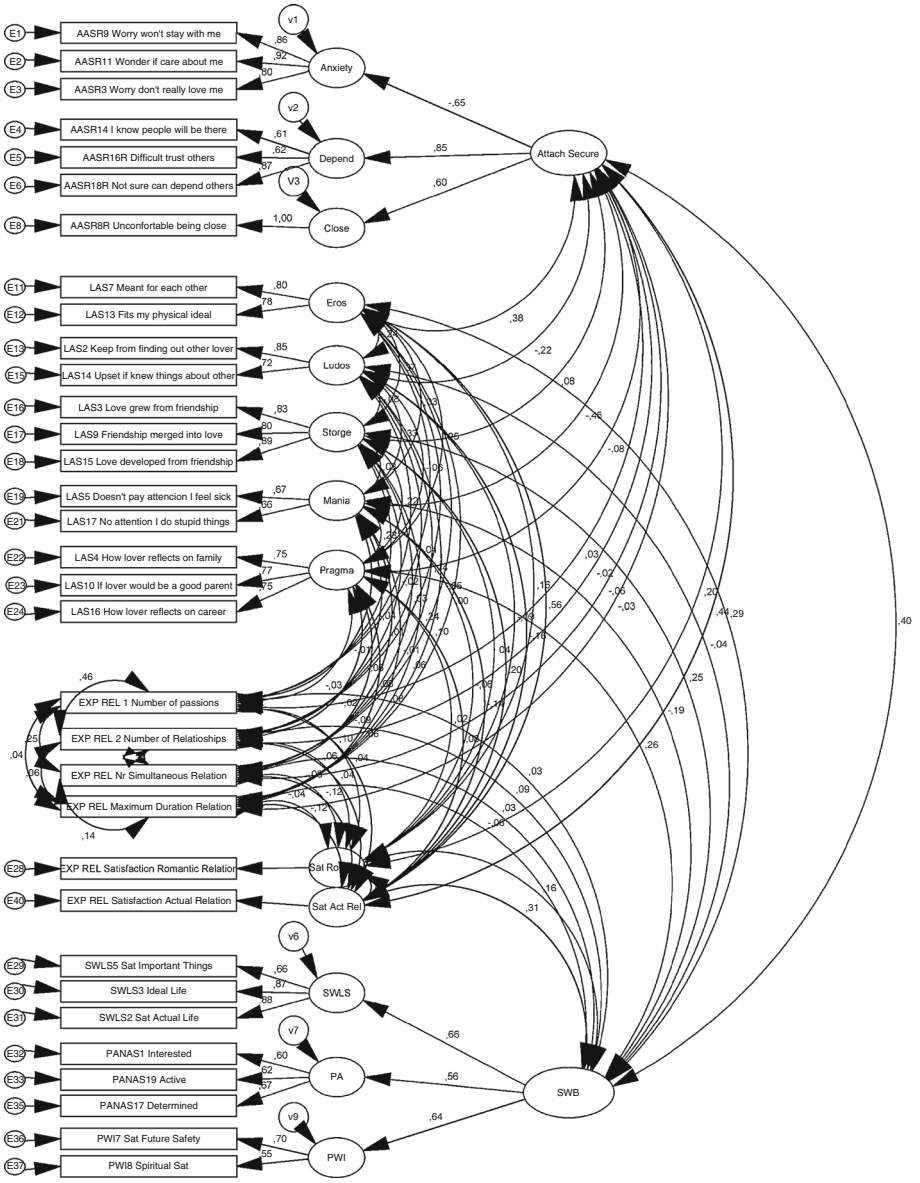

Fig. 1 Measurement US Model (standardized estimates)[1]

[1] AAR9 I often worry that romantic partners don't really love me; AAR11 I often worry that romantic partners won't want to stay with me; AAR3 I often wonder whether romantic partners really care about me; AAR14 I know that people will be there when I need them; AAR16R I find it difficult to trust others completely; AAR18R I am not sure that I can always depend on people to be there when I need them; AAR8R I am somewhat uncomfortable being close to others. LAS7 I feel that my partner and I were meant for each other; LAS13 My partner fits my ideal standards of physical beauty/handsomeness; LAS2 I have sometimes had to keep my partner from finding out about my other lovers; LAS14 My partner would get upset if he/she knew of some of the things I've done with other people; LAS3 Our love is the best kind

practical love. The scale consists of eighteen items, answered using a 1 (*Totally agree*) to 5 (*Totally disagree*) response format.

4. Romantic relationship experiences. With the purpose of measuring objective and subjective romantic relationship experiences, participants answered objective questions such as the number of times they were in love, number of relationships, maximum duration of relationships, and number of simultaneous relationships. Participants also answered subjective questions, such as their satisfaction with romantic relationships in general and their satisfaction with a current romantic relationship. These items were measured on a five point scale from "*Very little or not at all satisfied*" to "*Extremely satisfied.*" We tested a model with one latent variable explaining the two items (satisfaction with romantic relationships and satisfaction with current romantic relationships). Surprisingly, the model did not fit the data in any of the three samples, suggesting the items are not measuring the same construct. For that reason, we used them separately.

2.3 Procedure

After obtaining permission from the universities and teachers involved, students in the Mozambican and the Portuguese samples were invited, at the end of classes, to participate in a study about SWB and relationship experiences. The self-report questionnaire lasted on average 35 min; besides the measures in this study, it also measured personality and cultural values. Prior to completing the survey, participants were informed about the confidentiality and the anonymity of their responses to the questionnaire in accordance with the ethical standards of the American Psychological Association (APA). The students who did not volunteer were free to leave the classrooms. Students were informed that they were free to answer only the questions that they wished. An e-mail address of the researcher was given for any questions related to the research project. Data collection for the US sample was identical, except that participants completed the questionnaire online as one of several options available for obtaining course credit. Data in the three countries were collected during the winter of 2010.

3 Results

For the statistical analysis of the data, parameters were estimated using a raw data database and the maximum likelihood method, with estimates of means and intercepts on AMOS

because it grew out of a long friendship; LAS9 Our friendship merged gradually into love over time; LAS15 Our love relationship is the most satisfying because it developed from a good friendship; LAS5 When my partner doesn't pay attention to me, I feel sick all over; LAS17 If my partner ignores me for a while, I sometimes do stupid things to try to get his/her attention back; LAS4 A main consideration in choosing my partner was how he/she would reflect on my family; LAS10 An important factor of choosing my partner was how he/she would be a good parent; LAS16 A main consideration in choosing my partner was how he/she would reflect on my career; EXP REL1 Throughout your life, how many times did you fall in love?; EXP REL2 Throughout your life, how many love relationships did you maintain with someone (regular dates during more than 3 months) with or without commitment?; EXP REL3 If you did maintain several love relationships in simultaneous, which was the highest number of relationships in simultaneous?; EXP REL4 Which was the longest duration of your love relationships? EXP REL5 Of the previous love relationships, how many do you consider were satisfactory to you?; EXP REL6 To what extent are you satisfied with your current love relationship?—SWLS2 I am satisfied with my current life; SWLS3 My current life is ideal for me; SWLS5 I have the important things I want right now; PANAS17 Interested; PANAS19 Active; PANAS1 Determined; PWI7 How satisfied are you with your future security?; PWI8 How satisfied are you with your spirituality/religion?

(18th version) software (Arbuckle 2009). We considered a model to have acceptable fit when three of the following indices were simultaneously met: the Bentler comparative fit index (CFI) was above .90; the root mean square error of approximation (RMSEA) was below .08 or the SRMR was below .10; the normed χ^2 (computing χ^2/gl) was below 3; and the observed variables' regression loadings on the latent variables were above .30, according to criteria proposed by Kline (2010), Bollen (1989) and Jackson et al. (2009).

3.1 Preliminary Analysis

We started our analysis by performing a CFA of each measure in each of the three samples, by testing its factorial structure, including all the observed and latent variables of the scales. In the next step, we eliminated the items with regression loadings below .30. Then we eliminated other low regression-loading items, until we obtained the three higher regression-loading items to measure each latent variable and that best contributed to the fit of the multi-group model of the three samples.

1. We started the analysis of the adult attachment scale (AAS-R) by specifying a model with three intercorrelated latent variables (Anxiety, Depend, Close), each measured by six observed variables. The initial model showed a poor fit in the three samples of the study: in the US $\chi^2_{132} = 608.6$, $p < .05$, (CFI = .87; RSMEA = .09), in Mozambique $\chi^2_{132} = 348.1$, $p < .05$ (CFI = .82; RSMEA = .06), seven items' regression loadings were below .30 (items 1"I find it relatively easy to get close to people", 2R "I find it difficult to allow myself to depend on others", 5 "I am comfortable depending on others", 6 "I do not worry about someone getting too close to me", 12 "I am comfortable developing close relationships with others", 13R "I am uncomfortable when anyone gets too emotionally close to me", and 17R "Romantic partners often want me to be emotionally closer than I feel comfortable being") and in Portugal $\chi^2_{132} = 674.9$, $p < .05$, (CFI = .79; RSMEA = .09), three items' regression loadings were below .30 (item 2R, 5 and 6). In the next step, we eliminated the items with regression loadings below .20 in each sample (item 6, 2R, 5, 1, 12). We obtained a model with six items in the anxiety scale, four items in the depend scale and three items in the close scale. Then we eliminated the items with lower regression loadings until we obtained a model with three latent variables measured by three observed variables each. This model showed adequate fit in the three samples $\chi^2_{72} = 176.3$, $p < .05$, (CFI = 97; RSMEA = .03), but still two items from the close scale were below .30 in the Mozambican sample (items AARS17R and AARS13R). We eliminated these two items and obtained a model with three latent variables (anxiety, depend and close) measuring one higher order factor (attachment) that fitted the data well. Anxiety and depend are measured by three observed variables and close is measured by one item (see Fig. 1). The model indicated high levels of reliability in the three samples: US $\chi^2_{12} = 16.6$, $p = .17$, (CFI = 1; RSMEA = .03), Mozambique $\chi^2_{12} = 21.7$, $p = .05$ (CFI = .98; RSMEA = .04) and Portugal $\chi^2_{12} = 23$, $p = .03$, (CFI = .99; RSMEA = .04). All items' regression-loadings in the three samples were above .37.
2. We started the analysis of the love styles measure (LAS) by specifying a model with six correlated latent variables (eros, storge, ludus, mania, pragma and agape), each measured by three items, consistent with the scoring of the scale. This initial model showed the following fit to the data: in the US sample $\chi^2_{120} = 288.8$, $p < .05$,

(CFI = .95; RSMEA = .05), all items' regression loadings were above .50; in the Mozambique sample $\chi^2_{120} = 261.8$, $p < .05$ (CFI = .88; RSMEA = .05), three items' regression loadings were below .30 (items LAS1, "My partner and I have the right physical "chemistry" between us", LAS6, "I would rather suffer myself than let my partner suffer", and LAS8, "I believe that what my partner doesn't know about me won't hurt him/her"), and in Portugal $\chi^2_{120} = 287.8$, $p < .05$, (CFI = .91; RSMEA = .05), one item regression loading was below .30 (item LAS1). In the next step, we deleted these items and obtained the final measurement model for the love styles measure included in the study. A six correlated-factor model—where latent variables storge, mania and pragma were measured by three observed variables, and latent variables eros, ludus and agape were measured by two observed variables—was obtained. This model showed acceptable fit in the three samples: US $\chi^2_{75} = 207.9$, $p < .05$, (CFI = .95; RSMEA = .06); Mozambique $\chi^2_{75} = 175.2$, $p < .05$, (CFI = .91; RSMEA = .05); and Portugal $\chi^2_{75} = 169.5$, $p < .05$, (CFI = .93; RSMEA = .05). All items' regression loadings in the three samples are above .33.

3. To measure global SWB, we selected three items from each of the three measures, SWLS, PA, and PWI (Fig. 1) and we further describe the process for each measure below.

SWLS: We first tested a model of SWLS represented as a latent variable measured by the five items of the scale. This initial model showed the following fit indices: in the US sample $\chi^2_5 = 6.3$, $p = .28$, (CFI = 1; RMSEA = .02); in the Mozambican sample $\chi^2_5 = 33.2$, $p < .05$, (CFI = 97; RMSEA = .10); and in the Portuguese sample $\chi^2_5 = 25.2$, $p < .05$, (CFI = .99; RMSEA = .09). All regression loadings of the items were above .43. Excluding the item "I would change nothing about my current life" produced a better fit to the data in the three samples: US $\chi^2_2 = 3.5$, $p = .18$, (CFI = 1; RMSEA = .04); Mozambique $\chi^2_2 = 30.7$, $p < .05$, (CFI = .96; RMSEA = .17; SRMR = .04) and Portugal $\chi^2_2 = 10.3$, $p < .05$, (CFI = .99; RMSEA = .09; SRMR = .02). The RMSEA in the Mozambican and Portuguese samples was higher than .08, the small size of the model may be contributing to this fact. Thus, we additionally present the SRMR index demonstrating good fit in these samples. All regression loadings in the three samples were above .51. Next, we deleted the item "The current conditions of my life are excellent" to obtain the final three observed variables included in the global SWB measure.

PANAS: The positive dimension of PANAS (PA) is constituted by ten items (ten positive emotions). However, since the Portuguese version of PANAS is not a direct translation of the English version, we used only the direct translation items: Interested (Interessado), Active (Activo), Determined (Determinado), Inspired (Inspirado), Proud (Orgulhoso) and Enthusiastic (Entusiasmado). This initial model showed the following fit indices: US $\chi^2_9 = 27.3$, $p < .05$, (CFI = .91; RSMEA = .06); Mozambique $\chi^2_9 = 21.8$, $p < .05$, (CFI = .96; RSMEA = .05) and Portugal $\chi^2_9 = 45.8$, $p < .05$, (CFI = .96; RSMEA = .09). All regression loadings in the three samples were above .34. The final model with four items (namely, Interested, Inspired, Active, Determined) showed better fit indices: US $\chi^2_2 = 3.2$, $p = .20$, (CFI = 1; RSMEA = .04); Mozambique $\chi^2_2 = 1.1$, $p = .57$, (CFI = 1; RSMEA = .0) and Portugal $\chi^2_2 = 0.2$, $p = .90$, (CFI = 1; RSMEA = .0). All regression loadings in the three samples were above .36. Next,

we deleted the item "Inspired" to obtain the final three observed variables in the global SWB measure.

PWI: The initial model of the PWI was specified as a one factor model measured by the eight items that constitute the scale and showed the following fit indices: US $\chi^2_{20} = 188.6$, $p < .05$, (CFI = .87; RSMEA = .13); Mozambique $\chi^2_{20} = 91.7$, $p < .05$, (CFI = .92; RSMEA = .08) and Portugal $\chi^2_{20} = 129.2$, $p < .05$, (CFI = .91; RSMEA = .10). All regression loadings in the three samples were above .39. A one-factor model measured by four observed variables (namely, satisfaction with future security, satisfaction with relationships, satisfaction with health, and satisfaction with spirituality) showed a better fit to the data in the three samples: US $\chi^2_2 = 6.9$, $p < .05$, (CFI = .98; RSMEA = .07); Mozambique $\chi^2_2 = 2.8$, $p = .24$, (CFI = 1; RSMEA = .03) and Portugal $\chi^2_2 = 3.9$, $p = .14$, (CFI = .99; RSMEA = .04). All regression loadings in the three samples were above .43. Next, we deleted the item "Satisfaction with relationships" to obtain the final three observed variables in the global SWB measure.

Global SWB: Finally, to test global SWB we specified a single higher-order factor measured by three first-order latent variables (SWLS, PA and PWI), measured by three items each. The model indicated high levels of reliability in all three samples: US $\chi^2_{24} = 65.5, p < .05$, (CFI = .97; RSMEA = .06); Mozambique $\chi^2_{24} = 24, p = .46$, (CFI = 1; RSMEA = .00) and Portugal $\chi^2_{24} = 24.9$, $p = .51$, (CFI = 1; RSMEA = .01). All regression loadings of the items in the three samples were above .34.

3.2 Measurement Model in the American, Mozambican and Portuguese Samples

We started by testing a measurement model, trying to ensure a good fit to the data in the three samples. We specified a correlational model including the latent variables in the study, based on the preliminary analysis obtained for each measure. The measurement model was specified by five correlated latent variables: (1) *attachment style*, a second order latent variable inversely measured by anxiety with relationships and positively by comfort in establishing close relationships and being able to depend on others; (2) six love styles, specifying different concepts/attitudes towards love; (3) relationship experiences (number of times "in love", number of relationships, number of simultaneous relationships and maximum duration of relationships); (4) satisfaction with current and past relationships; and (5) *subjective well-being* (SWB), a second order dependent variable measured by global satisfaction with life (SWLS), satisfaction with life in specific domains (PWI) and positive affect (PA). It was not possible to identify the multi-group of the three samples with this model because the matrix covariance was not definite positive. Deleting agape love style, one item of PWI (satisfaction with health) and one item of mania love style (LAS 11 "I suspect he/she is with other"), it was possible to obtain the identification of the model with good fit indices for the multi-group of the three samples $\chi^2_{1254} = 1913.8$, $p < .01$, (CFI = .94; RMSEA = .02). This model also showed a good fit for each sample alone (Fig. 1): (a) the US sample, $\chi^2_{418} = 672.2$, $p < .01$, (CFI = .95; RMSEA = .04), all regression loadings in the model above .55; (b) the Mozambican sample, $\chi^2_{418} = 611.5$, $p < .01$, (CFI = .92; RMSEA = .03), all regression loadings above .35; c) the Portuguese sample, $\chi^2_{418} = 630{,}1$, $p < .01$, (CFI = .95; RMSEA = .03), all regression loadings above .37. The construct validity of the first and second order latent variables was supported—all the regression loadings were above .30.

3.3 Correlations Between Attachment Security, Love Styles and SWB in the Three Samples

Analyzing the correlational model in the three samples, we can observe the relations between each of the variables in our study (Table 1). We started by noting similar correlations in the three samples between SWB and attachment security (.40; .44; .55, respectively in the US, Mozambican and Portuguese); between SWB and eros love style

Table 1 Correlations between the latent variables in study, in the three samples, standardized estimates

Variables	US *r*	Moz *r*	Port *r*
Attach ↔ SWB	.40***	.44***	.55***
Attach ↔ Eros	.38***	.41***	.14*
Attach ↔ Storge	.08	−.03	−.18**
Attach ↔ Mania	−.46***	−.53***	−.64***
Attach ↔ Pragma	−.08	−.28**	−.10
SWB ↔ Eros	.30***	.53***	.41***
SWB ↔ Storge	.25***	.08	.26***
SWB ↔ Mania	−.18*	−.04	−.24*
SWB ↔ Pragma	.26***	.13	.20*
Eros ↔ Storge	.37***	.26***	.20***
Eros ↔ Mania	.03	.39***	.16*
Eros ↔ Pragma	.25***	.26**	.11
Ludus ↔ Eros	−.24***	.08	−.25***
Ludus ↔ Storge	−.08	.13	−.07
Ludus ↔ Attach	−.22***	−.26*	−.14*
Ludus ↔ SWB	−.04	−.25*	−.18*
Ludus ↔ Mania	.33***	.59***	.29***
Ludus ↔ Pragma	−.06	.31**	.21**
Mania ↔ Pragma	.23***	.41***	.40***
Storge ↔ Mania	.03	.26***	.18**
Storge ↔ Pragma	.23***	.47***	.41***
Sat Cur Rel ↔ SWB	.31***	.42***	.37***
Sat Cur Rel ↔ Attach	.44***	.32***	.28***
Sat Cur Rel ↔ Pragma	.08	.02	−.03
Sat Cur Rel ↔ Mania	−.14	−.03	−.04
Sat Cur Rel ↔ storge	.20**	.11*	.04
Sat Cur Rel ↔ Ludus	−.17*	−.02	−.22***
Sat Cur Rel ↔ Eros	.56***	.66***	.69***
Sat Rom Rel ↔ SWB	.16*	.15*	.13*
Sat Rom Rel ↔ Attach	.20***	.23***	.22***
Sat Rom Rel ↔ Mania	−.06	−.07	−.21***
Sat Rom Rel ↔ storge	.04	.05	.01
Sat Rom Rel ↔ Ludus	−.09	−.13	−.13*
Sat Rom Rel ↔ Eros	.16**	.07	.04
Sat Rom Rel ↔ Pragma	.02	.05	−.08
Sat Rom Rel ↔ Sat Ac Rel	.08	.09*	.13*

American participants ($N = 497$); Mozambican participants ($N = 544$); Portuguese participants ($N = 541$)

Attach Attachment security, *Eros* Eros love style, *Ludus* Ludus love style, *Mania* Mania Love Style, *Storge* Storge love style, *Pragma* Pragma love style, *Sat Curr Rel* Satisfaction with current romantic relationships, *Sat Rom Rel* Satisfaction with romantic relationships, *SWB* Subjective well−being

* $p \leq .05$;** $p \leq .01$; *** $p \leq .001$

(.30; .53; .41), between SWB and satisfaction with current romantic relationship (.31; .42; .37) and between SWB and general satisfaction with romantic relationships (.16; .15; .13). Significant positive correlations were also observed, in the three samples, between attachment security and satisfaction with current romantic relationship (.44; .32; .28, respectively in the US, Mozambican and Portuguese); between attachment security and general satisfaction with romantic relationships (.20; .23; .22); between attachment security and eros love style (.38; .41; .14). Negative correlations were observed between attachment security and mania love style (−.46; −.53; −.64), and between attachment security and ludus love style (−.22; −.26; −.14). Satisfaction with current relationship correlated similarly with eros love style (.56; .66; 69), respectively in the US, Mozambican and Portuguese samples.

3.4 Structural Prediction of SWB

After analyzing the patterns of correlations between each of the variables in the study, we wanted to know: which are the variables that contribute the most to SWB, in each sample, above and beyond the other variables? For that purpose, we specified a structural model where SWB was the dependent variable, explained by all of the other variables in the study (attachment security, five love styles, four objective and two subjective romantic relationship experiences) as independent variables. In the US sample, according to the structural regression loadings (standardized estimates), the main predictor of SWB was attachment security (.32), followed by pragma love style (.29) and storge love style (.15). In the Mozambican sample, we had problems with the identification of the structural model. Then we realized that eros love style and attachment security shared variance and we tested a model specifying eros love style as a mediator of the effect of attachment security in SWB (Fig. 2). This model yielded a good fit to the data, $\chi^2_{420} = 619$, $p < .01$,

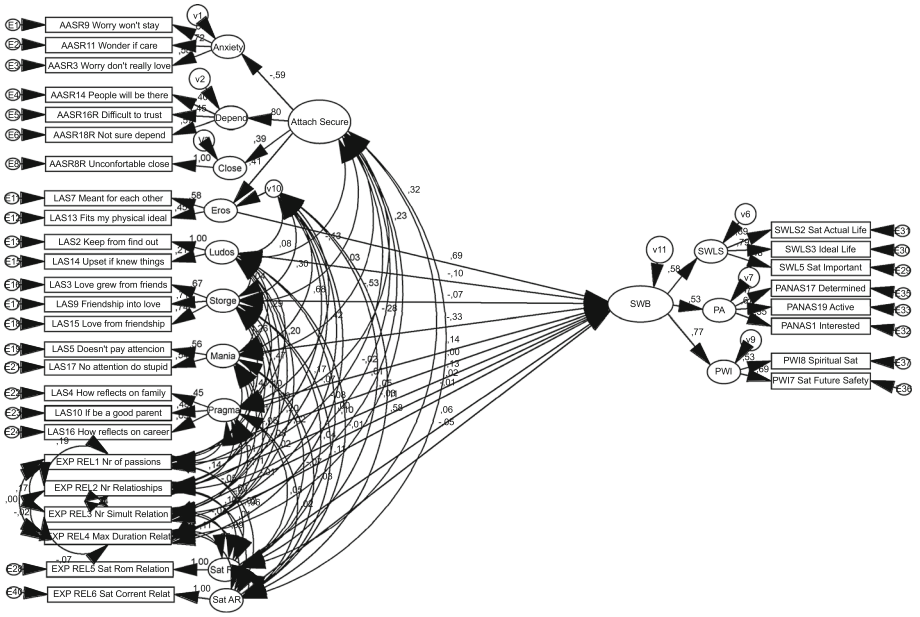

Fig. 2 Structural Mozambican model (standardized estimates)

Table 2 Unstandardized and standardized regression weights of the predictors of SWB in the US and Portuguese samples

Predictors	Subjective Well-Being					
	US			Port.		
	b	*S.E.*	*Beta*	*b*	*S.E.*	*Beta*
Attach	.29***	.10	.32	.83***	.25	.61
Eros	.00	.12	.00	.19	.11	.23
Ludus	.09	.06	.12	−.07	.10	−.09
Storge	.12*	.05	.15	.25**	.10	.23
Mania	−.13	.11	−.13	.01	.20	.01
Pragma	.25***	.07	.29	.22	.18	.16
Nr Passion	−.02	.05	−.02	.01	.01	.05
Nr Relat	.03	.03	.08	−.02	.02	−.09
Simult Relat	.05	.05	.07	.11	.07	.16
Max Durat	.00	.00	−.08	.00***	.00	−.21
Sat Rom Rel	.04	.03	.07	−.02	.04	−.03
Sat Cur Rel	.10	.11	.10	.04	.11	.04

American participants ($N = 497$); Portuguese participants ($N = 541$)

Attach Attachment security, *Eros* Eros love style, *Ludus* Ludus love style, *Mania* Mania Love Style, *Storge* Storge love style, *Pragma* Pragma love style, *Nr Passion* Number of passions, *Nr Relat* Number of relationships, *Simult Relat* Number of simultaneous relationships, *Max Durat* Maximum duration of Relationships, *Sat Curr Rel* Satisfaction with current romantic relationships, *Sat Rom Rel* Satisfaction with romantic relationships, *SWB* Subjective well-being

*$p \leq .05$, * $p \leq .01$, *** $p \leq .001$

(CFI = .91; RMSEA = .03). According to this model, the main predictor of SWB in the Mozambican sample was eros love style (.69), followed inversely by mania love style (−.33). In the Portuguese sample, the main predictor of SWB was attachment security (.61), followed by storge love style (.23) and by maximum duration of relationships (-.21), which unstandardized estimate is -.003 (abbreviated in the table to .00***). The other variables did not contribute specifically to SWB above the contribution of these predictors in the three samples (see Table 2).

3.5 Structural Differences in the Prediction of SWB Multi-Group of the Three Samples

In the next step, we wanted to test the structural differences in the structural model across the three samples. For that purpose, we had to guarantee that there was metric equivalence between the three samples. This was not possible with all the latent variables in the structural model—thus, we had to delete the storge and pragma latent variables and the "active" item from the PA latent variable. With a smaller model (with three love style dimensions: eros; ludus and mania) it was possible to compare the three samples in a multi-group with metric equivalence (Fig. 3). We compared the baseline model, $\chi^2_{663} = 1019.3$, $p < .05$ (CFI = .95; RMSEA = .02), to a constrained model (constraining to equality all the factor loadings of the observed variables between the three countries). The difference between the baseline and the constrained models was $\Delta\chi^2_{20} = 23.1$, $p = .284$. All the regression loadings in all three samples were above .38. Achieving this, a comparison of the structural effects between the three samples in this model is legitimate. Finally, we

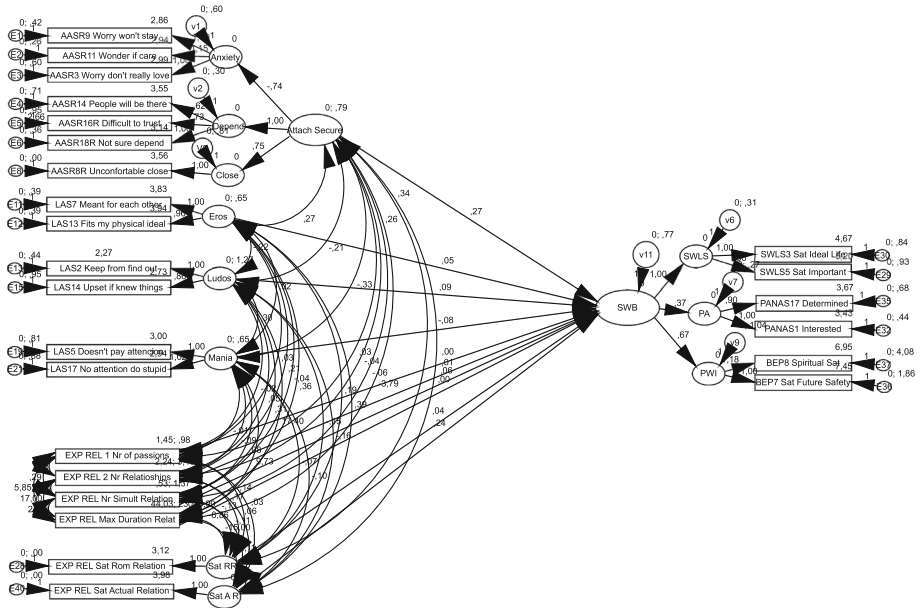

Fig. 3 Multi-group model of the predictors of SWB in the three countries, US group (unstandardized estimates)

Table 3 Unstandardized regression weights of the predictors of SWB; multi-group analysis of the three samples

Predictors	SWB					
	US		Moz		Port	
	b	*S.E.*	*b*	*S.E.*	*b*	*S.E.*
Attach	.27*	.12	.64	1.35	.91***	.26
Eros	.05	.12	.04	1.40	.33*	.14
Ludus	.09	.07	−.49	.53	−.05	.12
Mania	−.08	.13	.59	1.48	.11	.20
NrPassion	.00	.06	.01	.02	.01	.01
NrRelat	.01	.04	.01	.01	−.03	.02
SimultRelat	.06	.06	−.01	.06	.09	.08
MaxDurat	.00	.00	.00	.00	.00***	.00
Sat Rom Rel	.04	.04	−.02	.09	−.02	.04
Sat Curr Rel	.24*	.12	.17	.45	−.03	.13

American participants ($N = 497$); Mozambican participants ($N = 544$); Portuguese participants ($N = 541$)

Attach Attachment security, *Eros* Eros love style, *Ludus* Ludus love style, *Mania* Mania Love Style, *Storge* Storge love style, *Pragma* Pragma love style, *Sat Curr Rel* Satisfaction with current romantic relationships, *Sat Rom Rel* Satisfaction with romantic relationships, *SWB* Subjective well-being

*$p \leq .05$;** $p \leq .01$; *** $p \leq .001$*

compared the structural differences in the multi-group of the three samples. The baseline model and the model where all the regression paths were constrained to be equal were significantly different, $\Delta\chi^2_{20} = 41.4$, $p < .01$. According to the unstandardized regression loadings (see Table 3), one of the main differences across samples was that attachment security did not significantly predict SWB for the Mozambicans, but did significantly predict SWB for the Americans and the Portuguese (respectively, .64, .27, .91). The contribution of eros love style to SWB for the Portuguese was significant, while for the Americans and for the Mozambicans, it was not (respectively, .33, .05, .04). Ludus and mania love styles did not significantly contribute to SWB after the contribution of the other independent variables in the model. Finally, the maximum duration of relationships was a significant negative predictor of SWB in the Portuguese sample (−.003, −.22, respectively ustandardized and standardized estimates). The fact that in the Mozambican group of the multi-group structural model, none of the independent variables significantly predicted SWB, is due to the fact that eros love style and attachment security are sharing variance. Although the fit of the multi-group model was very good, in reality this model does not fit the Mozambican data. As we have seen, the structural model that adequately fits the Mozambican data is one in which eros love style is represented as a mediator of the effect between attachment security and SWB. This fact, however, supports the conclusion that there are differences between the structural relations across the three samples.

3.6 Mediational Analyses in Each Sample

One of our objectives was to analyze love styles and relationship satisfaction as mediators of the link between attachment and SWB. The results of a multi-group of the three samples indicate that there is a significant mediating effect of eros love style between attachment and SWB in the Portuguese and in the Mozambican samples but not in the US sample (see Table 4). On the other hand, the results indicate a mediating effect of satisfaction with current relationships between attachment security and SWB in the US sample but not in the Portuguese nor in the Mozambican samples. Ludus and mania love styles did not exhibit mediating effects in any of the three samples. Although there were significant mediating effects in the three samples, only in the Mozambican sample a mediating model best fitted the data.

Table 4 Mediating effects between the predictors of SWB

Mediator	Between	US		Moz.		Port.	
		Z	*p*	*Z*	*p*	*Z*	*p*
Eros	Attach—SWB	.99	.32	1.93	.05*	2.75	01*
Ludus	Attach—SWB	−1.55	.12	−1.51	.13	−.96	.34
Mania	Attach—SWB	.07	.95	−1.21	.23	−.70	.48
Sat Curr Rel	Attach—SWB	2.45	.01*	1.65	.10	−.10	.92
Sat Rom Rel	Attach—SWB	1.00	.32	.31	.76	1.00	.32

American participants ($N = 497$); Mozambican participants ($N = 544$); Portuguese participants ($N = 541$)

ATT Attachment security, *Eros* Eros love style, *Ludus* Ludus love style, *Mania* Mania love style, *Sat Curr Rel* Satisfaction with current romantic relationships, *SRR* satisfaction with romantic relationships, *SWB* subjective well-being

* $p \leq .05$

3.7 Gender Differences in the Prediction of SWB in Each Sample

Finally, we wanted to identify gender differences in each sample. Are the contributions of each variable to SWB different between men and women in each country? With the purpose of analyzing these differences, we started by obtaining the metric measurement equivalence between genders in the measurement model. We tested the metric invariance between genders by constraining all regression loadings in the measurement model and comparing it to a baseline model where all the parameters were freely estimated. In the US sample, the difference between the baseline model, $\chi^2_{836} = 1130.1$, $p < .01$ (CFI = .94; RMSEA = .03), and the constrained model was $\Delta\chi^2_{16} = 22.2$, $p = .125$. When we transformed the Mozambican model into a gender multi-group model, it no longer fit the data, $\chi^2_{836} = 1114.5$, $p < .01$ (CFI = .88; RMSEA = .03). By deleting the "*maximum duration of relationships*" variable, which showed a high standard error in both groups, the fit of the model improved, $\chi^2_{796} = 1036.8$, $p < .01$ (CFI = .90; RMSEA = .02). The difference between the baseline model and the constrained model was $\Delta\chi^2_{16} = 25.4$, $p = .06$. In the Portuguese sample, the difference between the baseline model, $\chi^2_{836} = 1193.8$, $p < .01$ (CFI = .92; RMSEA = .03), and the constrained model was $\Delta\chi^2_{16} = 19.7$, $p = .234$. Thus, the items are measuring the same constructs across genders in the three samples.

In the next step, we tested the regression paths of the structural model for differences between men and women in the prediction of SWB in each sample. The difference between the baseline model and the constrained model, where all the regression paths were constrained to be equal in both groups, was not significant in the US, $\Delta\chi^2_{12} = 12.9$, $p = .38$ or Portuguese samples, $\Delta\chi^2_{12} = 11.6$, $p = .48$. This result indicates that the regression weights of the independent variables altogether in predicting SWB are similar between women and men. However, we could observe differences in the regression loadings of some structural paths between genders, which we analyzed further. We noticed that in the US sample the contribution of eros love style, ludus love style and the number of simultaneous relationships was considerably different between men and women. To test the significance of these specific differences, we compared a model where all the regression loadings were constrained to be equal with a model where these specific independent variables were freely estimated. This method revealed a statistical difference, $\Delta\chi^2_3 = 8.1$, $p = .04$. Analyzing the unstandardized regression loadings (Table 5) in the American sample, Eros love style was a positive predictor of SWB for men (.37), while for women it was a negative predictor of SWB (−.20); ludus love style was a positive predictor of SWB for women (.13), while for men it was a negative predictor (−.02); and number of simultaneous relationships was a positive predictor of SWB for men (.13), while for women it was not a significant predictor of SWB (−.02). In the Portuguese sample, the regression paths that showed notable differences between men and women were storge love style and pragma love style. When we compared a model with all the regression paths constrained to a model where these two independent variables were freely estimated, the difference was significant, $\Delta\chi^2_2 = 6.8$, $p = .03$. This result indicates that in the Portuguese sample, storge love style was not a significant predictor of SWB for men (.02), while for women it was a significant positive predictor of SWB (.47). Pragma love style was a positive predictor of SWB for men (.85), while for women it was a negative predictor of SWB (−.05), although not significant in both groups.

In the Mozambican sample, it was not possible to identify the structural gender multi-group model. Due to the shared variance between eros and attachment security in the

Table 5 Unstandardized regression estimates of the predictors of SWB, across gender, in the three samples

Predictors	Subjective well-being											
	US				Moz.				Port.			
	Male		Female		Male		Female		Male		Female	
	b	*S.E.*	*b*	*S.E.*	*b*	*S.E.*	*b*	*S.E.*	*b*	*S.E.*	*b*	*S.E.*
Attach	.33	.35	.38***	.12	.92*	.41	.74*	.27	.67	.49	.82*	.32
Eros	.37	.23	−.20	.15	–	–	–	–	.18	.27	.13	.12
Ludus	−.04	.10	.17	.09	−.44	.34	−.41	.40	−.08	.12	−.01	.21
Storge	.12	.09	.12	.07	−.18	.21	−.15	.18	.02	.16	.47***	.16
Mania	.04	.37	−.21	.13	.64	.33	.24	.34	−.03	.32	.04	.34
Pragma	.13	.15	.31***	.09	.44	.40	.68*	.33	.85	.54	−.05	.20
NrPassions	−.08	.10	.02	.08	.03	.03	−.15*	.06	−.01*	.02	.01	.01
NrRelat	.02	.04	.04	.05	.02	.01	−.02	.05	−.01*	.03	.00	.03
SimultRelat	.13	.07	−.02	.07	−.04	.06	.25*	.11	.10	.08	.13	.13
MaxDura	.00	.00	.00	.00	–	–	–	–	.00***	.00	.00	.00
Sat Rom Rel	.01	.08	−.03	.04	−.05	.07	−.06	.07	.02	.07	.03	.05
Sat Curr Rel	−.05	.21	.17	.14	.19	.13	.14	.10	.14	.20	.08	.14

American participants ($N = 497$); Mozambican participants ($N = 544$); Portuguese participants ($N = 541$)

Attach Attachment security, *Eros* Eros love style, *Ludus* Ludus love style, *Mania* Mania Love Style, *Storge* Storge love style, *Pragma* Pragma love style, *Sat Curr Rel* Satisfaction with current romantic relationships, *Sat Rom Rel* Satisfaction with romantic relationships, *SWB* Subjective well-being

* $p \leq .05$;** $p \leq .01$; *** $p \leq .001$

prediction of SWB previously found, we tried specifying eros love style as a mediator between attachment security and SWB, but this approach also did not fit the data. We could identify the model by eliminating one observed variable (*maximum duration of relationships*) and by eliminating the regression path between eros love style and SWB. We then proceeded by testing the structural differences. We compared a baseline model, $\chi^2_{789} = 1{,}043.1$, $p < .01$ (CFI = .90; RMSEA = .02), with a model where all the regression paths were constrained, and the difference was not significant, $\Delta\chi^2_{10} = 12.7$, $p = .24$. Analyzing the structural model, we can see that there are important differences between genders in the contribution of some of the independent variables, namely, mania love style, pragma love style, the number of times the individual was in love, and the number of simultaneous relationships reported. We compared a model with all regression paths constrained to be equal to a model where these four independent variables were freely estimated, yielding a statistical difference, $\Delta\chi^2_4 = 11.9$, $p = .02$. This result means that mania love style was a stronger predictor of SWB in men (.64) than in woman (.24). Pragma love style was a significant predictor of SWB in women (.68) but not significant in men (.44). Number of times in love was not a significant predictor of SWB in men (.03), while it was a negative predictor of SWB in women (−.15). Number of simultaneous relationships was not a predictor of SWB in men (−.04) but was a significant positive predictor in women (.25).

4 Discussion

In this study, we measured attachment security, five love styles, objective romantic relationship experiences, subjective romantic relationships and subjective well-being (SWB) in three different countries and cultures: the United States (North American), Portugal (South European), and Mozambique (South Eastern African). The main objectives were to analyze the correlations between each of these variables and their power to predict SWB in each country; to analyze the structural differences and similarities in the prediction of SWB across the three countries and cultures; and to analyze gender differences and similarities in each country.

4.1 Correlations between Attachment Security, Love Styles, Relationship Experiences and SWB

Across the three samples, as hypothesized, there was a positive significant association between attachment security, eros (passionate) love style, satisfaction with current romantic relationship and SWB. Previous empirical studies also found positive correlations between SWB and attachment security (Mikulincer and Shaver 2007; Tomlinson et al. 2010), with romantic relationship satisfaction (Demir 2008; Myers 2000; Reis et al. 2000) and with eros love style (Kanemasa et al. 2004; Özer and Tezer 2008). Other studies found a positive relationship between attachment security and satisfaction with relationships (Butzer and Campbell 2008; McCarthy and Maughan 2010; Mikulincer and Shaver 2005). It is interesting, however, to find a similar correlation pattern in three different samples—North American, South European and Eastern African. These results support the theory of adult attachment, which relates attachment security to positive emotional love styles, satisfaction with romantic relationships and, ultimately, SWB (Hazan and Shaver 1987; Mikulincer and Shaver 2007).

The only love style that correlates positively with attachment security in the three samples is eros. Not being able to measure agape love style in our global measurement model, these results support the hypothesis that the other love styles were negatively or not significantly correlated with attachment security in all three samples. The positive correlation of eros love style and attachment security is theoretically congruent and consistent with past research (Frazier and Esterly 1990; Levy and Davis 1988). For example, Collins and Read (1990) observed that attachment security was related to views of love that were more romantic and less practical. It is, however, interesting to note that although attachment security and SWB are moderately correlated in all three samples, not all love styles that are positively correlated with SWB are positively correlated with attachment security. For example, storge and pragma love styles are positively correlated with SWB, suggesting that they are probably adaptive love styles that contribute to the global SWB of the individuals although they are not correlated with attachment security. The only love style that positively relates both to attachment security and SWB is eros. We believe these are interesting and new results, only possible by testing, in the same model, the relations between love styles, attachment and SWB. Besides being the only love style that correlates both with attachment security and SWB, eros is also the only love style that simultaneously correlates positively with satisfaction with current relationships, in all three samples. These results probably mean that the more securely attached individuals are, the more they are able to pursue and take the risk of believing in passionate love. Otherwise, individuals may prefer to believe in a love style that relies more on friendship feelings or identification and compatibility with their partners, as observed in less emotional love styles (e.g., storge or pragma). Although these results were not obtained through models with measurement equivalence between the three samples, it is, however, interesting to note similar relations between the variables in the three samples. These similarities give a certain feature of universality to our results and contribute to validating the theory of attachment, the measures used in our study and some previous empirical results.

As hypothesized, mania and ludus love styles were both negatively correlated with attachment security in all three samples. We note that in each of the three countries, the negative correlations between attachment and mania are moderate, while those between attachment and ludus are only weak. However, mania love style was *not* negatively correlated with SWB in the Mozambican sample and ludus love style was *not* negatively correlated with SWB in the US sample as hypothesized. Mania love style (possessive/dependent) is a very emotional love style but also characterized by being very anxious about abandonment from the partner, as well as very jealous. It is usually strongly and negatively associated with SWB (Kanemasa et al. 2004; Özer and Tezer 2008; Yancey and Berglass 1991). This love style was negatively correlated with attachment security, as expected, but not with SWB, in the Mozambican sample. These results may suggest that being a possessive and jealous lover in Mozambique may not be an unadaptive behavior as it may be in the US and Portugal. This result could be related to the fact that polygamy is still a customary practice in Mozambique and that 24 % of Mozambican women share their husbands with other wives (OECD 2012). This practice may generate feelings of jealousy and possessiveness in love relationships and increase its acceptability. Other hypotheses for this result may be related to a traditional view of love among the Mozambicans, associated with possession and commitment more than love and freedom between partners. On the other hand, ludus (game playing love) is known as a non-emotional love style characterized by the preference for having simultaneous romantic relationships, and found to be negatively associated with SWB (Kanemasa et al. 2004; Özer and Tezer 2008). The fact that in the US sample it was not negatively related to SWB may be related to gender or

age differences. Previous studies show gender differences in the associations of ludus with SWB; with young participant samples, the association has been reported as positive in men and negative in women (Yancey and Berglass 1991), but with older participants, negative in both genders (Yancey and Eastman 1995). In the American sample, although ludus love style correlates positively with global SWB, it correlates negatively with satisfaction with romantic relationships, as expected according to previous research (Inman-Amos et al. 1994; Hendrick et al. 1988; Kanemasa, et al. 2004). This result suggests that the benefits of ludus love style for SWB in America are not related to relationship satisfaction, but probably to other dimensions of SWB (e.g., self-esteem, confidence). Other hypotheses for this result may relate to a more detached view of love and relationships among the Americans, in which relationships are viewed as more casual and less based on commitment between partners.

Less emotional love styles, such as storge (friendship love) and pragma (practical love) were not significantly correlated or were very weakly negatively correlated to attachment security in all three samples, as in other studies (Collins and Read 1990; Remshar 1993). They differed, however, in their association with SWB, depending on the sample. Storge love style was a significant correlate of SWB in the US and Portuguese samples, as expected, but not in the Mozambican sample. Previous studies found an association of companionate or storge love style with various dimensions of SWB (Kanemasa et al. 2004; Kim and Hatfield 2004) and with relationship satisfaction (Hendrick and Hendrick 1993; Meeks et al. 1998). This result in the Mozambican sample is surprising, since it is expected to be a collectivistic society where companionate love would be valued and, for that reason, associated with SWB (Kim and Hatfield 2004). One explanation for this result may be a strong passionate vision of love among the Mozambicans, which may be incompatible with the idea of love based on friendship and companionship and therefore not associated with happiness. Pragma love style, a logical style where individuals preferably look for compatibility with the partner, more than passion and physical attraction, was negatively associated with SWB in the Mozambican sample but positively associated with SWB in the US and Portuguese samples. This is also a surprising result, since previous studies reported a negative association of pragma love style with SWB (Kanemasa et al. 2004; Yancey and Berglass 1991) in individualistic and collectivistic countries. Also, it could be expected that in some collectivist countries (i.e., Mozambique; Triandis 1989) that a certain degree of pragmatic love could be adaptive, as marriages may, at times, be arranged according to socioeconomic aspects besides being in love (Kim and Hatfield 2004). This unexpected result may be related to gender differences within the sample, as we will test further. Pragma love style was not correlated with relationship satisfaction in the three samples, as expected (Hendrick and Hendrick 1993; Meeks et al. 1998). Some of these unexpected results may also be explained by the measures used in past studies. For example, most of the previous studies use the cognitive or the affective dimension of SWB separately and we are using both dimensions simultaneously. As we have seen, the results are expected to differ according to the dimension, cognitive or affective, used to measure SWB (Kanemasa et al. 2004; Kim and Hatfield; Özer and Tezer 2008).

4.2 Predictors of SWB in the US, Portugal and Mozambique

We theoretically and empirically understand that attachment security, love styles, and romantic relationship experiences can predict human global SWB. What we did not know yet was the power of each variable in predicting SWB, beyond the other variables. We also did not know if the associations between these variables were universal or culture-specific.

If they are culture specific, what are the specific differences and similarities between the variables across the three cultures? We hypothesized that satisfaction with actual and past romantic relationships would be the main predictors of SWB because satisfaction with relationships is an important domain of life satisfaction, and consistently correlated with SWB (Berscheid 2003; Diener and Biswas-Diener 2008). However, attachment security is the main predictor of SWB in the US and Portuguese samples and eros love style is the main predictor of SWB in the Mozambican sample. Satisfaction with romantic relationships was not a significant predictor in any of the three samples, after the contribution of the attachment security and love styles.

The main predictor of SWB in the US sample was attachment style, followed by pragma and storge love styles. The other variables were not significant predictors of SWB after the specific contribution of these three. Eros love style, which was significantly associated with SWB in the correlational model, became non-significant after the contribution of attachment security. These variables were moderately correlated and probably sharing the variance that explains SWB. Storge and pragma love styles specifically predicted SWB in the structural model after the contribution of attachment security and each other, meaning that these love styles have specific contributions to SWB. Storge (friendship) love style is based on shared interests and intimacy and pragma love style is a practical love, based on established criteria for a relationship. One hypothesis for the contribution of pragma love style to SWB, found in the US sample, may be the historical background of the country, valuing material aspects and personal success as associated with happiness (see Oishi et al. 2013). Storge and pragma love styles are both not very emotionally charged (Lee, 1973), and were either not correlated or weakly negatively correlated with attachment security, although they may contribute to the individuals' overall SWB. We could not find prior studies that showed this differential association of love styles with attachment security and SWB. We believe this is a new insight for adult attachment theory.

In the Portuguese sample, the main predictor of SWB was attachment security, followed by storge love style and by maximum duration of relationships. The other variables did not contribute specifically to SWB above the contribution of these three. We observed the same processes in the Portuguese sample as in the US sample. Eros love style was not a significant predictor of SWB after the contribution of attachment security. The same outcome happened with all the variables that showed a moderate correlation with attachment security— such as satisfaction with current relationships and, inversely, mania. Again, these results suggest that attachment security and storge love style have specific, non-shared contributions to SWB. The contribution of storge love style to SWB in the US and Portuguese samples was not found in the Mozambican sample. One explicative hypothesis for this difference may be the higher equality between gender observed in the US and Portuguese societies, although lower in the Portuguese society, compared with the Mozambican (according to the Gender Inequality Index, United Nations Development Program 2013). The higher gender equality may promote a vision of friendship and companionship between romantic partners as associated with SWB, not shared by the Mozambicans.

In the Mozambican sample, it was only possible to identify the model in AMOS software when eros love style was specified as a mediator between attachment security and SWB (see Fig. 2). In the Mozambican model, eros love style was the main predictor of SWB and mediated the effect of attachment security on SWB. We could not find previous studies that presented similar results nor that analyzed African data. However, this result is theoretically plausible, highlighting the relationship between these variables and the view of adult attachment as the building blocks of relationships, while love styles reflect the

individual's beliefs and attitudes about love (Hendrick and Hendrick 1989). Mania love style negatively predicted SWB after the prediction of eros love style, as expected according to previous studies (Kanemasa et al. 2004; Özer and Tezer 2008). Mania was not negatively correlated with SWB in the correlational model, yet in the structural model, after the contribution of eros love style, mania became a negative predictor of SWB. This result suggests that Mozambicans may associate jealousy and possessiveness with passionate love. This is also explained by the moderate correlation between eros and mania love styles. The variance of SWB explained by mania and not yet explained by eros is negative. In the structural Mozambican model, attachment security did not directly predict SWB, but was mediated by eros love style. This result, found only in the Mozambican sample, may be explained by a strong passionate vision of love, associated with feelings of jealousy and possessiveness, and probably explained by a severe inequality between genders in Mozambican society (United Nations Development Program 2013) or by a past history of a legal and generalized polygamy, still reflected in current Mozambican customary practices. In summary, attachment security predicted SWB in the US and Portuguese samples. Eros love style did not predict SWB beyond attachment security in either sample. Also in both samples, storge love style showed an independent positive prediction of SWB. Only the US sample pragma love style predicted SWB beyond the other predictors and only in the Portuguese sample maximum duration of relationships negatively predicted SWB beyond the other predictors. In the Mozambican sample, eros love style was the main predictor of SWB and a mediator of the effect of attachment security on SWB; mania love style negatively predicted SWB, beyond eros love style.

4.3 Cross-Cultural Differences and Similarities in the Prediction of SWB

In order to test the structural differences in the predictors of SWB between the three countries, we needed to guarantee measurement equivalence between the three samples. This was only possible with a smaller multi-group model measuring attachment security, three love styles (eros, ludus and mania) and relationship experiences as predictors of SWB. With this model, we observed significant structural differences across the three countries.

In the US sample, attachment security was the only predictor of SWB, after which none of the other predictors significantly contributed to SWB. In the Portuguese model, after attachment security, eros love style also positively predicted SWB and maximum duration of relationships negatively predicted SWB. The US and Portuguese groups were similar in the main contribution of attachment security to SWB. This similarity across two different cultures—the American, more individualist, and the Portuguese, more collectivist—could be interpreted as a common trend in the association of attachment security with SWB (Van Ijzendoorn and Sagi-Schwartz 2008; Van Ijzendoorn and Bakermans-Kranenburg 2010). Some differences, however, rely on the love styles association with SWB, which can be interpreted as more culture-specific (Van Ijzendoorn and Sagi-Schwartz, 2008; Kim and Hatfield, 2004). Another hypothesis for the similarities between US and Portuguese (versus Mozambican) samples may be a shared exposure to Western mass-media and global culture, which is not as widespread in Mozambique.

The Mozambican data appeared to be different from the others because none of the independent variables significantly predicted SWB. Additionally, we observed high standard errors of the predictors in this model. This means that although the multi-group of the three samples provided a good fit to the data, this model did not adequately fit the Mozambican data. The structural model that adequately fit the Mozambican data specified eros

love style as a mediator of the effect between attachment and SWB. Nonetheless, this finding supports the structural differences in the model across the samples. There are several social and cultural differences among the three countries that may be contributing to the differences in the results. Mozambique is the most collectivistic of the three countries and the least wealthy. In Mozambican society, children and adolescents start contributing to the family household income sooner than American and Portuguese children, who are generally supported by their parents for longer periods of time. These societal differences may help to explain differences in the main contribution of attachment security to SWB, in adulthood, across the countries. Mozambique is also the country with the highest levels of social and gender inequality among the three, followed by Portugal and then by the US. Also, Mozambique is the only society among the three that practices polygamy and where the practice of arranged marriage is probably more widespread. It is important, in the future, to examine which of these factors may be responsible for the current findings.

4.4 Mediating Effects of Love Styles and Relationship Satisfaction

Our third objective was to test the mediating effect of love styles and relationship satisfaction, between attachment security and SWB, in the multi-group model of the three samples. The results showed a significant mediating effect of eros love style between attachment and SWB in the Mozambican and in the Portuguese samples, but not in the US sample. On the other hand, the results showed a mediating effect of satisfaction with current romantic relationships between attachment and SWB in the US sample, but not in the Portuguese and Mozambican samples. These results suggest that in the Portuguese and in the Mozambican samples, the relation between attachment security and eros love style has a greater contribution to SWB than each of them alone, which is theoretically plausible. Eros love style, a conceptual belief about love, may be developed along and in relation with the individual's internal working models of attachment (more or less secure) based on their early relationship experiences (Hazan and Shaver 1987; Hendrick and Hendrick 1989). In the same way, satisfaction with one's current romantic relationship in the American sample has a mediating effect between attachment security and SWB. This result is also theoretically plausible, since attachment security is related to good expectations about romantic relationships and both are expected to contribute to SWB (Mikulincer and Shaver 2007). Being securely attached and having a satisfactory romantic relationship contributes further to SWB. These results may also be interpreted according to the more (or less) individualistic cultures of each country. The contribution of eros love style to SWB is stronger and a mediator of attachment security, in the relatively more collectivistic countries of Mozambique and Portugal, while satisfaction with relationships is a stronger predictor of SWB, and a mediator of attachment security, in the relatively more individualistic US, where probably individuals are more focused in their own well-being. Another hypothesis for these results may be that specific cultural traits of the Portuguese (South-European) and Mozambican (Eastern-African) societies emphasize passion as an important aspect for well-being, whereas North Americans may emphasize personal satisfaction with relationships as more important to SWB.

4.5 Gender Differences and Similarities in the Prediction of SWB

From the analysis of the gender multi-group models in each country, we observed no gender differences in the prediction of SWB by attachment security; but we have found

specific gender differences in the prediction of SWB by love styles and relationship experiences. These results may suggest that the association between attachment security and SWB is probably a more universal trend, while the association of love styles and relationship experiences with SWB may be more gender-specific.

In the US sample, one observed gender difference was that, after the prediction of attachment security, eros positively predicted SWB in men—but negatively predicted SWB in women. That is, American men were higher in SWB if they had an eros love style, whereas American women were lower in SWB if they had an eros love style. In the Portuguese sample, storge love style was a significant positive predictor of SWB in women but not in men. Among the Mozambicans, pragma love style was a positive predictor of SWB in women but not in men. Previous research points out that women may be more pragmatic in love relationships than men (Hendrick and Hendrick 1995; Yancey and Berglass 1991). In the Portuguese sample we observed the opposite, pragma love style was a positive predictor of SWB in men but not in women. Therefore, the Portuguese results are not expected.

Some of these gender differences may be interpreted according to the evolutionary psychology of gender differences, namely that men tend to focus on physical attractiveness (reproductive success), whereas women tend to focus on resources and commitment to the relationship (see Buss 2004, for a review). The results may also be interpreted as the result of social inequalities across genders throughout the world. Men generally hold more status and resources, so they may focus on physical attraction, while women may choose partners more rationally, based on resources and commitment (Eagley and Wood 2003). This might be particularly true in a society like Mozambique, where gender inequality is very large (United Nations Development Program 2013).

One limitation of our study is the reliance on convenience sampling, compromising the generalizability of the results. Another limitation is that Mozambicans filled out a questionnaire in their own language (Portuguese), although not culturally validated. Also, due to the fact that we chose short versions of the scales with only three items per dimension, it was difficult to obtain measurement equivalence between the three samples, and some of the latent variables in our study are measured by two items. A final limitation of our study is the fact that the participants filled out a questionnaire with several measures at the same time.

5 Conclusion

Using structural equation modeling, we found several cultural similarities and differences in the structural relations of attachment styles, love styles, and relationship experiences as predictors of SWB. Attachment security was a primary predictor of SWB in the US and Portuguese samples, but not in the Mozambican sample, where eros was a primary predictor of SWB and a mediator of the relationship between attachment and SWB. There are several hypotheses that may explain the differences found in the results between the countries, such as the higher gender inequality and the polygamy practices in Mozambican society. The link between attachment security and SWB was explained by current romantic relationships satisfaction among Americans, whereas it was explained by eros love style in the Portuguese sample. In the Mozambican sample, eros love style was the main predictor of SWB and a mediator of the effect of attachment security on SWB. We hypothesized that these differences may be related to the higher individualism of the US, probably contributing to a greater focus on personal satisfaction with relationships among the

Americans and, on the other hand, the Portuguese and the Mozambicans' Latin heritage that emphasises passionate love (Levine et al. 1995). We also found several gender similarities and differences. The association between attachment security and SWB was not gender-specific; in comparison, the association between love styles and SWB, and relationship experiences and SWB, were gender-specific. It is important to conduct similar studies to analyze the consistency of these results using probabilistic samples and with longitudinal designs to gain greater understanding of these processes. In addition, it is critical to verify the current findings with informant reports, as some of the love style questions are likely to be influenced by social desirability. Despite some limitations, the current research presents the first comprehensive test of the relation between attachment security, love styles, romantic relationship experiences and SWB in three culturally diverse samples. As relationships are critical for one's survival and well-being (Berscheid 2003), it is desirable to continue exploring the specific aspects of attachment, love, and romantic relationships that contribute to SWB across cultures.

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