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**When feeling mixed can be meaningful:**

**The relation between mixed emotions and eudaimonic well-being**

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**Abstract**

Whilst positive emotions benefit well-being, the role of other more complex emotional experiences for well-being is less well understood. This research therefore investigated the relationship between mixed emotions and eudaimonic well-being. A cross-sectional study (Study 1; N = 429) first demonstrated (using structural equation modelling) that mixed emotions are related to the presence of goal conflict. Importantly, it was also found that mixed emotions are positively related to eudaimonic well-being, and that one potential mechanism linking mixed emotions and eudaimonic well-being is via the search for meaning in life. Study 2 (N = 52) implemented a quasi-experiment regarding a naturally occurring meaningful life event (i.e., graduation day) and again demonstrated that mixed emotions are associated with a greater level of eudaimonic well-being. Implications of these findings include the importance of mixed emotions in the search for meaning in life, and the role of mixed emotions in goal conflict resolution.

**Keywords:** mixed emotions, eudaimonic well-being, meaning in life, well-being, emotional complexity.

**When feeling mixed can be meaningful:**

**The relation between mixed emotions and eudaimonic well-being**

Eudaimonic well-being refers to a person's sense that his or her life has purpose or meaning. Unlike hedonic well-being, which refers to a person's sense of pleasure in life, eudaimonic well-being is not defined by the presence of positive emotion and absence of negative emotion. Indeed, experiencing a functional balance of positive and negative emotions may be a hallmark of eudaimonic well-being (Fredrickson, 2013). In this investigation, we examine whether subjective experiences that involve feeling both positive and negative emotion at the same time, known as mixed emotions, contribute to people's eudaimonic well-being.

There are currently two distinctive approaches to the study of well-being: the eudaimonic approach and the hedonic approach. The eudaimonic approach focuses on the integration of multiple human potentials that permit people to live congruently with their values, ideals, and actions (Ryan & Deci, 2001; Ryff & Singer, 1998, 2008) and usually emphasises the importance of achieving goals that foster a meaningful life in spite of momentary restraint (Ryan et al., 2008). Eudaimonic well-being has also been linked to meaning in life, in terms of the sense of meaning and fulfilment (Ryan & Deci, 2008), although some authors have suggested that meaning in life and eudaimonic well-being may not necessarily be synonyms because people may be searching for meaning without having a sense of fulfilment (e.g., Steger, Frazier, Oishi, & Kaler, 2006).

In contrast, the hedonic approach to well-being emphasises positive emotions and satisfaction with life as the hallmarks of a good life (Deiner, Suh, Lucas, & Smith 1999; Kahneman, Diener, & Schwarz 1999). Hedonic accounts assume that people are driven by

the goal of experiencing pleasure, and therefore, that well-being is enhanced to the extent that pleasure is maximised and distress is minimised (Diener et al., 1999; Kahneman et al., 1999).

The place of emotions in the eudaimonic approach to well-being is notably different than in the hedonic approach. The eudaimonic model of well-being does not view positive emotions as being good for well-being per se, but rather it is the ability to experience emotions in accordance with the conditions that provoked them that is seen as being helpful (Ryan & Deci, 2001). Ryan and colleagues (Ryan et al., 2008) further argued that people are likely to achieve enduring happiness to the extent they are able to live a life that is full of meaning. This idea was articulated in self-determination theory (SDT; Ryan & Deci, 2001; Ryan et al., 2008) which proposed that people can be happy through the realization of three basic needs (autonomy, competence, and relatedness) that constitute the essence of a meaningful life. According to this account, too much emphasis on hedonic outcomes (e.g., positive affect, life satisfaction) can lead people to live a life that is devoid of depth (Ryan et al., 2008).

The present research introduces the idea that mixed emotions are an emotional experience that may be associated with eudaimonic well-being. Mixed emotions are defined as affective experiences characterised by the co-activation of both positive and negative emotions, such as feeling happy and sad concurrently (Larsen & McGraw, 2011; Larsen, McGraw, & Cacioppo, 2001; Schimmack, 2001). The activation of mixed emotions has been a controversial field of study (Larsen & McGraw, 2011), but today we know that mixed emotions can actually be experienced beyond measurement problems (Berrios, Totterdell, & Kellett, 2015b). Yet, some critics have claimed that measuring mixed

emotions does not guarantee that two opposite emotions are actually occurring at the very same time. However, some recent studies using subjective measures of mixed emotions have revealed that a crucial component of mixed emotions is whether or not people identified two emotions of opposite valence as co-occurring (Barford & Smillie, 2016; Berrios, Totterdell, & Kellett, 2015a), emphasising the subjective experience of mixed emotions. Furthermore, meta-analytic evidence has shown that results derived from using subjective measures of mixed emotions or more classic measures, such as the minimum index (Schimmack, 2001), do not distort the average estimates of effect sizes (Berrios et al., 2015b).

Previous research has shown that mixed emotions are elicited following goal conflict (Berrios et al., 2015a). Drawing on this evidence, Berrios and colleagues (2015a) suggested that mixed emotions facilitate the integration of complex information by helping individuals gain equilibrium between disparate courses of action when facing conflicting goals. Several theories of eudaimonic well-being claim that it entails engagement in activities that fulfil meaningful goals (e.g., Ryan & Deci, 2001; Ryan et al., 2008; Waterman, 1990) and promote balance between relevant facets of individual experience (e.g., Ryff, 1989, 1995; Ryff & Singer, 1998). Achieving this balance involves navigating between different goals in the form of principles (e.g., finding purpose in life, maintaining healthy relationships). These principles reflect a person's high level (abstracted) goals and, according to perceptual control theory (Bourbon, 1995; Powers, 1973), integrating such high level goals can help resolve conflicts that are experienced at lower levels in a person's goal hierarchy. Therefore, given the known link between goal conflict and mixed emotions, it is plausible that mixed emotions participate in the process by which individuals achieve

balance among multiple strands of individual experience, thus implicating them in the attainment of eudaimonia.

### **Theoretical models and evidence connecting mixed emotions and well-being**

**Theoretical models.** Two models have suggested that mixed emotions may have a positive impact on a person's well-being. The first model is the dynamic model of affect (DMA; Reich, Zautra, & Davis, 2003; Zautra, 2003) which conceptualises positive affect and negative affect as complementary experiences during stressful events. The model proposes that under conditions of low stress the affect system allows complex information processing, but under high stress, information processing is concentrated on immediate demands, and as a consequence, discrimination between positive affect and negative affect is simplified. Therefore, the DMA anticipates that high stress will result in negative correlations between positive affect and negative affect (Reich et al., 2003). Importantly, the DMA also predicts that individual differences in the capacity to experience more complex affective patterns (i.e., mixed emotions) during stressful situations may be beneficial for individuals' health (Davis, Zautra, & Smith, 2004; Reich et al., 2003). Individual differences in mixed emotions are thought to buffer or moderate the negative consequences of stressful events on individuals' health (Reich et al., 2003). Thus, for example, some evidence has demonstrated that individual differences in experiencing mixed emotions are associated with levels of resilience during bereavement (Coifman, Bonanno, & Rafaeli, 2007).

The second model is the co-activation model of healthy coping (Larsen, Hemenover, Norris, & Cacioppo, 2003). According to this model, the co-activation of both positive and negative affect can facilitate sense-making processes during stressful

situations, and in turn this can allow individuals to gain control over their lives and overcome traumatic experiences. This is achieved when there is an optimal balance between positive and negative emotions when facing adverse situations. According to the model, the optimal proportion of positive affect necessary to benefit health will decrease as the intensity of the stressor increases. Finally, the model suggests that balanced co-activation of opposite affects facilitates problem solving and helps individuals to find meaning during stressful events by helping individuals to take the good with the bad; in other words, to turn adversity into advantage (Larsen et al., 2003).

**Empirical evidence connecting mixed emotions and well-being.** Ong and Bergeman (2004) investigated how the co-activation of positive and negative emotions influences well-being by surveying the emotional state of a sample of older adults every day for 30 consecutive days. They calculated the within-person correlation between the positively valenced emotions and the negatively valenced emotions as an indicator of mixed-emotions. More positive within-person correlations reflected greater mixed-emotion experience. Results showed that within-person correlations between positive affect (PA) and negative affect (NA) were positively related to indicators of resilience and negatively correlated with neuroticism. The findings were interpreted as demonstrating that co-activation of positive and negative emotions predicts better mental functioning among older adults.

In another study, Hershfield and colleagues (Hershfield, Scheibe, Sims, & Carstensen, 2013) showed that frequency of mixed emotion episodes was strongly associated with better physical health. In this study, 3 waves of data were collected with a 5-year interval. Participants were instructed to complete an emotion adjective questionnaire

5-times a day for over a week in each wave; they also completed a medical health questionnaire. Mixed emotions were estimated as the within-person correlation between positive emotions (e.g., happiness, amusement) and negative emotions (e.g., sadness, fear). Multilevel models showed that mixed emotions were associated with less physical health symptoms, over and above mean levels of positive and negative emotions.

Coifman, Bonanno, and Rafaeli (2007) examined the association between mixed emotions and resilience by interviewing a sample of bereaved people on four different occasions following bereavement. Portions of each interview were coded as indicating positive affect or negative affect. Participants also completed a measure of perceived health and a standardised measure of health-related symptoms. The sample was divided into people who were categorised as resilient and those who were experiencing depressive symptoms. Findings, based on within-person correlations, revealed that resilient participants tended to experience positive and negative emotions concurrently more frequently during each interview compared to the participants with depressive symptoms.

A study conducted by Brose, Voelkle, Lövdén, Linderberger, and Schmiedek (2014) found that people who scored higher on the psychological well-being dimension of personal growth had less negative PA-NA within-person correlations. However, Gröhn, Lumley, Diehl, and Labouvie-Vief (2013) did not find an effect of psychological well-being on PA-NA within-person correlations. Actually, an opposite trend was observed with estimates exhibiting a negative, though non-significant, association between psychological well-being and PA-NA within-person correlations, excepting the dimension of relation with others which showed a positive trend.

Miyamoto and Ryff (2011) investigated the beneficial effects of mixed emotions on well-being in the context of cultural differences between Japanese and American samples in frequency of mixed emotions experience. Results showed that Japanese participants experienced more mixed emotions as compared to their American counterparts. Furthermore, Japanese participants who experienced mixed emotions in moderate amounts reported better health and fewer ill-health symptoms. It is worth noting that Miyamoto and Ryff's findings indicate that beneficial effects of mixed emotions on well-being can be observed at moderate levels. Too much or too little mixed emotions, measured in terms of either intensity or frequency, was detrimental for individuals' well-being. This evidence sits comfortably with eudaimonic approaches which suggest equilibrium as a mean to achieve optimal wellness (e.g., Ryan & Deci, 2001; Ryff & Singer, 1998, 2008).

Actually, recent theoretical contributions (Fredrickson, 2013; Grant & Schwartz, 2011; Warr, 2007) have stressed the importance of investigating non-monotonic effects on well-being, whereby beneficial variables reach inflection points at which their effects turn detrimental. For example, Warr (1987, 2007) proposed that certain job characteristics such as job demands and job autonomy resemble vitamins because above certain thresholds they can have negative consequences for employee well-being (i.e., job-related anxiety, reduced job satisfaction, emotional exhaustion), which is evident in their curvilinear relationships. Research in emotion science has also found that individuals who experience high cheerfulness are more likely to engage in risky behaviours (Martin, Friedman, Tucker, Tomlinson-Keasey, Criqui, & Schwartz, 2002) which are detrimental to well-being, suggesting a nonlinear trend in the relationship between positivity of emotions and well-being. Thus, following previous evidence and recent theoretical contributions, our

investigation explored whether the effects of mixed emotions on well-being are curvilinear to provide further evidence about the benefits (or otherwise) of experiencing mixed emotions.

In sum, theories suggesting a relationship between mixed emotions and well-being have considered that mixed emotions may be beneficial but only in the context of stressful situations. A direct link between transient mixed emotions experiences and eudaimonic well-being has not been examined. Furthermore, previous evidence linking mixed emotions and eudaimonic well-being has produced conflicting results, using indirect measures of mixed emotions (within-person correlations between PA and NA), and without estimating changes in eudaimonic well-being as a result of experiencing mixed emotions. Finally, potential curvilinear effects of mixed emotions on eudaimonic well-being have yet to be tested.

### **Overview of Studies 1 and 2**

The main goal of the present research was to evaluate whether mixed emotions can positively influence eudaimonic well-being. Study 1 used a cross-sectional survey design to firstly confirm whether or not mixed emotions are experienced after situations that involve conflicting goals, following previous research showing such an association (Berrios et al., 2015a). Secondly, Study 1 evaluated the association between mixed emotions and eudaimonic well-being, controlling for relevant constructs (i.e., meaning in life, gender and age). We controlled for meaning in life because the relationship between meaning in life and well-being or adjustment has been previously tested producing some conflicting results (see Park, 2010 for a review). Concerning gender, mixed emotions scores have been shown to be higher for women (Berrios et al., 2015b). Finally, previous longitudinal research has

shown that mixed emotions increase with age (e.g., Hershfield et al., 2013). Eudaimonic well-being is known to arise when people find meaning in what they do (e.g., Ryan & Deci, 2001; Ryan et al., 2008, Waterman, 1990), so it was necessary to establish that mixed emotions have additional explanatory value in accounting for eudaimonic well-being. Eudaimonic well-being was understood both in Study 1 and 2 as a state, rather than a particular life style or a trait-related construct (Huta & Ryan, 2010). Therefore, measures of eudaimonic well-being considered the evaluation of well-being as perceived in the moment people completed the corresponding questions. Furthermore, the measures used in Study 1 and Study 2 are consistent with the nature of the task requested to participants in each study. Study 1 used a measure of eudaimonic well-being as motives in life (Huta & Ryan, 2010), which is consistent with the evaluation of personal goals. In contrast, Study 2 used a measure of eudaimonic well-being that mainly focuses on the current evaluation of eudaimonic well-being, which is consistent with the evaluation of eudaimonic well-being after a manipulation procedure. Thus, the following hypothesis was tested:

***H1:*** Experiencing mixed emotions will be positively associated with eudaimonic well-being, over and above meaning in life.

Finally, the study explored previous conceptualizations linking eudaimonic well-being and hedonic well-being. Self-determination theory conceptualizes that hedonic well-being (positive emotions and satisfaction) is achieved to the extent that individuals are able to reach a balance between three basic needs (Ryan et al., 2008); therefore, eudaimonic well-being is a precursor of hedonic well-being.

Study 2 used a quasi-experimental design to test the prediction that experiencing mixed emotions in the face of a meaningful life event enhances eudaimonic well-being. The

selection of an event involving a meaningful ending (graduation from university) was chosen because it provided a context to test the prediction using a well-tested phenomenon (i.e., poignancy; Ersner-Hershfield et al., 2008, 2009). Temporal proximity to graduation was chosen because it has been linked to opposing tendencies (e.g., wanting to maintain established close-relationships, whilst simultaneously anticipating expansion of interpersonal horizons in the near future; Zhang & Fung, 2009), and was in keeping with the requirement to have a situation that involved conflicting goals. Study 2 also explored the potential non-monotonic effects of mixed emotions on eudaimonic well-being. The study tested the following hypothesis:

*H2*: Mixed emotions will be positively associated with eudaimonic well-being in response to a poignant event (graduation).

## Study 1

### Method

**Participants.** Four hundred and twenty nine students (295 females and 134 males,  $M_{age} = 23.7$  years;  $SD = 6.9$  years), participated in the study in exchange for the opportunity to win vouchers worth the equivalent of €57. Participants were informed that the study aimed to better understand the relationship between personal goals and emotional experience. The sample size required for the present study was based on the general recommendations of Bentler and Chou (1987) for conducting Structural Equation Modelling (SEM) analyses. They suggested that the ratio of sample size and number of free parameters should be close to 5:1.

**Measures.** Once the informed consent form was read and accepted, participants completed the following scales online:

***Conflicting goals scale.*** A new measure of conflicting goals was developed based on the strivings instrumentality matrix, which is a self-report measure that evaluates an individual's most important goals (Emmons & King, 1988). The measure consisted of a list of personal goals likely to be relevant to the sample using the goal taxonomy provided by Austin and Vancouver (1996). From the list of goals presented, participants selected the five currently most important goals for them. Based on this selection, participants were asked to rate the extent to which these goals had been in conflict within the last few days by answering three different items, based on the same items used by Emmons and King (1988) in the strivings instrumentality matrix (i.e., "*I think that pursuing some of these goals hurts the pursuit of the other ones*"; "*these goals usually compete for my time*"; "*sometimes these goals are in conflict with each other*") on a five-point Likert format-scale from 1 (*Disagree strongly*) to 5 (*Agree strongly*) ( $M = 3.43$ ,  $SD = 0.97$ ;  $\alpha = 0.69$ ). This measure was less time-consuming to complete than the original scale, which involves generating a list of goals and then comparing each goal with every other in terms of goal conflict.

***Mixed emotions scale.*** The mixed emotions scale (Berrios et al., 2015a) measured the presence of mixed emotions in relation to an important event or experience in the last few days using 4 different items. Participants rated the extent to which they had been experiencing mixed emotions (i.e., "*I felt contrasting emotions*"; "*I felt a mixture of emotions*"; "*I felt a combination of different emotions at the time*"; "*I felt different emotions at the same time*"), on a five-point Likert format-scale from 1 (*Not at all*) to 5 (*Very much*) ( $M = 3.31$ ,  $SD = 0.98$ ;  $\alpha = 0.85$ ). This scale has been recently tested using

comparable measures of mixed emotions producing consistent estimates of effect sizes (Barford & Smillie, 2016). Furthermore, a recent meta-analysis revealed that using direct measures of mixed emotions do not distort the observed effect sizes (Berrios et al., 2015b).

***Meaning in life questionnaire.*** Participants also completed a validated measure of meaning in life, the Meaning in Life Questionnaire (MLQ; Steger et al., 2006). This is a 10-items scale that evaluates two dimensions of meaning in life. The presence of meaning in life dimension evaluates the degree to which people are certain about the sense of significance in their lives (e.g., “*my life has a clear sense of purpose*”;  $M = 4.37$ ,  $SD = 1.52$ ;  $\alpha = 0.91$ ). In contrast, the dimension of searching in meaning in life refers to personal motivations to find out meaning in life (e.g., “*I’m seeking a purpose or mission for my life*”;  $M = 4.48$ ,  $SD = 1.45$ ;  $\alpha = 0.90$ ). Participants were required to rate the extent to which 10 statements represented what makes their life important and meaningful on a seven-point Likert format-scale from 1 (*Absolutely untrue*) to 7 (*Absolutely true*).

***Hedonic and eudaimonic motives for activities.*** Finally, participants completed the hedonic and eudaimonic motives for activities questionnaire (*HEMA*; Huta & Ryan, 2010). This is a 10-item questionnaire which evaluates the degree to which people approach their activities according to hedonic and eudaimonic principles. The hedonic well-being sub-scale was evaluated using five items (e.g., “*seeking pleasure*”;  $M = 4.65$ ,  $SD = 1.00$ ;  $\alpha = 0.80$ ) presented on a seven-point Likert format-scale ranging from 1 (*Not at all*) to 7 (*Very much*). The eudaimonic well-being sub-scale was evaluated using four-items (e.g., “*seeking to use the best in yourself*”;  $M = 5.37$ ,  $SD = 0.99$ ;  $\alpha = 0.76$ ). This scale has shown correspondence with alternative measures of well-being (e.g., life satisfaction, positive and negative affect) both in cross-sectional and longitudinal studies (Huta & Ryan, 2010). We

also chose this scale because it is consistent with the description of the study as research investigating people's motives in life that was given to participants and with the assessment of goals that participants completed in the first stage.

## **Results**

Variables included in the present study were normally distributed. Furthermore, simple correlations analyses revealed only small to moderate associations between the variables included, indicating low multicollinearity (see Table 1). Importantly from the correlation matrix observed in Table 1, it is possible to observe that dimensions of searching for meaning in life and having meaning in life were negatively correlated, which may mean that subsequent associations with eudaimonic motives involve suppression. The results of Study 1 are separated into three subsections. The first subsection presents the association between conflicting goals and mixed emotions. The second sub-section is dedicated to examining the influence of mixed emotions on eudaimonic well-being, over and above the influence of meaning in life. Data analysis for the first and second subsections were conducted using *Mplus 7* (Muthén & Muthén, 2012), a dedicated statistical package to perform a broad range of structural equation modelling (SEM) analyses. This technique offers the advantage of testing complex multivariate models, while controlling for measurement error of the variables studied. It is important to mention that all the analyses using SEM considered the full structural model, including the corresponding items. Finally, in the third sub-section, some ancillary analyses are reported describing mediational models to explain the effect of mixed emotions on eudaimonic well-being. These analyses were performed using *Process* (Hayes, 2013) which is a dedicated

application for conducting a variety of mediation and moderation analyses using bootstrapping.

**Conflicting goals and mixed emotions.** The path model of conflicting goals predicting mixed emotions, controlling for gender and age, exhibited satisfactory goodness-of-fit indices,  $\chi^2(25, N = 392) = 34.56$ ,  $CFI = 0.99$ ,  $RMSEA = 0.03$  [90%CI: 0.001 / 0.055],  $SRMR = 0.03$ . More importantly, findings showed that conflicting goals significantly predicted mixed emotions,  $\beta = 0.14$ ,  $p < 0.05$ , though the explanatory power was low,  $R^2 = 0.06$  ( $SE = 0.03$ ). To assess the robustness of this finding, the reverse path from mixed emotions to conflicting goals was tested and found to not be statistically significant,  $R^2 = 0.03$  ( $SE = 0.02$ ),  $p = 0.16$ . This finding mirrored the evidence presented in previous studies (Berrios et al., 2015a) that perceptions of greater goal conflict predict higher levels of mixed emotions.

**Mixed emotions as a predictor of eudaimonic well-being.** To determine the influence of mixed emotions on eudaimonic well-being, a preliminary model was built using SEM including mixed emotions as the independent variable, and hedonic well-being and eudaimonic well-being as dependent variables, controlling for searching for meaning in life, presence of meaning in life, and gender and age of the sample. The model exhibited satisfactory goodness-of-fit indices,  $\chi^2(611, N = 429) = 1620.65$ ,  $CFI = 0.86$ ,  $RMSEA = 0.07$  [90%CI: 0.061 / 0.069],  $SRMR = 0.07$ . As expected, the path analyses showed significant positive associations between mixed emotions and eudaimonic well-being,  $\beta = 0.14$ ,  $p < 0.05$ , and mixed emotions and hedonic well-being,  $\beta = 0.15$ ,  $p < 0.05$ .

Searching for meaning in life also significantly positively predicted eudaimonic well-being,  $\beta = 0.26$ ,  $p < .05$ , but not hedonic well-being,  $\beta = 0.05$ ,  $p = 0.45$ . Presence of

meaning in life significantly positively predicted both eudaimonic well-being,  $\beta = 0.40$ ,  $p < 0.05$ , and hedonic well-being,  $\beta = 0.12$ ,  $p < 0.05$ . Age significantly positively predicted eudaimonic well-being,  $\beta = 0.12$ ,  $p < 0.05$ , and significantly negatively predicted hedonic well-being,  $\beta = -0.12$ ,  $p < 0.05$ . Gender did not reveal a significant effect for eudaimonic or hedonic well-being. It is also worth noting that the subjective experience of mixed emotions was positively related to searching for meaning in life ( $r = 0.17$ ,  $p < 0.01$ ), whereas a negative association was found between mixed emotions and presence of meaning in life ( $r = -0.15$ ,  $p < 0.05$ ). *Fig. 1* shows the structural model.

Altogether, the model explained  $R^2 = 0.21$  ( $SE = 0.05$ ),  $p < 0.05$  of variance in eudaimonic well-being, and  $R^2 = 0.05$  ( $SE = 0.02$ ),  $p = 0.05$  of variance in hedonic well-being. These findings indicate that mixed emotions positively predicted eudaimonic well-being, even after controlling for relevant variables such as meaning in life. There was also an effect of mixed emotions on hedonic well-being, although its magnitude was small and the amount of variance explained was only marginally significant. All in all, this evidence supports hypothesis 1 that mixed emotions are positively related to eudaimonic well-being, over and above meaning in life.

**Ancillary analyses: exploring potential mechanisms to explain the effect of mixed emotions on eudaimonic well-being.** Finally, a number of analyses were conducted to assess previous theoretical assumptions concerning the relationship between mixed emotions and meaning in life and the relationship between eudaimonic well-being and hedonic well-being.

Firstly, we tested whether the mechanism through which mixed emotions is associated with eudaimonic well-being was via facilitating the initiation of searching for meaning in life. Results showed that although the direct effect was not different from zero,

$t(418) = 1.70, p = 0.09, 95\%CI [-0.01 / 0.18]$ , the total effect was significant,  $t(417) = 2.12, p < 0.05, 95\%CI [0.01 / 0.20]$ . More importantly, the indirect effect of mixed emotions on eudaimonic well-being through searching for meaning in life was found to be statistically different from zero,  $P_M = 0.19, 95\%CI [0.01 / 1.51], k^2 = 0.02, 95\%CI [0.01 / 0.05]$ , providing evidence of a mediational process because the 95% confidence intervals did not include zero. This model also accounted for a small but significant amount of variance,  $R^2 = 0.01, F(1, 418) = 4.49, p < 0.05$ . Thus, greater levels of mixed emotions appeared to be associated with greater eudaimonic well-being, as a result of engaging in a greater search for meaning in life.

Secondly, it was explored whether mixed emotions were related to greater hedonic well-being as a result of greater eudaimonic well-being. Results showed that although the direct effect was not different from zero,  $t(418) = 1.50, p = 0.13, 95\%CI [-0.02 / 0.17]$ , the total effect was significant,  $t(417) = 1.97, p < 0.05, 95\%CI [0.01 / 0.20]$ . In correspondence with the assumption derived from the SDT, the indirect effect from mixed emotions on hedonic well-being through eudaimonic well-being was statistically different from zero,  $P_M = 0.25, 95\%CI [0.01 / 2.06], k^2 = 0.02, [95\%CI: 0.01 / 0.05]$ , supporting a mediation explanation due to the corresponding 95% confidence intervals not including zero. This model also accounted for a small but significant amount of variance,  $R^2 = 0.01, F(1, 419) = 3.86, p < 0.05$ . Thus, participants who reported greater levels of mixed emotions appeared to also have higher levels of hedonic well-being as a result of higher levels of eudaimonic well-being.

Finally, the previous two mediation models were integrated in a serial multiple mediation model (see **Fig. 2**). Results revealed that the direct effect of mixed emotions on

hedonic well-being was not different from zero,  $t(419) = 1.57$ ,  $p = 0.12$ ,  $95\%CI [-0.02 / 0.18]$ , whereas the total effect was marginally significant,  $t(419) = 1.94$ ,  $p = 0.05$ ,  $95\%CI [-0.01 / 0.20]$ . However, the indirect effect of mixed emotions on hedonic well-being via searching for meaning in life and, in turn, eudaimonic well-being was different from zero,  $P_M = 0.05$ ,  $95\%CI [0.01 / 0.65]$ , providing preliminary evidence of a serial multiple mediation. Furthermore, although the overall explanatory power of the model was modest, it was possible to observe an improvement from the simple model of mixed emotions predicting searching for meaning in life,  $R^2 = 0.02$ ,  $F(1, 418) = 4.55$ ,  $p < 0.01$ , to the more complex model including two mediators in series,  $R^2 = 0.06$ ,  $F(3, 416) = 8.66$ ,  $p < 0.01$ . Age and gender were not significant when included in the model. Findings support the mediation of searching for meaning in life and eudaimonic well-being as key mechanisms for explaining how mixed emotions can yield hedonic well-being.

## Study 2

### Method

**Participants.** Fifty eight students in the final year of University studies (36 females and 22 males,  $M_{age} = 24.0$  years;  $SD = 4.3$  years), participated in the study in exchange for the opportunity to win vouchers worth the equivalent of €43. Participants were obtained from a student volunteers list. They were informed that the study aimed to understand how watching a short video-clip about life in the University affected their thoughts and feelings. The sample was exclusively composed of students who were about to shortly leave University. From this sample, six participants (two females and four males) dropped out of the study before completing the experiment, so the final sample size was composed of  $N = 52$  participants. This sample size satisfied calculations of the required sample size for the

present study. The power analysis was performed using G\*Power 3.1 (Faul et. al., 2007) in order to achieve 80% of power, considering a within-person design involving one group, two measurement points (pre-post), a probability error of .05, a medium effect size (based on a recent meta-analysis of mixed emotions inductions; Berrios, Totterdell, & Kellett, 2015b), and a correlation of zero between the repeated measure variables.

**Procedure and measures.** This study was conducted at the end of the academic year and was specially designed for those students about to leave the University. This information was communicated in the invitation email sent to the student volunteers list. At the beginning of the experiment participants were asked to confirm whether they were leaving University that year, which all participants confirmed.

Participants were requested to self-report how they felt right now, using six emotion adjectives extracted from a state-affect measure containing eight adjectives (Eisenkraft & Elfenbein, 2010), excluding the adjectives “calm” and “angry” to shorten the scale. This measure of state-affect has been demonstrated to clearly reflect discrete emotions that are opposite in valence (Eisenkraft & Elfenbein, 2010). The measure assessed the intensity with which each emotion was felt using a Likert-format scale ranging from 1 (*Not at all*) to 5 (*A great deal*). The order of the emotion adjectives was randomised to help overcome potential order effects.

Next participants were informed that they were about to watch a short video-clip (two minutes) about life in the University. This video-clip was the experimental manipulation because it was designed to elicit mixed emotions. Previous studies in consumer research have used a combination of pictures and messages to elicit mixed emotions (e.g., Aaker, Drolet, & Griffin, 2008; Williams & Aaker, 2002). The sample was

about to graduate so it was possible to anticipate that they would be likely to experience mixed emotions in response to images and messages about university life (i.e., poignancy; Ersner-Hershfield et al., 2008, Study 2). The video-clip was therefore a compilation of pictures of the university and city in which students attended or lived at the time of the study. Accompanying the pictures were messages suggesting that participants were ending one stage in their lives and beginning a new one (e.g., “*You'll miss the University and the friends you've made...but you're also looking forward to the future and the exciting possibilities it holds*”). The images and messages were displayed in conjunction with a musical piece (*La Noyée* by Tiersen, 2011) that has been demonstrated to elicit mixed emotions (Hunter et al., 2008) because it combines conflicting musical cues (i.e., musical pieces in fast tempo and minor mode). The video-clip can be watched in the following web link: <https://www.youtube.com/watch?v=ymyZkeHmcg4>

Once participants had watched the video-clip, they immediately completed the same state-affect measure used at the beginning of the experiment. The order of the emotion adjectives was again randomised. Previous studies evaluating mixed emotions in students close to graduation revealed that the most common mixed emotions experience was *happy-sad* (e.g., Ersner-Hershfield, et al., 2008, Study 2; Larsen et al., 2001, Study 3). Thus, for the sake of parsimony, and following previous evidence, the emotion measures for sadness, enthusiasm and happiness were used to calculate two mixed emotions indices using the minimum index (Schimmack, 2001): *enthusiasm-sad* and *happy-sad*. The minimum index estimates a mixed emotions measure based on the minimum value between a pair of oppositely valenced emotional adjectives. Additionally, in order to control for potential demand effects resulting from requesting the same emotion report twice, the average of all

the positively valenced emotions and the average of all the negatively valenced emotions were used to calculate another minimum index score (*positive-negative*). Previous meta-analysis has shown that the minimum index, compared to other mixed emotions measures, produces similar estimates and commensurate effect sizes observed using direct measures of mixed emotions, such as the scale used in Study 1 (Berrios et al., 2015b). Study 2 used the minimum index because participants were measured for mixed emotions before and after the watching the video-clip. The minimum index provides a more subtle measure of mixed emotions (participants were not aware they were responding on mixed emotions experiences), which contrast with the subjective measure of mixed emotions used in Study 1.

Next, participants completed a brief version of the questionnaire for eudaimonic well-being (Waterman et al., 2010). This scale evaluates level of eudaimonic well-being using 21 statements concerning perceptions and personal beliefs about current life, and has been validated in a previous study (Waterman et al., 2010). In the current experiment three items ( $M = 2.63$ ,  $SD = 1.04$ ;  $\alpha = 0.85$ ) were selected based on factorial loadings of the original questionnaire and the correspondence with the eudaimonic well-being measure used in Study 1 (*i.e.*, “*I believe I have discovered who I really am*”; “*I can say that I've found my purpose in life*”; “*I believe I know what it was meant to do in my life*”; “*I'm confused about what my talents really are*” – *reverse coded item* -). Compared to the previous Study 1, in Study 2 eudaimonic well-being was measured in terms of the evaluation of participants' life in the moment they were completing the questionnaire. These items were answered using a Likert-format scale ranging from 1 (*Strongly disagree*) to 5 (*Strongly agree*).

Lastly, participants completed two short questions to evaluate whether they finished the experiment in one round (“*Did you complete this study in one round?*”), and whether they were interrupted while completing the experiment (“*Did you complete this study without interruptions (e.g., mobile calls, friends around)?*”); both of these questions were answered in a *yes/no* format. These last two questions were included to establish whether interruptions or delays in completing the study may have influenced the results, because the experiment was completed online and it demanded participants’ attention while watching the video.

## Results

Preliminary analyses did not identify significant outliers and eudaimonic well-being was approximately normally distributed. Descriptive statistics shown in *Table 2* revealed that, on average, participants reported feeling more intense negative emotions (e.g., sad, bored, stressed) after watching the video-clip compared to before watching it. In contrast, participants reported feeling less intense positive emotions (e.g., happy, inspired, relaxed) after the video-clip. Paired sample *t*-tests revealed significant differences between sadness pre- and post-video,  $t(51) = -2.59, p < 0.05, M_{\text{difference}} = -0.39, 95\%CI [-0.68 / -0.09]$ , stress pre- and post-video,  $t(51) = 3.18, p < 0.05, M_{\text{difference}} = 0.42, 95\%CI [0.16 / 0.69]$ , happiness pre- and post-video,  $t(51) = 2.48, p < 0.05, M_{\text{difference}} = 0.29, 95\% CI [0.05 / 0.53]$ , and relaxed pre- and post-video,  $t(51) = 2.48, p < 0.05, M_{\text{difference}} = 0.35, 95\% CI [0.07 / 0.63]$ . In terms of the quality control variables (i.e., whether participants completed the experiment without interruptions and in one round), only one participant did not complete the study in one round, and two participants reported being interrupted while completing

the experiment. No effects were found after including these variables as between-subject factors in the elicitation of mixed emotions ( $p > 0.15$ ).

As mentioned above, in order to appropriately evaluate the presence of mixed emotions, two minimum indices were calculated: *enthusiasm-sad* and *happy-sad*. In accordance with previous research, it was expected that the video-clip would elicit a combination of sadness and happiness or sadness and enthusiasm. The descriptive statistics (shown in *Table 2*) showed that, on average, participants reported more mixed emotions after compared to before watching the video-clip. Negative emotions had lower values, on average, compared to positive emotions, which might imply that the minimum index was tracking negative emotions. However, correlational analyses (shown in *Table 2*) revealed that the minimum indices after the experimental manipulation were positively and strongly correlated with the corresponding positive emotions and negative emotions alike, suggesting that mixed emotions estimated using the minimum index did not correspond with the effect of negative emotions only.

**Manipulation checks.** A paired sample *t*-test based on 10,000 bootstrapped samples was conducted to estimate whether participants felt more mixed emotions after the video-clip compared to before. Results showed that participants felt significantly more *enthusiastic-sad* after ( $M = 1.96$ ) compared to before ( $M = 1.71$ ) watching the video clip,  $t(51) = -2.04, p < 0.05, M_{difference} = -0.25, 95\%CI [-0.48 / 0.00], d = 0.29$ . Likewise, participants reported feeling more *happy-sad* after ( $M = 2.10$ ) compared to before ( $M = 1.81$ ) watching the video-clip,  $t(51) = -2.27, p < 0.05, M_{difference} = -0.29, 95\%CI [-0.56 / -0.04], d = 0.31$ . The inclusion of the mixed emotions positive-negative, and the age and

gender of the sample did not show an effect on the experience of mixed emotions of *happy-sad* or *enthusiastic-sad* ( $p > 0.20$ ).

**Effect of mixed emotions on eudaimonic well-being.** To determine whether mixed emotions predicted eudaimonic well-being, hierarchical linear regressions based on 10,000 bootstrapped samples were used to test a set of models. Firstly, the pre-video measure of the mixed emotion *enthusiastic-sad* was entered at step 1 and the post-video measure of mixed emotion *enthusiastic-sad* at step 2. The minimum index for *enthusiastic-sad* measured after participants had been exposed to the video-clip explained a significant amount of the variance in eudaimonic well-being,  $F(2,49) = 4.06$ ,  $p < 0.05$ ,  $R^2 = 0.14$ . The analysis showed that greater mixed emotions experience of *enthusiastic-sad* post-video were associated with greater eudaimonic well-being,  $b = .58$ ,  $p < 0.05$ ,  $95\%CI [0.20 / 0.96]$ . It was notable that *enthusiastic-sad* before the video-clip was not associated with eudaimonic well-being at step 1,  $b = -0.06$ ,  $p = 0.74$ ,  $95\% CI [-0.43 / 0.28]$ , or at step 2,  $\beta = -0.22$ ,  $p = 0.19$ ,  $95\% CI [-0.60 / 0.12]$ .

A second model used the mixed emotion *happy-sad*. At step 2, the minimum index for *happy-sad* post-video explained a significant amount of variance in eudaimonic well-being,  $F(2,49) = 4.67$ ,  $p < 0.05$ ,  $R^2 = 0.16$ . The mixed emotion *happy-sad* after the video-clip was significantly associated with eudaimonic well-being,  $b = 0.52$ ,  $p < 0.01$ ,  $95\%CI [0.14 / 0.84]$ ; the pre-video measure of mixed emotion *happy-sad* did not relate to eudaimonic well-being at step 1,  $b = -0.02$ ,  $p = 0.92$ ,  $95\%CI [-0.54 / 0.35]$ , or at step 2,  $b = -0.25$ ,  $p = 0.19$ ,  $95\%CI [-0.64 / 0.13]$ .

The previous models were repeated including sadness after watching the video-clip at step 3 to control for potential effects of changes in sadness as a predictor of eudaimonic

well-being. Results showed no significant effects of sadness on eudaimonic well-being for the model including the mixed emotion *enthusiastic-sad* ( $p = 0.70$ ) or for the model including the mixed emotion *happy-sad* ( $p = 0.88$ ); the main effects of the corresponding mixed emotions indices on eudaimonic well-being were still significant. Similarly, the inclusion of happiness after watching the video-clip at step 3 did not reveal a significant effect on eudaimonic well-being for the model including the mixed emotion *enthusiastic-sad* ( $p = 0.65$ ) or the model including mixed emotion *happy-sad* ( $p = 0.61$ ); the main effects of the corresponding mixed emotion indices on eudaimonic well-being were still statistically significant.

Overall, these analyses indicate that mixed emotions *happy-sad* and *enthusiastic-sad* experienced post-video were significantly associated with eudaimonic well-being, and that the mixed emotions effect was prompted by the video depiction of graduation. This evidence supports hypothesis 2 that mixed emotions will be positively associated with eudaimonic well-being in response to a poignant event (graduation). This was true over and above the inclusion of sadness or happiness in the corresponding models.

To evaluate a potential non-monotonic effect of mixed emotions on eudaimonic well-being the squared terms for the mixed emotion *enthusiastic-sad* pre- and post-video were entered at step 3 in the model. The variables were centred and then squared to reduce collinearity effects. The squared term for *enthusiastic-sad* after the video-clip explained a significant amount of eudaimonic well-being variance,  $F(4,47) = 3.60$ ,  $p < 0.05$ ,  $R^2 = 0.23$ ,  $\Delta R^2 = 0.10$ , which was larger than the amount explained at step 2. Furthermore, the squared term for *enthusiastic-sad* post-video marginally significantly predicted eudaimonic well-

being,  $b = -0.53$ ,  $p = 0.06$ ,  $95\%CI [-1.01 / 0.14]$ . No significant effects were found for the squared term of mixed emotions before the video-clip ( $p > 0.25$ ).

Similarly, the squared terms for the mixed emotion *happy-sad* pre- and post-video were entered at step 3. The variables were centred and then squared to reduce collinearity effects. The squared term for *happy-sad* after the video explained a significant amount of eudaimonic well-being variance,  $F(4,47) = 3.34$ ,  $p < 0.05$ ,  $R^2 = 0.24$ ,  $\Delta R^2 = 0.08$ , which was a greater amount than at step 2. The squared term for mixed emotion *happy-sad* after the video was again marginally significant,  $b = -.27$ ,  $p = 0.08$ ,  $95\%CI [-.75 / 0.07]$ , whereas the effect of the squared term for mixed emotion *happy-sad* before the video was non-significant ( $p > .10$ ). Thus, the curvilinear effect of mixed emotions on eudaimonic well-being could not be clearly supported, although data indicated a trend according to the expected.

## Discussion

The goal of this research was to examine whether mixed emotions, in the context of goal conflict, may have beneficial effects on eudaimonic well-being. Two studies provided evidence to support the idea that mixed emotions may positively influence eudaimonic well-being. The studies varied in design (cross-sectional survey, Study 1; quasi-experimental, Study 2), measures (different eudaimonic well-being measures and mixed emotions indices) and statistical methods. Overall, findings supported the hypothesis that mixed emotions experiences can have beneficial effects on eudaimonic well-being. The present research expands the implications of mixed emotions on individual well-being beyond recovery from (or resilience to cope with) stressful situations, as suggested by

previous theoretical models relating mixed emotions to well-being (e.g., Larsen et al., 2003; Reich et al., 2003; Zautra, 2003).

In Study 1, a large sample of participants completed a survey designed to evaluate whether conflicting goals predict mixed emotions. In accordance with previous studies (Berrios et al., 2015a), findings showed that conflicting goals were significantly related to mixed emotions and that the reverse path did not reveal any statistically significant effect. Furthermore, results confirmed that mixed emotions were associated with eudaimonic well-being and hedonic well-being, over and above meaning in life. It was also found that age was positively associated with eudaimonic well-being, but negatively associated with hedonic well-being. Despite the small age range of the sample in Study 1, this evidence seems to indicate that as people get older, they tend to report greater eudaimonic well-being. This is consistent with previous evidence indicating that as people age they tend to attribute greater importance to more meaningful experiences. (Carstensen, 2006; Carstensen et al., 1999).

Study 2 used a quasi-experiment based on a real event (i.e., graduation) to obtain additional evidence for the proposed relationship between mixed emotions and eudaimonic well-being. In this study, a sample of participants who were about to graduate watched a video-clip intended to elicit mixed emotions arising from the poignancy of that event and completed the eudaimonic well-being questionnaire immediately after the video. Findings confirmed that participants experienced more mixed emotions after watching the video clip, and positive changes in mixed emotions were related to higher scores on the eudaimonic well-being measure. Manipulating mixed emotions in real-time and using an ecologically valid paradigm (experiencing poignancy in response to a life transition) provided stronger

evidence to support the hypothesis that mixed emotions can enhance eudaimonic well-being. Preliminary analyses testing a curvilinear effect of mixed emotions on eudaimonic well-being did not confirm an inverted-U effect, although data indicated a trend suggesting a negative curvilinear effect, which may be explored in future studies.

Overall, this research has made four distinct contributions. Firstly, this research has provided a novel contribution to understanding the relationship between emotions and well-being by demonstrating, in two studies, that mixed emotions have positive effects on eudaimonic well-being. Our participants perceived their lives as more meaningful and more in accordance with relevant goals and values when they experienced greater levels of mixed emotions, either in response to recalling relevant goal-conflict situations that had occurred in the last few days (Study 1), or in the moments after watching a video-clip designed to enhance poignancy (Study 2).

Secondly, this research has provided preliminary evidence that may help to explain how mixed emotions can impact well-being. Study 1 revealed that mixed emotions were associated with searching for meaning in life, which in turn, was associated with enhanced eudaimonic well-being. Although this finding is very preliminary and based on cross-sectional data, from which it is not possible to establish causality or rule out third variable explanations, it is interesting to note that this evidence is consistent with the idea that mixed emotions facilitates the integration of complex information, in particular, facilitating the searching for meaning (Larsen et al., 2003) which leads people to experience greater eudaimonic well-being.

Thirdly, according to the SDT (Ryan & Deci, 2001; Ryan et al., 2008), eudaimonic well-being represents the process through which people can engage in relevant activities

that favour the achievement of three basic needs (autonomy, competence, and relatedness). The satisfaction of these needs then produce hedonic outcomes, such as pleasant emotions and greater satisfaction with life (Ryan et al., 2008). Evidence reported in this investigation lends support for this idea. Mixed emotions predicted eudaimonic well-being, and in turn, eudaimonic well-being mediated the observed effects of mixed emotions on hedonic well-being. These results are also consistent with some ideas suggested by the co-activation model of healthy coping (Larsen et al., 2003), according to which mixed emotions may facilitate problem solving and helps individuals to find meaning during stress; akin to ideas proposed in the DMA (Reich et al., 2003; Zautra, 2003). In this research we have extended the implication of mixed emotions beyond recovery from or coping with stressful situations, and we have shown preliminary evidence linking mixed emotions, meaning in life, and eudaimonic well-being.

Fourthly, the evidence partially supported a complex model including searching for meaning in life as a mediator of the association between mixed emotions and eudaimonic well-being. Park (2010) defined meaning-making as the process through which individuals attempt to reduce the discrepancy between perceived goals, beliefs or expectations. Park (2010) further suggests that searching for meaning may result in greater acceptance, perceptions of growth, and changes in identity, global beliefs or goals. Study 1 actually found that mixed emotions are closely related to searching for meaning in life, but negatively related to having meaning in life. This finding suggests that mixed emotions experiences may mobilize individuals to engage to reduce discrepancies, but the actual creation of meaning is not necessarily guaranteed. An alternative explanation may suggest that it is the process of searching for meaning in life that instigates the experience of mixed

emotions. Given that previous research has shown that conflicting goals elicit mixed emotions (Berrios et al., 2015), it is possible that searching for meaning may be itself a conflicting goals experience marked by contradictory tendencies of the self (Steger, Kashdan, Sullivan, & Lorenz, 2008). In contrast, having meaning in life may not be related to conflicting goals, and may partly explain why we found a negative association with mixed emotions.

Finally, this research is consistent with the idea that mixed emotions may not only facilitate the resolution of conflicting goals (Berrios et al., 2015a) but also promote balance among multiple possibilities by prioritising meaningful goals. Perceptual control theory asserts that the resolution of goal conflict can be achieved by the integration of goals at higher levels in the hierarchy (Powers, 1973), which is consistent with eudaimonic well-being theories claiming that eudaimonic well-being is characterised by engagement in activities that fulfil meaningful goals (e.g., Ryan & Deci, 2001; Ryan et al., 2008, Waterman, 1990) and promote balance between relevant facets of individual experience (e.g., Ryff, 1989, 1995; Ryff & Singer, 1998). Hence, if mixed emotions are primarily elicited following goal conflict, then the effect of mixed emotions on eudaimonic well-being should not be interpreted without considering the specific situational characteristics under which mixed emotions were elicited.

Together, these findings enhance the current literature on eudaimonic well-being by including relevant emotional correlates that may help to explain why eudaimonic well-being is a distinct construct compared to hedonic well-being (Waterman, 1993). Hedonic approaches have emphasised that positive emotions are a key constituent of well-being (Deiner et al., 1999; Kahneman et al., 1999), whereas eudaimonic well-being approaches

claim wellness mainly refers to the integration of multiple human potentials and the achievement of goals that foster a meaningful life in spite of momentary restraint (Ryan et al., 2008; Ryff & Singer, 1998, 2008; Waterman, 1993). The present research contributes suggesting that there is also a consistent emotional correlate associated with eudaimonic well-being: mixed emotions, which are conceptually coherent with notions of integration and balance between multiple possibilities that life holds, which are common ideas in eudaimonic well-being theory and research.

### **Limitations and future directions**

Despite the contributions of the present research, several limitations remain. Firstly, the sample of participants that took part in Studies 1 and 2 mainly consisted of university students. Thus, the generalisability of the present findings is an important issue that future studies will need to address by replicating findings in other groups of the population (e.g., workers, middle age people, and samples from developing countries). Secondly, all of the studies used self-report measures. It is possible that self-report measures of mixed emotions may be subject to biases derived from memory, desirability or acquiescence (Kihlstrom, Eich, Sandbrand, & Tobias, 1999). This is particularly important given that the effect sizes were small in magnitude. Future studies should evaluate the correspondence between self-report measures of mixed emotions and data obtained from physiological responses. Furthermore, future studies using cross-sectional designs may randomly vary the presentation order of the questions concerning goals and mixed emotions, in order to control for potential response biases. Thirdly, it is important to mention that, in Study 1, an adapted, shorter version of the strivings instrumentality matrix (Emmons & King, 1988) was used; the same applies for Study 2 in terms of the selection of a reduced number of

items of the questionnaire for eudaimonic well-being (Waterman et al., 2010). These versions of the corresponding scales need to be further validated to guarantee convergent validity.

Fourthly, it was difficult to infer causality with respect to several of the hypotheses tested. The hypotheses derived from the data presented in Studies 1 and 2 of this research will need closer examination using longitudinal designs that can specify the directionality between mixed emotions and eudaimonic well-being, as well as the presence of this association in naturally occurring settings, which may add validity to the present findings.

Finally, the quasi-experimental design presented in Study 2 lacked a control group to contrast the evidence. Therefore, it is not possible to clearly infer a causal effect of mixed emotions on eudaimonic well-being. Although the incorporation of an alternative mixed emotions index (minimum index positive-negative) is useful to address potential demand effects, it is still possible that a general demand effect on self-report could explain the results.

## **Conclusion**

In conclusion, it is possible to assert that the evidence presented in this research is consistent with the proposal that mixed emotions have a positive effect on eudaimonic well-being. The investigation of the association between mixed emotions and eudaimonic well-being is particularly important considering that the concept of eudaimonic well-being is closely linked to the achievement of relevant goals and engagement in meaningful activities, which may be threatened when experiencing conflicting goals. Overall, mixed emotions may play a role in helping individuals to consider the full nature of the situation,

assisting equilibration between multiple aspects of complex events, and ultimately, enhancing eudaimonic well-being. Experiencing mixed emotions can potentially facilitate the process of creation of meaning, which ultimately favours attainment of eudaimonic well-being.

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THE EFFECTS OF MIXED EMOTIONS ON EUDAIMONIC WELL-BEING

Table 1. Descriptive statistics and correlations between the variables included in Study 1 ( $N = 429$ ).

Variable	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7
1. Conflicting goals	3.43	0.97	-						
2. Mixed emotions scale	3.31	0.98	0.11*	-					
3. Having meaning in life	4.37	1.52	-0.05	-0.14**	-				
4. Searching for meaning in life	4.48	1.45	0.03	0.18**	-0.28**	-			
5. Hedonic motives	4.65	1.00	-0.12*	0.09	0.06	0.01	-		
6. Eudaimonic motives	5.37	0.99	0.05	0.11*	0.31**	0.12*	0.23**	-	
7. Age	23.7	6.9	0.06	-0.11*	0.12*	-0.07	-0.07	0.11*	-

Note: \*  $p < 0.05$ ; \*\*  $p < 0.01$ .

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Table 2. Descriptive statistics and correlations between mixed emotions indicators and the respective emotion adjectives used to calculate the minimum index in Study 2 ( $N = 52$ ).

<i>Emotion adjectives</i>	<i>PRE</i>		<i>POST</i>	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Sad	2.23	1.23	2.48	1.00
Stressed	2.52	1.26	2.10	1.21
Enthusiastic	2.65	1.08	2.62	1.16
Bored	2.10	1.10	1.98	1.11
Happy	3.00	1.02	2.71	1.02
Relaxed	2.92	1.33	2.58	1.04
MI happy-sad	1.81	0.77	2.10	0.87
MI enthusiastic-sad	1.71	0.80	1.96	0.71
MI positive-negative	1.76	0.47	1.73	0.42

<i>Correlations</i>							
	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>	<i>7</i>
1. MI happy-sad (pre)	-						
2. MI enthusiastic-sad (pre)	0.74**	-					
3. MI positive-negative (pre)	0.68**	0.68**	-				
4. MI happy-sad (post)	0.32*	0.24	0.26	-			
5. MI enthusiastic-sad (post)	0.32*	0.38**	0.26	0.64**	-		
6. MI positive-negative (post)	0.29*	0.32*	0.52**	0.63**	0.58**	-	
7. Eudaimonic well-being	-0.04	-0.02	0.01	0.34**	0.36**	0.29*	-

	<i>r (PRE)</i>	<i>r (POST)</i>
MI happy-sad <i>with</i> happy	0.05	0.50**
MI happy-sad <i>with</i> sad	0.71**	0.60**
MI enthusiastic-sad <i>with</i> enthusiastic	0.31*	0.47**
MI enthusiastic-sad <i>with</i> sad	0.61**	0.57**

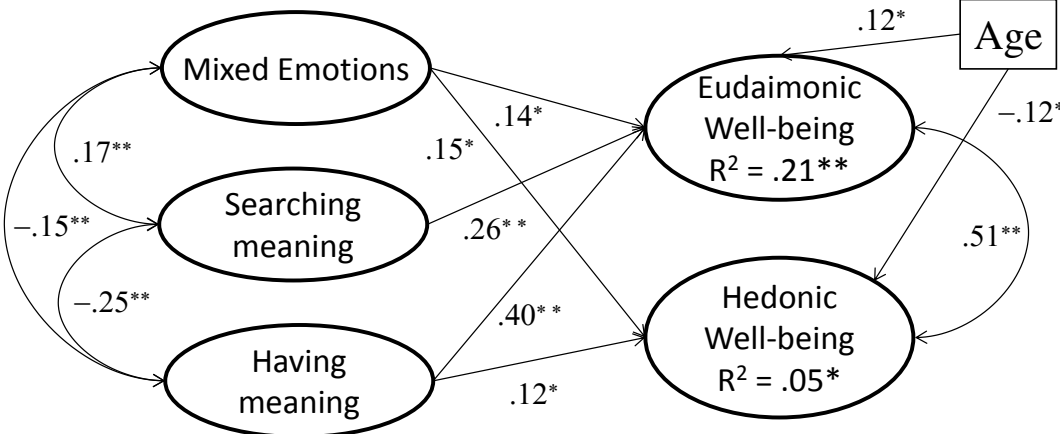
Note: MI = minimum index of mixed emotions. \*  $p < 0.05$ ; \*\*  $p < 0.01$ .

### Figure Captions

**Fig. 1** Conceptual structural model of the mixed emotions scale predicting well-being, controlling for relevant variables in Study 1. \*\*:  $p < 0.01$ ; \*:  $p < 0.05$ . Structural model included all the corresponding items; this is only a conceptual model including the latent constructs.

**Fig. 2** Conceptual diagram of the serial multiple mediation model involving mixed emotions predicting hedonic well-being, through the effect of searching for meaning in life and eudaimonic well-being in Study 1. \*\*:  $p < 0.01$ ; \*:  $p < 0.05$ , †  $p < 0.10$ .

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THE EFFECTS OF MIXED EMOTIONS ON EUDAIMONIC WELL-BEING

