

The power of extraverts: Testing positive and negative mood regulation

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Título: El poder de los extravertidos: Evaluando la regulación de estados de ánimo positivos y negativos.

Resumen: La extraversión es un rasgo de personalidad que ha sido sistemáticamente relacionado con el afecto positivo y el bienestar. Uno de los mecanismos que puede dar cuenta de estos efectos positivos es la habilidad para responder a los estados de ánimo tanto negativos como positivos. La investigación previa ha encontrado que el mayor mantenimiento de estados de ánimo positivos que logran los extravertidos podría explicar sus niveles elevados de afecto positivo. Sin embargo, las investigaciones que han explorado las diferencias entre extravertidos e introvertidos en cuanto a la regulación del estado de ánimo negativo han dado lugar a resultados mixtos. El objetivo del presente estudio fue explorar el papel de las diferentes facetas de la regulación emocional desplegadas por los extravertidos, ambivertidos e introvertidos. Tras ser inducidos a un estado de ánimo triste o alegre, los participantes fueron sometidos a una tarea de regulación emocional. Los participantes extravertidos y ambivertidos mostraron un nivel de regulación del estado de ánimo positivo mejor que los introvertidos, pero un nivel similar de regulación del estado de ánimo triste. Por tanto, esta investigación destaca la importancia de la regulación de estados de ánimo positivos en el funcionamiento psicológico de los extravertidos, y abre nuevas conceptualizaciones para desarrollar intervenciones en las que los introvertidos puedan mejorar la regulación de sus estados de ánimo positivos y, en consecuencia, mejorar su nivel general de afecto positivo y de bienestar.

Palabras clave: Extraversión; regulación anímica; afecto positivo, regulación de estados de ánimo positivos, reparación anímica.

Abstract: Extraversion is a personality trait which has been systematically related to positive affect and well-being. One of the mechanisms that may account for these positive outcomes is the ability to regulate the responses to positive, as well as negative, moods. Prior research has found that extraverts' higher positive mood maintenance could explain their higher levels of positive affect. However, research exploring differences between extraverts and introverts in negative mood regulation has yielded mixed results. The aim of the current study was explore the role of different facets of mood regulation displayed by extraverts, ambiverts, and introverts. After been exposed to a sad vs. happy mood induction, participants underwent a mood regulation task. Extraverts and ambiverts exhibited higher positive mood regulation than introverts, but similar mood repair. Thus, this research highlights the importance of positive mood regulation in the psychological functioning of extraverts, and opens new conceptualizations for developing interventions for introverts to improve their positive mood regulation and, hence, overall positive affect and well-being.

Key words: Extraversion; mood regulation; positive affect, positive mood regulation, mood repair.

Introduction

Extraversion, one of the traits included in the well-studied "Big Five" model of personality, is one of the most commonly studied personality traits. As a result, an enormous amount of results reveals the wide range of behaviors and consequences related to this trait is available (Wilt & Revelle, 2009). Less research exists in relation to ambiverts (e.g., Grant, 2013; Yuan et al., 2012). Ambiversion was proposed by Eysenck (1971) to characterize individuals that present both extraversion and introversion features and typically present intermediate scores in extraversion scales. One of the more important outcomes associated with extraversion is well-being (Ozer & Benet-Martinez, 2006). On average, extraverts report higher levels of well-being than introverts. Although research exploring the mechanisms of the association between extraversion and well-being has been scarce, there has been an increase in the number of studies exploring exactly how it is that extraversion is linked to higher levels of positive affect.

The core features of extraversion

Understanding the core basis of trait extraversion could be very useful in order to draw more accurate hypotheses about how extraversion is related to positive affect. Unfortunately, there is no agreement on what is the core feature of extraversion, even though this debate has been active for decades. Classic theories have emphasized different components of the construct to explain how extraversion works. Hans Eysenck (1952) argued that extraverts presented lower cortical excitability and higher inhibition ability than introverts which could explain their tendency and ability to engage and enjoy social situations. On the other hand, Gray (1981, 1987) and later Depue and Collins (1999) proposed reward sensitivity as the core feature of extraversion. Gray's Reinforcement Sensitivity Theory suggested that there are two neurobiologically independent systems for appetitive and aversive motivation (Gray, 1987). For their part, Depue and Collins (1999) defined reward sensitivity as the tendency to experience "an incentive motivational state that facilitates and guides approach behavior to a goal" (p. 495). Extraversion would be closely related to the high sensitivity for appetitive motivation which, in turn, would be closely related to positive affect.

Some authors have emphasized that, in fact, the tendency to experience positive emotions is what characterizes extraversion (Lucas & Fujita, 2000; Watson & Clark, 1992, 1997). However, when this link has been analyzed in more

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detail, the precise processes by which positive emotions are present in extraverts have become a matter of controversy.

Authors initially pointed out that enhanced social activity could be the mechanism underlying the relation between extraversion and positive affect (e.g., Pavot, Diener, & Fujita, 1990). In fact, sociability has been proposed by some authors as the most representative facet defining extraversion (Costa & McCrae, 1992). However, overall results have not always supported a key role of sociability in extraversion. For example, in a series of studies Lucas, Diener, Grob, Suh, and Shao (2000) explored whether the preference for social vs. solitary activities, regardless of whether they were rewarding or not, was related to extraversion. Results showed that social activity preference did not load on the extraversion factor. In contrast, the extraversion factor was strongly correlated with positive affect which was interpreted as suggesting that reward sensitivity, and not sociability, is the core feature of extraversion (see also, Lucas, Le, & Dyrenforth, 2008).

Alternatively, extraverts might display more frequent positive emotions because of their higher reactivity to positive experiences. However, evidence supporting this hypothesis has been mixed and more recent studies comparing responses of extraverts vs. introverts after having been exposed to natural or laboratory positive stimuli have yielded null results (e.g., Lucas & Baird, 2004; Lucas et al., 2008). Some authors have highlighted the difference between wanting (i.e., reward desire) and liking (i.e., reward enjoyment), and recent data seems to be consistent with the view that extraversion is more associated with wanting than with liking (Smillie, 2013a; Smillie, Cooper, Wilt, & Revelle, 2012).

A related line of research has explored whether extraverts might exhibit high positive affect, not because of something they are, but because of something they do (e.g., Fleeson, Malanos, & Achille, 2002; Zelenski, Santoro, & Whelan, 2012). Specifically, it has been replicated that introverts when asked to act as extraverts (i.e., “bold, spontaneous, assertive, and talkative”) experience higher positive affect, and when extraverts were asked to act as introverts (i.e., reserved, inhibited, timid, and quiet) experience less positive affect. Although these findings open the possibility of designing innovative interventions for introverts, they do not clarify the mechanisms by which acting as an extravert generates positive affect.

Extraversion and mood regulation

According to Thompson (1994), affect regulation “consists of the extrinsic and intrinsic processes responsible for monitoring, evaluating and modifying emotional reactions, especially their intensive and temporal features” (pp. 27–28). Many behaviors, as well as cognitions, have the aim of changing one’s own moods and emotions.

Two different mood regulation processes have been linked to extraversion: negative mood regulation (i.e., mood repair) and positive mood regulation (i.e., positive mood

maintenance). Neuroticism, and in a lesser degree extraversion, has been found to be associated with negative mood regulation (e.g., Extremera & Fernández-Berrocal, 2005; Wood, Heimpel, & Michela, 2003), that is, individuals high in neuroticism and low in extraversion tend to report less tendency to mood repair.

But mood regulation can be led to modify positive moods. Positive mood regulation involves, among others, the tendency to maintain or amplify positive emotional states. Prior research has shown through different methodologies that extraversion enhances positive mood regulation. Wood et al. (2003) showed that extraversion was positively associated to savoring and enjoying and negatively associated with joy-killing or dampening. Thus, extraverts might engage in positive experiences for maintaining positive moods increasing that way their overall positive affect. Further, Lischetzke and Eid (2006) showed that positive mood maintenance, but not mood repair, mediated the relation between extraversion and positive affect. Further, a more recent study showed that, when individuals act as extraverts, they are more motivated to maintain positive moods which, in turn, would increase positive affect (Lischetzke, Pfeifer, Crayen, & Eid, 2012). Thus, positive mood regulation appears to be an important mechanism that help to explain the connection between extraversion and positive affect.

The present research

The present research aimed to further explore the mechanisms involved in the link between extraversion on the one hand, and positive and negative mood regulation, on the other. Specifically, we tried to analyze whether extraverts, compared to introverts and ambiverts, are actually more prone to taking advantage of an available positive experience to maintain positive affect or to repair negative affect. According to the control theory model of mood regulation (Larsen, 2000), individuals do not keep engaging in mood regulation when they reach certain threshold which can be different for different individuals. In other words, extraverts can have a higher threshold than introverts for disengaging activities that increase positive affect. Similarly, the threshold for activating positive mood repair when in a sad mood can be different for extraverts than for introverts.

In this research, participants were initially induced a sad or a happy mood. Then they were asked to rate their preferences among 6 short films (three positive, three neutral) that they were supposed to watch immediately. Following previous research suggesting that extraverts present enhanced positive mood regulation (e.g., Lischetzke & Eid, 2006), it was hypothesized that extraverts, when in a positive mood, preferred positive videos more than introverts. Since evidence regarding differences in negative mood regulation is mixed, we did not make specific predictions about differences between extraverts and introverts in the negative mood induction condition.

Methods

Participants

One hundred and twelve university students (24% men) were recruited for the study in exchange for course credit. Their mean age was 20.93 years ($SD = 1.55$).

Measures

Extraversion. We used the Eysenck Personality Questionnaire Revised (EPQR-S; Eysenck, Eysenck, & Barrett, 1985; Spanish version, Eysenck & Eysenck, 1997). Each scale comprises 12 items with a dichotomous scale (0 = *no*, 1 = *yes*). The range of scores varies from 0 to 12. In the present study, Cronbach's alpha of extraversion scale was .84.

Mood Assessment. We assessed current sad and happy mood intensity by means of a set of adjectives rated on a visual analogue scale (Sanz, 2001). Each of the two mood subscales was comprised of 4 items. The sadness subscale included the following items: sad, gloomy, low-spirited, and downhearted. The joy subscale included the following items: happy, cheerful, animated, and hopeful. Each item was rated on an 11-point visual scale from 0 (*nothing*) to 10 (*extremely*). The range of scores of each subscale varies from 0 to 40. In the present study, Cronbach's alpha was .89 for sadness and .93 for happiness.

Mood regulation task. The goal of this task was to evaluate the activation of mood regulation behaviors in an anticipated emotion-based decision task that has been previously applied in the context of mood regulation research (Heimpel, Wood, Marshall, & Brown, 2002). Participants were told that they would see a film and were asked to rate their preferences among 6 short films (three positive, three neutral). Neutral films were documentaries and positive films were humoristic videos. Prior studies (e.g., Heimpel et al., 2002) have included an imbalanced number of neutral to positive clips. For the sake of favoring a balanced experimental scenario, we included the same amount of positive and neutral clips. An overall index of mood regulation was calculated based on the preferences of positive vs. neutral videos. Each video selected was coded as 1 if neutral, or 2 if positive. Since first order preference is the most important in terms of mood regulation and the sixth preference the least, the index was calculated multiplying the valence of the first video selected (i.e., coded 1 or 2) by 6, the valence of the second video selected by 5, the valence of the third video selected by 4, and so on. Thus, the mood regulation index ranged from 26 (i.e., the three neutral videos selected first) to 36 (i.e., the three positive videos selected first). Thus, higher scores indicate higher tendency to mood regulation. Finally, the valence of the first video selected was also used as an alternative index of mood regulation.

Procedure

Participants were recruited from several classes, and were divided in groups of approximately ten individuals and scheduled at the lab. After signing an informed consent form, each participant was randomly assigned to a happy vs. sad mood induction and was invited to seat in front of a computer separated at least seven feet from other participants. After completing the initial questionnaires, they went through the sad/happy mood induction via an imagery procedure combined with music. Sad music was Prokofiev's "Russia Under the Mongolian Yoke," played at half speed and happy music was a jazz version of Bach's Brandenburg Concerto No. 3 by Hubert Laws (Heimpel et al., 2002). Participants were asked to listen to the music and imagine three negative or positive hypothetical scenes as if they were happening to them (e.g., Rusting, 1999). Before the imagery task, they received instructions aimed at facilitating their imagination to be as realistic and as effective as possible (see Salovey, 1992). After the nine minute mood induction, participants filled out another mood assessment scale. Afterwards they were informed that they would see a film using a cover story and were asked to rate from 1 to 6 their preferences (1 = *most preferred*, 6 = *least preferred*) among 6 films (three positive, three neutral). Finally, before leaving the lab, participants in the sad mood condition were given a positive mood induction (i.e., one of the positive films).

Statistical analyses

The sample was divided in three groups using tertiles on the extraversion scale. Since it was not possible to divide the sample in three equal groups because of the distribution of extraversion scores, we tried to at least to have a similar size between extraverts and introverts. The sample was distributed as follows: extraverts ($N = 41$), ambiverts ($N = 30$), and introverts ($N = 41$). Then, to explore differences in the mood regulation index between the three groups, a two-way (Group: Extraverts, Ambiverts, Introverts x Mood induction: Happy, Sad) between-subjects ANOVA was conducted. A complementary strategy was employed using participants' first selection (i.e., positive video or neutral video). Two chi-square tests of independence, one for each mood induction condition, were performed to determine whether the three groups (i.e., extraverts, ambiverts and introverts) were equally likely to select positive vs. neutral video in the first place.

Results

Preliminary analyses

No significant gender differences were found for initial mood or extraversion scores. Two ANOVAs were performed to explore differences in initial happy and sad mood between extraverts, ambiverts and introverts. There were no

differences among groups for sad mood, $F(109) = 1.55, p = .22, \eta_p^2 = .03$. By contrast, significant differences emerged in regards to happy mood, $F(109) = 12.57, p < .001, \eta_p^2 = .19$. Post-hoc Bonferroni analyses showed that extraverts scored higher in the happy mood scale than introverts ($p < .001$) but not than ambiverts ($p = .58$), and ambiverts scored higher in happy mood than introverts ($p = .005$).

Manipulation check

For both conditions, participants' mood was modified as expected. The sad mood induction significantly reduced happy mood ($t(55) = 9.75, p < .001$) from pre- ($M = 24.14, SD = 8.67$) to post-induction ($M = 14.86, SD = 9.18$), and significantly increased sad mood ($t(55) = -6.43, p < .001$) from pre- ($M = 8.05, SD = 9.05$) to post-induction ($M = 16.43, SD = 10.62$).

The positive mood induction significantly increased happy mood ($t(55) = -4.51, p < .001$) from pre- ($M = 20.79, SD = 9.17$) to post-induction ($M = 24.39, SD = 8.99$) and significantly decreased sad mood ($t(55) = 5.28, p < .001$) from pre- ($M = 9.29, SD = 9.49$) to post-induction ($M = 5.29, SD = 8.37$).

Extraversion and mood regulation

A Group (extraverts, ambiverts, introverts) x Mood induction (happy, sad) ANOVA was performed. Main effects for group were significant, indicating significant differences among groups in mood regulation across mood inductions, $F(2, 106) = 5.26, p = .007, \eta_p^2 = .09$. Alternatively, no significant effects were found for mood induction factor, $F(1, 106) = 1.99, p = .16, \eta_p^2 = .02$. The interaction effect between Group and Mood induction was significant, $F(2,106) = 6.63, p = .002, \eta_p^2 = .11$. Figure 1 shows the mood regulation index scores across the Groups and Mood inductions. One-way ANOVA exploring the effects within the positive mood induction showed significant differences between groups in the mood regulation index, $F(2,53) = 14.50, p < .001, \eta_p^2 = .35$. Post-hoc analyses using the Bonferroni test indicated significant lower positive mood regulation for introverts than for extroverts ($p < .001$) and also significantly lower than for ambiverts ($p < .001$) in the positive mood induction. By contrast, the one-way ANOVA analyzing the effects within the negative mood induction did not show significant differences between groups in the mood regulation index $F(2,53) = .73, p = .48, \eta_p^2 = .03$.

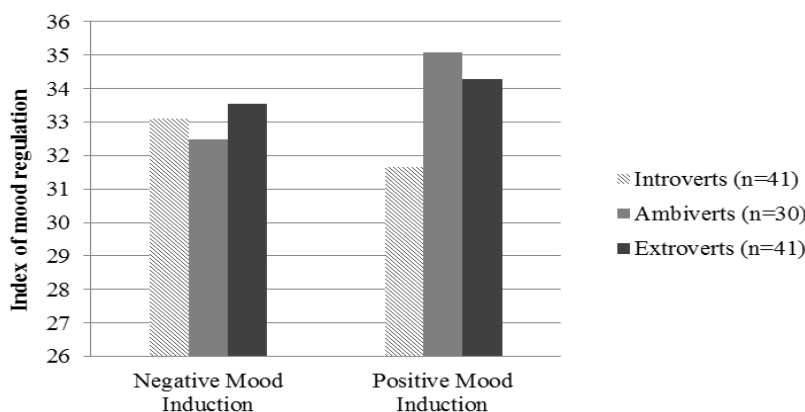


Figure 1. Mood regulation index across groups and type of mood induction.

Positive and negative mood regulation among groups was also explored using as dependent variable the valence of the first video selected. Regarding the happy mood condition, Chi-square test for independence indicated significant association between the different levels of extraversion and the most preferred video, $\chi^2(2, n = 56) = 6.67, p = .04$, Cramer's $V = .34$. As shown in Table 1, extraverts preferred, as expected, the positive video more than their coun-

terpart. Post-hoc analyses showed that significant differences were found only between extraverts and introverts ($p < .05$). Regarding the sad mood condition, the association was not significant between the groups and the video selections, $\chi^2(2, n = 56) = 2.88, p = .24$. Thus, overall, results using the first video selection reproduced what was found using the mood regulation index.

Table 1. Most preferred video after induction by group.

		Introverts	Ambiverts	Extraverts
Happy mood induction	Positive video	13 (65%)	13 (86.67%)	20 (95.24%)
	Neutral video	7 (35%)	2 (13.33%)	1 (4.76%)
Sad mood induction	Positive video	16 (76.19%)	9 (60%)	17 (85%)
	Neutral video	5 (23.81%)	6 (40%)	3 (15%)

Discussion

Using a framework that proposes reward sensitivity as the core feature of extraversion, this research aimed to further explore potential mechanisms explaining the link between extraversion and positive affect. Previous research had suggested that mood regulation could be one of these mechanisms. Prior research has shown evidence of extraversion predicting two different mood regulation processes: positive mood regulation (i.e., positive mood maintenance) and negative mood regulation (i.e., mood repair). The present study explored to what extent extraverts, compared to ambiverts and introverts, exhibited a tendency to engage in positive vs. negative mood regulation. Results showed that extraverts and ambiverts displayed higher positive mood maintenance than introverts. Additionally, the present results support the idea that extraverts and introverts seem to show similar propensity to mood repair. These findings are consistent with previous research showing that self-reported positive mood maintenance, but not mood repair, mediated the relation between extraversion and positive affect (Lischetzke & Eid, 2006). Thus, the present research extends those results replicating them using a behavior-like measure of mood regulation.

Interestingly, this pattern of results is not consistent with some prior research suggesting a higher tendency to mood repair in extraverts compared to introverts. The different method of measuring mood repair may account for the divergence in results since these prior studies used self-reported measures of mood repair. Extraverts' self-report of mood repair is usually provided while extraverted participants being in neutral or positive mood, and their approach tendency to positive activities (i.e., reward sensitivity) could contaminate their reports. Thus, extraverts' self-report on negative mood regulation might differ from actual mood regulation behavior assessed after the onset of a sad mood.

This study also highlights the importance of differentiating ambiverts in studies comparing extraverts and introverts. Our results show that, although not always significant, the pattern of responses between extraverts, introverts and ambiverts are not continuous. In other words, ambiverts' reactions to the mood regulation task do not fall in the middle between extraverts and introverts. Although it is premature to draw strong conclusions from these data, it is worth noting that non-linear relations between extraversion and other variables has also been found in previous literature (e.g., Grant, 2013).

Concerning the method for assessing mood regulation, although we have preferred to use a behavior-like measure of mood regulation for increasing external validity, there are other methods for assessing mood regulation. For example, cognitive tasks have been typically used in a significant number of studies. Smith & Petty's (1995) classic research included, among others, an autobiographical memory task for assessing mood repair when comparing individuals high vs. low in self-esteem. More recently, eye-tracking method-

ology has been also used for assessing emotion regulation (Sanchez, Vazquez, Gomez, & Joormann, 2014). Although cognitive measures have some clear advantages, is not easy to discard the differential contribution of emotion regulation and cognitive schemas as sources of influences on cognitive processing, especially since a sad mood induction can simultaneously activate latent negative schemas and mood regulation (see for a review, Beevers, 2005).

Mechanisms underlying mood regulation

It is important to acknowledge that although we intended to measure mood regulation behavior, we cannot ensure that mood regulation was the goal of participants when made their video selections. Additionally, we cannot assume that extraversion itself is the responsible of the participants' responses. In fact, several mechanisms can potentially account for the responses in the mood regulation task. For example, we do not know to what extent the origin of the different selections among groups has to do with how the clips were perceived, or whether it is mainly a consequence of mood regulation-related goals or a combination of both. In this respect, it could be argued that the differential perception of the contents of the clips of introverts and the other groups might account for the data. Although this is possible, it seems unlikely given the different patterns reported by extraverts in the happy vs. sad mood inductions.

Another possibility is that mood regulation, as measured in our study, is mainly motivation-based. Some theoretical and empirical considerations can support this explanation. First, reward sensitivity, a strongly rooted motivational construct, is considered by many authors as the defining feature of extraversion. Thus, there are reasons to believe that a motivational component may be, at least partially, responsible for our findings. Hervas & Vazquez (2013) found that the activation of a sad mood is usually associated with decreases in reward sensitivity. Thus, for extraverts, a sad mood could reduce the high reward sensitivity they usually exhibited, and could be the reason of the impaired mood regulation. This would explain why, in our study, extraverts' preference for positive videos was higher after a positive mood than after a negative mood. Research exploring the link between mood regulation and self-esteem suggests that the mechanisms responsible for impaired mood regulation include motivational components (Heimpel et al., 2002). This explanation may apply to extraverts especially since decreases in self-esteem seem to covary with decreases in reward sensitivity (Hervas & Vazquez, 2016). Finally, recent research has found that introverts do not engage in extraverted behavior because they underestimate the positive effects of acting extraverted (Zelenski et al., 2013). Anticipating a future experience may be closely related to reward sensitivity. In the Introduction section, we introduced the difference between wanting (i.e., reward desire) and liking (i.e., reward enjoyment). Reward desire could be a key process in the anticipation of a positive experience (see Smillie, 2013b). Thus, although it is specula-

tive at this point, it can be argued that reward sensitivity could influence the process of anticipation and affective forecasting of a potentially positive activity (e.g., extraverted behavior). Overall, there are enough theoretical and empirical reasons supporting that mood regulation may mainly be motivationally-driven, at least with respect to extraversion, and that the present results can be distinctly explained using this motivational framework.

Practical implications

Although this research was not designed to maximize its practical implications, it extends our knowledge about relevant mechanisms that can help to explain why introverts typically exhibit lower levels of positive affect and well-being. Thus, implications for developing strategies to promote positive interventions specifically designed for introverts can be drawn. In this respect, it is important to clarify that there is nothing inherent damaged in introverts because of having less positive affect or well-being. On the contrary, as usually stated in strength-based positive interventions, most of the times it is more important working using the strengths and advantages of one's own personality than focusing on the downsides. However, this perspective does not preclude the proposal of an intervention that can allow introverts who desire to increase their levels of positive affect to develop new resources. Thus, as important as it may be to train introverts to behave as extraverts (e.g., Zelenski et al., 2013), or to improve the quality of their interpersonal relationships (e.g., Cabello & Fernandez-Berrocá, 2015), it may be relevant to also build positive mood regulation resources (e.g., through psychoeducation, automatizing enjoyment-oriented behaviors, savoring and so on) that allow introverts to adjust the cognitive and motivational processes that can be misaligned by having reduced reward sensitivity. Considering specifically the findings from this research, training positive mood maintenance could be one of the objectives within a hypothetical program conceived to help introverts.

Limitations

Some additional methodological limitations deserve mention. Since the sample was biased in age and sex, current results should be replicated in additional samples. As to other laboratory studies, there are some inherent methodologi-

cal problems associated with the context where key behaviors are elicited and assessed. For example, it is possible that extraverts and introverts reacted differently to the laboratory scenario and that such reaction could affect the results or interact with the any of the mood inductions. To avoid this, we tried to minimize this confounding effect implementing the whole study through a computer so that the presence and potential influence of the research assistant was minimized. It is also important to replicate current results using another mood regulation behavior or different materials. For example, a music selection task offering happy and neutral songs could be used for gathering additional support to the results. Moreover, previous research has found that extraverts usually report desiring higher arousal states more than introverts (e.g., Rusting & Larsen, 1995). Thus, new studies manipulating the arousal in addition to the valence in the materials offered to participants (e.g., high arousal positive videos vs. low arousal positive videos) could also strengthen the present findings.

Another limitation to be considered is the lack of a control group (i.e., using a neutral mood induction). Although from a theoretical point of view, mood regulation is usually related to an active mood, either positive or negative, having a neutral mood condition could clarify if the results found are due to mechanisms that are mainly activated by the happy or, alternatively, by the sad mood.

Conclusions

Extraversion has been persistently associated with positive affect. This research further extends our knowledge about the mechanisms that allow extraverts to have higher positive affect. Specifically, it supports previous findings suggesting that positive mood maintenance, but not mood repair, is what characterizes extraverts in terms of mood regulation. Moreover, the pattern of results is consistent with the idea that reward sensitivity is one of the core features of extraversion and may help to further understand introverts as well as develop new positive interventions for them.

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