



HAL
open science

Mapping judgment of well-being in sport

Eric Fruchart, Patricia Rulence-Pâques

► **To cite this version:**

Eric Fruchart, Patricia Rulence-Pâques. Mapping judgment of well-being in sport. *International Journal of Sport and Exercise Psychology*, 2020, 19 (4), pp.488-503. 10.1080/1612197X.2020.1717577 . hal-04176051

HAL Id: hal-04176051

<https://hal.science/hal-04176051>

Submitted on 2 Aug 2023

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

Mapping Judgment of Well-Being in Sport

Eric Fruchart¹ and Patricia Rulence-Pâques²

University of Perpignan Via Domitia¹, France

University of Lille III², France

Abstract

This study aims to map different positions regarding the way in which 71 adolescents ($Mage = 15.46, SD = 1.55$), 104 young adults ($Mage = 21.10, SD = 1.33$), and 57 middle-aged adults ($Mage = 48.30, SD = 6.59$) integrated mentally five elements of eudaimonia (relatedness, autonomy, competence, mental vitality and physical vitality) for judging the degree of well-being in sport. The participants indicated their judgment of well-being in 32 scenarios constructed from the combination of these information cues. A cluster analysis, ANOVAs, and chi-square test were conducted. Two positions on judgment were observed and called “Additive rule and Moderate Well-Being” and “Disjunctive rule and High Well-Being”. The five elements of eudaimonia had a positive effect on the judgment of well-being. They were combined differently according to the age of the participants. This type of study may be useful for health educators and exercise or health promotion specialists.

Keywords: psychological needs; subjective vitality; judgment of well-being; sport

Well-being is any level of health where the physical, social, mental, emotional, and spiritual components are balanced, integrated, and coordinated (Ryan & Deci, 2001). The positive relation between sport and well-being has been established in young people, and adults of all ages (e.g., Gould & Carson, 2008). To study this issue, researchers in psychology identified two main perspectives: hedonic well-being vs eudaimonic well-being. Recent literature has suggested that the contrast between their comparison could be reduced by recognising the inherent value of both approaches (e.g., Henderson & Knight, 2012). This type of investigation could make a new contribution to understanding how to enhance people's well-being (Diener, Pressman, Hunter, & Delgado-Chase, 2017). In this sense, the Organisation for Economic Co-operation and Development (OECD; 2013) suggests a definition of subjective well-being that includes aspects of both hedonic and eudaimonic conceptions of well-being.

Subjective well-being is defined as “good mental states, including all various evaluations, positive and negative, that people make of their lives, and the affective reactions of people to their experiences” (OECD, 2013, p.10). Subjective well-being is composed of global life evaluation, affect, and eudaimonia (OECD, 2013). While there is a consensus on the importance of global evaluation, affect (negative and positive) and eudaimonia in the study of subjective well-being, the relation between these three components of subjective well-being is not clear (OECD, 2013). The first interest of the present study is to cross two components of subjective well-being (global evaluation and eudaimonia) in identifying the way in which individuals combine mentally some elements of eudaimonia for judging well-being in sport.

Global life evaluation may be applied to study subjective well-being in a specific area of life such as the sports area (e.g., Blanchard, Amiot, Perreault, Vallerand, & Provencher, 2009). This assessment describes the level of well-being individuals experience according to

their subjective evaluation (Diener & Suh, 1997). This approach considers that the subjective components of well-being are primordial for understanding its construction (Diener, 2009). Global evaluation refers to judgmental elements (Diener, 2009) and the judgment may be a primordial element to broach the subjective well-being. Despite fairly widespread recognition of the contribution of sport to well-being, the mechanisms or cognitive processes that operate in judgment are not clear. No investigation has been made on the manner in which the information cues are combined by individuals for judging well-being in sport.

Eudaimonia focuses on meaning and self-realization and defines well-being in terms of the degree to which a person is fully functioning (e.g., Huppert, 2009). In a sports domain, eudaimonia is often applied to investigate well-being (e.g., Lundqvist, 2011; Reinboth, Duda, & Ntoumanis, 2004). Subjective vitality and satisfaction of psychological needs are two elements of eudaimonia (e.g., Mack et al., 2011).

Subjective vitality may be considered as a first element of eudaimonic well-being. As a marker for eudaimonia, it is defined by a positive feeling of being alive and a positive feeling of having energy (e.g., Ryan & Frederick, 1997). Subjective vitality informs about the degree to which individuals feel physically and mentally vigorous and alert while practising their physical activity (Reinboth & Duda, 2006). Subjective vitality is positively related to emotional and physical well-being, social well-being, psychological well-being, and satisfaction with life (e.g., Ryan & Frederick, 1997; Salama-Younes, 2011).

Satisfaction of psychological needs may be considered as a second element of eudaimonic well-being. Psychological needs are antecedents or predictors of eudaimonia. They are based on the basic psychological need theory (Deci & Ryan, 2017) that postulates the existence of three inherent fundamental needs: (1) relatedness that refers to the need to feel significantly connected with others, to be satisfied by one's relations with others, (2) autonomy that reflects the need to regulate one's action or to be the origin of one's own

actions, and (3) competence that concerns the need for feeling competent in one's environment so as to produce the desired outcomes (Deci & Ryan, 2017). This approach has permitted the examination of the mechanisms responsible for the variation in well-being (Deci & Ryan, 2008). It asserts that when needs are satisfied, well-being is enhanced, and when they are thwarted, there is a negative impact on one's well-functioning.

Researchers studying psychological needs suggested two types of model: the additive model and the balanced model. The additive model posits that each of these three psychological needs exerts a unique direct impact on well-being (e.g., Lighthouse, Wilson, & Oster, 2010). In addition to this additive model, Sheldon and Niemic (2006) suggested the balanced model. The balanced model states that individuals may experience a balanced level or an imbalanced level in the satisfaction of their psychological needs. Individuals satisfy and weight each psychological need differently. In the balanced level, some individuals have within-person consistency, i.e., they give the same weight to the three psychological needs. In the imbalanced level, other ones have within-person variability, i.e., they do not give the same weight to the three psychological needs (Perreault, Gaudreau, Lapointe, & Lacroix, 2007). Considering people experiencing the same average level of satisfaction, researchers demonstrated concerning this dichotomy that people who present three well-balanced psychological needs reveal a greater level of well-being than those who present three imbalanced psychological needs (e.g., Sheldon & Niemic, 2006).

This balanced model has not been often used in sport and very few researchers have studied the balance of psychological needs. Perreault et al. (2007) showed that the balance of the three psychological needs was associated with lower levels of athlete burnout. Mack et al. (2011) demonstrated the positive effect that the fulfilment of balanced psychological needs has on volley-ball players' well-being. Further research will have to investigate how the three psychological needs interact with each other in order to understand their respective influence

on well-being in sport (Mack et al., 2011). No research has so far been carried out on the differences between balanced vs imbalanced levels in the three psychological needs, nor anyone has scrutinized the way they are combined in a global judgment of well-being. Their combination may be studied in using the theory of integration of information (Anderson, 2008). Judgment of well-being may be explained by the integration of different subjective components through cognitive algebra (Anderson 1996; Muñoz Sastre, 1998).

The theory of integration of information (Anderson, 2008) assumes that all perception, thought or action is goal-oriented and depends on the integration of different information cues. According to Anderson (2008), when an individual integrates information to make a final judgment (e.g., judgment of well-being in sport), a field of external stimuli (e.g., to be competent and to be autonomous in sport) will trigger three successive operations that are carried out for the purposes of the person: (1) a valuation operation that transforms stimuli into subjective representations (e.g., subjective representations to be competent and to be autonomous in sport); (2) an integration operation that transforms these subjective representations into internal response (e.g., integration of representations to be competent and to be autonomous into internal response). During this operation, these subjective representations may have different weights reflecting the importance that the individual attaches to the different stimuli (e.g., an individual may give a more important weight to competence than to autonomy); (3) an action operation that transforms internal responses into observable responses. Often it entails selecting a level along a scale of judgment (e.g., a scale of judgment of well-being in sport).

The theory of integration of information (Anderson, 2008) aims to highlight the cognitive psychological laws of the treatment and the integration of several stimuli. The goal is to discover what operations of cognitive algebra persons use to process information in different situations. This cognitive algebra, dominated by additive, disjunctive, and

conjunctive rules, is not concerned with the actual stimuli but with their psychological consideration or subjective values that the subject gives them. In an additive rule, people give the same weight or importance to each stimulus. In disjunctive or conjunctive rules, individuals give more importance to certain stimuli and less importance to the other ones (for illustration in sport, see Rulence-Pâques, Fruchart, Dru, & Mullet, 2005).

This theory was used to approach subjective well-being in different life domains (e.g., Muñoz Sastre, 1998; Theuns, Hofmans, & Verresen, 2007). Muñoz Sastre (1998) studied lay conceptions of well-being and integration rules used in judgment of well-being among young, middle-aged, and elderly adults. The findings showed that the information integration rule for estimating the level of well-being is essentially additive, i.e., the participants judge well-being by giving the same weight to various pieces of information. No difference was found between the young, middle-aged, and elderly adults. All of them used this same cognitive additive rule. On the other hand, the theory of information integration has never been applied to study global judgment of well-being in sport up to now. So, the first interest of this present study is to understand how people integrate various eudaimonic information cues for judging well-being in sport.

The second interest of this study is to identify different positions on judgment of well-being in sport according to the manner in which people combine the information cues. The theory of information integration was already considered to examine the various positions of judgment in the sports domain (e.g., Fruchart, Rulence-Pâques, & Mullet, 2017). Fruchart et al. (2017) investigated the cognitive processes by which adolescents and adults judge how acceptable it is to use a nutritional supplement in sport. From cluster analyses, two different positions on judgment were observed according to the age. In the health domain, Warr (2006) focused on the different individual's processing of information about the environment and one's self in judgment of well-being. They found that individual factors may differentially

promote activation of the judgment of well-being. This judgment of well-being may vary from a person to another.

The age may explain different positions of judgment of well-being in sport. Health-related quality of life, as observed in the subjective appraisals by individuals about their well-being, may be more or less high in physically active persons regardless of age. In fact, the effect of sport on subjective well-being differs from one age to another (Netz, Wu, Becker, & Tenenbaum, 2005) and adolescents and middle-aged adults present differences in their subjective well-being (Huebner & Diener, 2008). Pawlowski, Downward and Rascuite (2011) explored the age-specific effects of sport on subjective well-being and showed that the positive impact of sport on subjective well-being increased with age. As the impact of factors on the judgment of well-being could be different regardless of age (Blanchard et al., 2009), the participants of this present study include adolescents, young adults and middle-aged adults to further the research carried out on changes in population structure (Lehnert, Sudeck, & Conzelmann, 2012).

The main purpose of our investigation is to map different positions regarding the manner in which individuals of different ages integrate cognitively five elements of eudaimonia (relatedness, autonomy, and competence, mental vitality, and physical vitality) for judging well-being in sport. We suggested three hypotheses.

Firstly, we expected (Hypothesis 1) that different individual positions of judgment of well-being would be shown (see Fruchart et al., 2017; Warr, 2006). More precisely, we expected to find two different positions corresponding to the dichotomy between balanced vs imbalanced level in the three psychological needs (e.g., Mack et al., 2011). The members of the first position would reveal a balanced level (Perrault et al., 2007). They would give the same weight to the three psychological needs for judging well-being and they would develop an additive information integration rule. The members of the second position would reveal an

imbalanced level (Perrault et al., 2007). They would not give the same weight to the three psychological needs and they would develop a disjunctive or conjunctive information integration rule.

Secondly, in order to emphasize the contribution of the three independent psychological needs (Lighthouse et al., 2010) and both factors of subjective vitality (e.g., Ryan & Frederick, 1997) in well-being in sport, we expected (Hypothesis 2) that the higher levels of the three psychological needs and the two dimensions of vitality would be reported when the elements of well-being were present in the scenarios as opposed to when they are not.

Thirdly, we expected (Hypothesis 3) that both different positions of well-being would not be found according to the participant's age. Indeed, Muñoz Sastre (1998) showed no difference in cognitive rule among participants of various age for judging well-being.

Method

Participants

That study took place in the north of France. Participants were 232 French persons ($Mage = 26.06$, $SD = 13.40$). One hundred and twenty-seven ($Mage = 24.19$, $SD = 11.88$) were men and one hundred and five were women ($Mage = 28.31$, $SD = 14.79$). Three age groups were considered and were balanced for gender. Seventy-one were adolescents ($Mage = 15.46$, $SD = 1.55$), 104 were young adults ($Mage = 21.10$, $SD = 1.33$), and 57 were middle-aged adults ($Mage = 48.30$, $SD = 6.59$). After having obtained the parents' and head's consent, adolescents were contacted in school. Adults were contacted in the street. They were all unpaid volunteers. The study was explained and they were asked to participate. If they agreed, we arranged an appointment.

Material

In accordance with Anderson's methodology (Anderson, 1996), the material consisted of 32 cards. Each card contained a hypothetical story, a question and a response scale. These 32 stories were built from the combinations of five within-subject factors. Three factors arose from the basic psychological needs theory (Deci & Ryan, 2017): the autonomy (he can only practise this sport on fixed days at fixed times during the week or he can practise this sport whenever he wants according to his schedule), the relatedness (he does not feel connected with others or he feels connected with others), the competence (he does not feel competent in this sport or he feels competent in this sport). Two factors were drawn from subjective vitality (Ryan & Frederick, 1997): the mental vitality (no mental vitality because the physical activity does not allow him to empty his mind, or mental vitality because the physical activity allows him to empty his mind), and the physical vitality (no physical vitality because he does not go to his own physical limits, or physical vitality because he goes to his own physical limits). All combinations of these factors yielded $2 \times 2 \times 2 \times 2 \times 2 = 32$ scenarios. One typical scenario was the following: "For some time, Maël is invaded by a feeling of ill-being. He decided to pursue a sport. He can practise this sport whenever he wants according to his schedule. He feels connected with others. Soon, he feels competent in this sport. This sport does not allow him to empty his mind nor to go to his own physical limits". The question was "To what extent do you think that Maël will find well-being?". Beneath each scenario was an eleven points response scale with "*not at all sure*" indicated on the left and "*completely sure*" indicated on the right.

Procedure

The procedure performed in this study involving human participants was in accordance with the ethical standards of the institutional committee. The participants were tested individually in a room in a researcher's laboratory. The research worker explained the procedure to each participant individually. They had to read each of the 32 stories describing

an individual who is in a state of ill-being and decides to practise a sport. They were instructed to rate the degree into which they think that this individual will find well-being. The concept of “finding well-being” was explained to the participants in specifying that this means to be invaded by a feeling of well-being. Each participant answered individually by putting marks on the response scale at the location they felt appropriate between the two anchors. According to Anderson's methodology (1996), there were two phases: a familiarization phase and an experimental phase. In the familiarization phase, the participant's task was to read 6 scenarios taken randomly from the set of 32 stories and to express an opinion about the individual's well-being. These 6 scenarios exposed participants to the full range of stimuli so as to become familiar with the test material. They were given an opportunity to compare their responses and make changes if necessary. In the experimental phase, the 32 scenarios of factorial design were administered to participants who provided their ratings at their own pace but were not allowed to compare their responses or to go back and make changes as in the first phase. The whole session lasted about 40 minutes.

Data analysis

Each rating by each participant from the experimental phase was converted to a numerical value expressing the distance (number of points, from 0 to 10) between the left anchor, serving as the origin and the point which has been checked on the response scale by the participant. These numerical values were then subjected to graphical and statistical analyses.

A cluster analysis was performed on the raw data because we thought that participants were going to respond in very different ways from one another on the raw data (see Hypothesis 1). As commonly employed in the sport literature (e.g., Martinent, Nicolas, Gaudreau, & Campo, 2013), a hierarchical and a non-hierarchical cluster analysis were conducted using a two-step process to improve stability in the cluster solution (Hair, Black,

Babin, & Anderson, 2010). The standardised numerical values were entered into the cluster analysis. The first stage involved a hierarchical cluster analysis using Ward's linkage method with squared Euclidian distance measure to determine the number of clusters in the data. Ward's method is an agglomerative clustering method based on sum-of-squares criterion and produces groups that minimise within-group dispersion (Hair et al., 2010). The number of clusters to be merged from the data was determined with the agglomeration schedule coefficients and dendogram (Aldenderfer & Blashfield, 1984). The validity of the cluster solution was inspected using a repeated-measures ANOVA, with the cluster membership as a between subject factor, information cues as independent variables, and the judgment of well-being as dependent variables (Aldenderfer & Blashfield, 1984).

After having defined the number of clusters, the second stage involved a k means (nonhierarchical) cluster analysis by specifying the most appropriate cluster solution from Stage 1. This approach allows one to identify individual differences in integration rules (Hofmans & Mullet, 2013).

After identifying the different clusters, separate repeated-measures ANOVAs were performed on the data of each of them with information cues as independent variables, and the judgment of well-being as dependent variables. To finish the data analysis, chi-square tests were conducted to examine whether cluster groups were associated with a categorical demographic variable (i.e., age).

Results

Cluster analysis

The results of the hierarchical cluster analysis (Stage 1) suggested that a two-cluster solution ($K = 2$) was the most appropriate solution. Then, we performed a k -means cluster analysis (Stage 2) in specifying a two-cluster solution. The two-cluster solution was similar in the two stages of the cluster analysis. Follow-up repeated measures ANOVA revealed that the

subgroups of two-cluster solution were significantly different ($p < .001$) on the totality of factors: autonomy, $F(1,230) = 148.60$, $p < .001$, $\eta^2_p = .39$; relatedness, $F(1,230) = 80.07$, $p < .001$, $\eta^2_p = .80$; competence, $F(1,230) = 25.26$, $p < .001$, $\eta^2_p = .10$, mental vitality, $F(1,230) = 11.06$, $p < .001$, $\eta^2_p = .05$; physical vitality, $F(1,230) = 13.55$, $p < .001$, $\eta^2_p = .06$. These findings confirmed the tenability of the two-cluster solution.

Repeated-measures ANOVAs and graphical analysis

A repeated-measures ANOVA was conducted on the data of each cluster. The main results of the ANOVAs performed on cluster 1 and cluster 2 are shown in Table 1. The five independent variables were all statistically significant in both clusters. In cluster 1, the effect sizes of the independent variables were observed in decreasing order: Competence, Relatedness, Mental Vitality, Physical Vitality, and Autonomy. In cluster 2, the effect sizes were observed in decreasing order: Mental Vitality, Competence, Physical Vitality, Relatedness, and Autonomy. For each factor, except the Physical Vitality factor, the effect sizes in cluster 1 were stronger than they were in cluster 2. Figure 1 showed the means for each factor for both clusters. In both clusters, the higher the autonomy, the relatedness, the competence were, the higher the well-being was judged. The stronger the mental vitality and the physical vitality were, the higher the well-being was judged.

Figure 2 and Table 2 present both clusters. Figure 2 shows the combined effect of autonomy, relatedness and competence (i.e., three independent variables) on judgments of well-being (i.e., the dependant variable) in both clusters. The choice of this interaction was guided by our first hypothesis. The mean ratings of judgments of well-being are on the y-axis. Each panel corresponds to one level of the competence factor. The two levels of relatedness are on the x-axis. Each curve corresponds to one level of the autonomy factor.

Cluster 1 ($n = 140$) was termed “Additive rule and Moderate Well-Being” since the mean response was near the middle of the scale ($M = 5.50$, $SD = 0.04$). It is shown in the two

panels at the top of Figure 2. The curves are separate, which indicates an effect of autonomy. The curves slope clearly, which indicates an effect of relatedness. In the left panel, the curves are less elevated compared to the y-axis than they are in the right panel, which indicates an effect of competence. All the curves are parallel, which indicates that the integration law was additive. The Autonomy x Relatedness x Competence interaction was not significant, $F(1, 139) = 0.564, p = .454$ ($p < .05$ is significant). Means and SD for this interaction are shown in Table 2.

Cluster 2 ($n = 92$) was termed “Disjunctive rule and High Well-Being” since the mean response was clearly above the middle of the scale ($M = 6.51, SD = 0.05$). It is shown in the two panels at the bottom of Figure 2. The slope of the curves is ascendant, which indicates the effect of the relatedness. The curves are less separate than they are in cluster 1, which shows a less important effect of the autonomy. The curves in the right panel are more elevated compared to y-axis than they are in the left panel, which indicates an effect of the competence. In the left panel, the curves form a light fan open to the left. In “no competence” modality, the people in Cluster 2 applied a disjunctive rule to judge well-being. In the right panel, the curves are parallel. In “competence” modality, the people in Cluster 2 applied an additive rule to judge well-being. The Autonomy x Relatedness x Competence interaction was significant, $F(1, 91) = 6.229, p < .014$. Means and SD for this interaction are shown in Table 2.

Chi-square tests

Table 3 shows the composition of each cluster in terms of participants' age. The 3 (adolescents/young adults/middle-aged adults) \times 2 (Clusters) Pearson's chi-square test was significant, $\chi^2(2) = 14.889, p < .001$. In order to depict where specifically there are significant differences in the cluster compositions in this Pearson's chi-square test, we used the Marascuilo's post-hoc multiple proportion comparisons. The 2 (adolescent/young adults)

$\times 2$ (cluster 1-cluster 2) Marsaculo's chi-square test was significant, $\chi^2 (1) = 12.75, p < .001$. The 2 (young adults/middle-aged participants) $\times 2$ (cluster 1-cluster 2) Marsaculo's chi-square test was significant, $\chi^2 (1) = 8.61, p < .001$. The first cluster was predominantly made up of the young adults (74 %), then of the middle-aged adults (51%) and then of the adolescents (48%). The second cluster was predominantly made up of the adolescents (52%) and the middle-aged adults (49%) then of young adults (26 %).

Discussion

The aim of our study was to discover various positions of judgment of well-being regarding the way in which individuals of different ages combine factors of psychological needs and subjective vitality to judge well-being in sport. Our study addressed the following three expectations.

Our first hypothesis was that two different judgment positions on well-being would be identified and would correspond to the two positions of the balanced model in the three psychological needs (e.g., Sheldon & Niemic, 2006). The first position would correspond to the balanced level whereas the second one would correspond to the imbalanced level (e.g., Mack et al., 2011). This hypothesis has been confirmed by the highlight of two clusters. The psychological needs have been weighted differently in these two clusters. In the interaction Relatedness \times Competence \times Autonomy, the members of cluster 1 applied an additive rule. It is possible to state that the greater the relatedness, the competence, the autonomy are, the higher level of well-being is judged by the participants. This additive rule confirms the balanced level in the three psychological needs. The members of cluster 1 gave the same weight or importance to the three psychological needs for judging well-being.

On the other hand, the members of cluster 2 developed a disjunctive rule in a situation where there was no feeling of competence. In this situation, the impact of the autonomy is influenced by the degree of the relatedness. In the scenarios, when the individual feels no

competence, a heavy weight is accorded to relatedness and the need of autonomy is reduced. When the individual feels competence, relatedness and autonomy do not influence each other. This finding follows the imbalanced level in the three psychological needs which posits that individuals do not give the same importance to each psychological need. These results highlighted that the balanced model is composed of both types of level, i.e., imbalanced type vs balanced type, and individuals do not experience well-being in the same manner (e.g., Lighthouse et al., 2010).

The difference of cluster is also characterized by the order of importance given to 5 factors for judging well-being. The members of cluster 1 estimated that the competence is the primordial factor for estimating their degree of well-being, followed by the relatedness, the mental vitality, the physical vitality, and the autonomy. The members of cluster 2 judged that the mental vitality is the primordial factor for estimating their level of well-being, followed by the competence, the physical vitality, the relatedness, and the autonomy. Furthermore, whatever factor is taken into consideration, its impact on the judgment of well-being is more important for the members of cluster 1 than for the members of cluster 2. Contrary to Sheldon and Niemic (2006)'s findings, it would seem that people who develop an additive information integration rule (or a balanced level in the three psychological needs) judge higher well-being than people who develop a disjunctive information integration rule (or an imbalanced level in the three psychological needs). This divergence in the result may be explained by the combination of five information cues for judging well-being instead of taking the three psychological needs into consideration. Future investigations will study the dichotomy imbalance vs balance in considering the integration of the three psychological needs only.

The second hypothesis was that the higher levels of the three psychological needs and the two dimensions of vitality would be reported when the elements of well-being were present in the scenarios as opposed to when they are not. It was supported by the data. The

three psychological needs have a positive effect on the judgment of well-being. This finding confirms the additive model of the psychological needs (e.g., Lighthouse et al., 2010) in reminding that the competence, the relatedness, and the autonomy that are developed in sport increase independently the subjective well-being. The two components of subjective vitality, the physical element and the mental element, have a positive effect on the level of judgment of well-being. This result completes prior investigations about the relation between the subjective vitality and well-being in sport. These ones demonstrated that the participation of sport provoked the subjective vitality and improved the feeling of well-being (e.g., Ryan & Frederick, 1997; Salama-Younes, 2011). In the present study, these two elements of subjective vitality were clearly identified like antecedents of judgment of well-being in the sports domain. In the understanding of subjective well-being (OECD, 2013), our study highlighted the relation between eudaimonia and global evaluation (i.e., judgment) of well-being. The eudaimonic elements had a significant positive effect on the global evaluation of well-being. Future researches will be implemented in order to confirm this finding.

The third hypothesis was that both positions of well-being would not be found according to the participant's age. That was not supported by the data. Cluster 2 is principally composed of adolescents (52%) and middle-age adults (49%). Compared to young adults, cluster 2 included the highest number of adolescents and middle-age adults. So, the adolescents and middle-age adults judged well-being in the same manner. This finding alternates with Huebner and Diener (2008)'s results that suggested that adolescents and middle-aged adults have a varied understanding of subjective well-being. Cluster 1 is principally composed of young adults (74%). Compared to adolescents and middle-aged adults, cluster 1 included the highest number of young adults. Adolescents' and middle-aged adults' judgment of well-being in sport is higher than the young adults' one. Netz et al. (2005) supported that the impact of sport on subjective well-being varies from one age to another.

Our finding completes this suggestion by specifying that the elements of eudaimonia are integrated differently for judging well-being according to age. On the other hand, our results do not confirm that the older the person is, the greater the effect of sport on subjective well-being is judged to be felt (Pawlowski et al., 2011). As regards cognitive laws, our result contradicts Muñoz Sastre's findings that identified an additive rule for judging well-being among the young, middle-aged, and elderly adults. Muñoz Sastre studied the influence of various factors (health, harmony with spouse, harmony with children, friends, work, and leisure activities) on well-being in situations of everyday life. Our investigation concerns more specific situations (i.e., sport) and other factors than those found in Muñoz Sastre's study. This difference may explain the divergence of findings. Other research could be necessary to test the various cognitive rules in judgment of well-being according to people's age.

In view of our findings, it seems judicious to integrate both hedonic and eudaimonic approaches in order to improve knowledge about well-being (e.g., Henderson & Knight, 2012). The perspective of subjective well-being (OECD, 2013) proposes a promising model to understand how global evaluation of well-being (i.e., judgment of well-being) builds cognitively according to some elements of eudaimonia (Diener, 2009). This scientific approach combined with the theory of information integration may be useful in helping to reinforce knowledge on the balanced model of the three psychological needs in sports domain (e.g., Mack et al., 2011).

It is important to continue to determine the factors or the combination of factors that may bring a feeling of subjective well-being. For example, another factor for obtaining psychological benefit may be the time-out or time away (a distraction) from stimuli or thoughts that contribute to psychological "poor-being". Affect, perceptions about various aspects of the self, and stress responses may be positively influenced (e.g., Podlog,

Lochbaum, & Stevens, 2010). Indeed, well-being may attract people to sport (e.g., Blanchard et al., 2009) because practising sport has a beneficial effect on mental health and physical health (Hagger & Chaztisarantis, 2005).

Limitations

We can identify certain weaknesses in our investigation. Firstly, our study took only an interest in the global evaluation (i.e., the judgment) and eudomonía which are two of three characteristics of subjective well-being. Yet, subjective well-being is constituted of a third concept, the experience of affects (OECD, 2013). This element was omitted to avoid a potential cognitive tiredness for the participant. To study the experience of affects, we should add two other dependent variables (positive affect and negative affect) in our experimental design. Hence, we should reduce the number of independent variables to avoid a cognitive tiredness for the participant, due to a greater number of scenarios.

Secondly, we regret the lack of consideration shown in certain factors which could influence the judgment of well-being, such as the social support or self-esteem (e.g., Gagné, Ryan, & Bargmann, 2003), the individual's age and gender described in the scenario, the participants' gender or the type of practice. Thirdly, the application of the basic psychological need theory is not only pertinent for evaluating well-being but also for estimating thwarting too (Ryan & Deci, 2017). We should be interested in the psychological need thwarting that represents the frustration or obstruction of the psychological satisfaction within the sports domain (e.g., Gunnell, Crocker, Wilson, Mack, & Zumbo, 2013). Fourthly, so as to represent better the cross-section of ages, we might take into consideration elderly people (e.g., Lee & Hung, 2011). These limitations could be considered in future studies.

Conclusion and implications

The originality of this investigation is to cross two of three concepts of subjective well-being (OECD, 2013). It has used elements of eudaimonia (relatedness, autonomy,

competence, mental vitality and physical vitality) in indicating a global judgment of well-being in sport. This permitted us to identify two positions of judgment of well-being. The five eudaimonic elements had a positive effect on the judgment of well-being and were combined differently according to the age of the participants. Adolescents, young adults, middle-aged adults integrated differently the five elements of eudaimonia for judging the degree of well-being.

This type of study can help health educators and exercise or health promotion specialists in developing individual sports programs that procure feelings of well-being. Our study demonstrated that different positions on judgment of well-being may be found among people of different ages. All individuals do not give the same importance to the variables of the sports situation to estimate their level of well-being. These findings suggest the necessity for educators to consider persons individually and the importance of feeling of competence, affiliation, autonomy, and vitality in promoting sport to fight against ill-being. From practical implications, each individual might be presented with the type of questionnaire that was used in the present study before he/she begins a sport. In this way, health promotion specialists might identify for each person the influence of the combination of different factors (e.g., competence, affiliation, autonomy, vitality) on his/her judgment of well-being. According to the individual result, professionals might elaborate adapted physical activity situations and intervention programs aimed at improving a person's well-being. This topic could be included in actual health programs. For instance, if a person has a great feeling to psychological needs and vitality, it may be conceivable to use a health-enhancing physical activity program that facilitates the fulfillment of these predictors of judgment of well-being (e.g., Sylvester, Mack, Busseri, Wilson, & Beauchamp, 2012).

References

- Aldenderfer, M. S., & Blashfield, R. K. (1984). *Cluster Analysis*. Beverly Hills, CA: Sage Press.
- Anderson, N. H. (1996). *A functional theory of cognition*. Hillsdale: Lawrence Erlbaum.
- Anderson, N. H. (2008). *Unified social cognition*. New York: Psychology Press.
- Baumeister, R. F., & Leary, M. R. (1995). The need to belong: desire for interpersonal attachment as a fundamental human motivation. *Psychological Bulletin*, *117*, 497–529.
- Blanchard, C. M., Amiot, C. E., Perreault, S., Vallerand, R. J., & Provencher, P. (2009). Cohesiveness, coach's interpersonal style and psychological needs: Their effects on self-determination and athletes' subjective well-being. *Psychology of Sport and Exercise*, *10*, 545-551. doi: 10.1016/j.psychosport.2009.02.2005
- de Charms, R. C. (1968). *Personal causation: The internal affective determinants of behavior*. New York: Academic Press.
- Connell, J. P., & Wellbourn, J. G. (1991). Competence, autonomy, and relatedness: a motivational analysis of self-esteem processes. In M. R. Gunnar, & L. A. Sroufe (Eds.), *The Minnesota symposium on child psychology. Self-processes in development*, Vol. 22 (pp. 43–77). NJ: Erlbaum.
- Deci, E. L., & Ryan, R. M. (2008). Facilitating optimal motivation and psychological well-being across life's domains. *Canadian Psychology*, *49*, 14-23.
- Deci, E. L., & Ryan, R. M. (2017). *Self-determination theory. Basic psychological needs in motivation, development and wellness*. New York, NY : Guilford Press
- Diener, E. (2009). Subjective well-being. In E. Diener (Ed.), *Social Indicators of Research Series. The science of well-being* (Vol. 37, pp. 11-58). New York: Springer Science Business Media B.V.
- Diener, E, Pressman, S. D., Hunter, J., & Delgado-Chase, D. (2017). If, why, and when

- subjective well-Being influences health, and future needed research. *Applied Psychology: Health and Well-Being*, 9, 133-167. doi: 10.1111/aphw.12090
- Diener, E., & Suh, E. (1997). Measuring quality of life: Economic, social, and subjective indicators. *Social Indicators Research*, 40, 189-216.
- Fruchart, E., Rulence-Pâques, P., & Mullet, E. (2017). Mapping adults' and young athletes' views regarding how acceptable it is to use a nutritional supplement in sport. *International Journal of Sport and Exercise Psychology*. doi: 10.1080/1612197X.2017.1367952
- Gagné, M., Ryan, R. M., & Bargmann, K. (2003). Autonomy support and need satisfaction in the motivation and well-being of gymnasts. *Journal of Applied Sport Psychology*, 15, 372-390.
- Gould, D., & Carson, S. (2008). Life skills development through sport: current status and future directions. *International Review of Sport and Exercise Psychology*, 1, 58-78.
- Gunnell, K. E., Croker, P. R. E., Wilson, P. M., Mack, D. E. & Zumbo, B. D. (2013). Psychological need satisfaction and thwarting: A test of Basic Psychological Needs Theory in physical activity contexts. *Psychology of Sport and Exercise*, 14, 599-607. doi: 10.1016/j.psychsport.2013.03.007
- Hagger, M., & Chaztisarantis, N. L. D. (2005). *The social psychology of exercise and sport*. Milton Keynes: Open University.
- Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2010). *Multivariate data analysis* (7th ed.). Englewood Cliffs, NJ: Prentice-Hall.
- Henderson, L. W., & Knight, T. (2012). Integrating the hedonic and eudaimonic perspectives to more comprehensively understand wellbeing and pathways to wellbeing. *International Journal of Wellbeing*, 2, 196-221. doi:10.5502/ijw.v2i3.3
- Hofmans, J., & Mullet, E. (2013). Towards unveiling individual differences in different stages

- of information processing: A clustering-based approach. *Quality and Quantity*, 47, 455-464. doi: 10.1007/s11135-011-9529-7
- Huebner, E. S., & Diener, C. (2008). Research on life satisfaction of children and youth. implications for the delivery of school-related services. In M. Eid, & R. J. Larsen (eds) *The Science of Subjective Well-Being*. Guilford Press, New York, pp 376–392
- Huppert, F. A. (2009). Psychological Well-being: Evidence Regarding its Causes and Consequences. *Applied Psychology: Health and Well-Being*, 1, 137-164. doi:10.1111/j.1758-0854.2009.01008.x
- Lee Y. J. & Hung W. L. (2011). The relationship between exercise participation and well-being of the retired elderly. *Aging & Mental Health*, 15, 873-881. doi: 10.1080/13607863.2011.569486
- Lehnert, K., Sudeck, G., & Conzelmann, A. (2012). Subjective well-being and exercise in the second half of life: a critical review of theoretical approaches. *European Review of Aging and Physical Activity*, 9, 87-102. doi: 10.1007/s11556-012-0095-3
- Lighthouse, V. L., Wilson, P. M., & Oster, K. (2010). Strength versus balance: the contributions of two different models of psychological need satisfaction to well-being in adapted sport athletes. In I. E. Wells (Ed.), *Psychological well-being* (pp. 157-170). Hauppauge, NY: Nova Science Publishing.
- Lundqvist, C. (2011). Well-being in competitive sports-The feel-good factor? A review of conceptual considerations of well-being. *International Review of Sport and Exercise Psychology*, 4, 109-117. doi: 10.1080/1750984X.2011.584067
- Mack, D. E., Wilson, P. M., Oster, K. G., Kowalski, K. C., Crocker, P. R. E., & Sylvester, B. D. (2011). Well-being in volleyball players: Examining the contributions of independent and balanced need satisfaction. *Psychology of Sport and Exercise*, 12, 533-539. doi: 10.1016/j.psychsport.2011.05.006

- Martinent, G., Nicolas, M., Gaudreau, P., & Campo, M. (2013). A cluster analysis of affective states before and during competition. *Journal of Sport & Exercise Psychology*, 35, 600-611.
- Muñoz Sastre, M. T. (1998). Lay conceptions of well-Being and rules used in well-being judgments among young, middle-aged, and elderly adults. *Social Indicators Research*, 47(2), 203-231.
- Netz, Y., Wu, M. -J., Becker, B. J., Tenenbaum, G. (2005). Physical activity and psychological well-being in advanced age: a meta-analysis of intervention studies. *Psychology Aging*, 20, 272-284.
- OECD (2013). *OECD Guidelines on Measuring Subjective Well-Being*. OECD Publishing. <http://dx.doi.org/10.1787/97892641916556-en>
- Pawlowski, T., Downward, P. M., & Rasciute, S. (2011). Subjective well-being in European countries: On the age specific impact of physical activity. *European Review of Aging and Physical Activity*, 8, 93-102. doi: 10.1007/s11556-011-0085-x
- Perreault, S., Gaudreau, P., Lapointe, M.-C., & Lacroix, C. (2007). Does it take three to tango? Psychological need satisfaction and athlete burnout. *International Journal of Sport Psychology*, 38, 437-450.
- Podlog, L., Lochbaum, M., & Stevens, T. (2010). Need satisfaction, well-being, and perceived return-to-sport outcomes among injured athletes. *Journal of Applied Sport Psychology*, 22, 167-182. doi: 10.1080/10413201003664665
- Reinboth, M., & Duda, J. L. (2006). Perceived motivational climate, need satisfaction and indices of well-being in team sports: a longitudinal perspective. *Psychology of Sport & Exercise*, 7, 269-286. doi: 10.1016/j.psychsport.2005.06.002
- Reinboth, M., Duda, J. L., & Ntoumanis, N. (2004). Dimensions of coaching behavior, need satisfaction, and the psychological and physical welfare of young athletes. *Motivation*

& *Emotion*, 28, 297-313.

- Rulence-Pâques, P., Fruchart, E., Dru, V., & Mullet, E. (2005). Cognitive algebra in sport decision-making. *Theory and Decision*, 58, 387-406. doi: 10.1007/s11238-005-3890-8
- Ryan, R. M., & Deci, E. L. (2001). On happiness and human potentials: a review of research on hedonic and eudaimonic well-being. *Annual Review of Psychology*, 52, 141-166.
- Ryan, R. M., & Frederick, C. M. (1997). On energy, personality, and health: subjective vitality as a dynamic reflection of well-being. *Journal of Personality*, 65, 529-565.
- Salama-Younes, M. (2011). Positive mental health, subjective vitality, and satisfaction with life for French physical education students. *World Journal of Sport Sciences*, 4(2), 90-97.
- Sheldon, K. M., & Niemiec, C. P. (2006). It's not just the amount that counts: Balanced need satisfaction also affects well-being. *Journal of Personality and Social Psychology*, 91(2), 331-341. doi: 10.1037/0022-3514.91.2.331
- Sylvester, B. D., Mack, D. E., Busseri, M. A., Wilson, P. M., & Beauchamp, M. R. (2012). Health-enhancing physical activity, psychological needs satisfaction, and well-being: Is it how often, how long, or how much effort that matters? *Mental Health and Physical Activity*, 5, 141-147. doi: 10.1016/j.mhpa.2012.10.004
- Theuns, P., & Hofmans, J. (2014). Functional measurement. In A.C. Michalos (Ed.), *Encyclopedia of Quality of Life and Well-Being Research* (pp. 2383-2385). Dordrecht: Springer. doi: 10.1007/978-94-007-0753-5_3750
- Theuns, P., Hofmans, J., & Verresen (2007). A functional measurement inquiry on the contribution of different life domains to overall subjective well-being. *Teorie & Modelli*, 12, 181-189.
- Warr, P. (2006). Differential activation of judgment in employee well-being. *Journal of Occupational and Organizational Psychology*, 79, 225-244. doi: 10.1348/096317905X52652

Table 1

Main Results of the ANOVAs Performed on Cluster I and Cluster II

Factor	Effect		Error		<i>F</i>	<i>p</i>	η^2_p
	<i>df</i>	<i>MS</i>	<i>df</i>	<i>MS</i>			
CLUSTER 1							
Autonomy	1	808.35	139	5.09	158.93	.000	.53
Relatedness	1	6126.59	139	6.51	941.64	.000	.87
Competence	1	7326.21	139	7.67	956.41	.000	.87
Mental Vitality	1	3616.21	139	5.87	616.46	.000	.81
Physical Vitality	1	1396.21	139	5.96	234.14	.000	.63
CLUSTER 2							
Autonomy	1	131.41	91	4.45	29.49	.000	.24
Relatedness	1	1215.92	91	5.62	216.29	.000	.70
Competence	1	2513.04	91	10.68	235.25	.000	.72
Mental Vitality	1	3798.34	91	13.92	272.83	.000	.75
Physical Vitality	1	1831.41	91	8.49	215.78	.000	.70

Table 2

Means and SDs for Competence × Autonomy × Relatedness for both Clusters

			Cluster I		Cluster II	
Competence × Autonomy × Relatedness			<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Competence	Autonomy	Relatedness				
No	No	No	2.82	0.06	4.56	0.13
No	No	Yes	4.95	0.09	6.22	0.10
No	Yes	No	3.57	0.07	5.17	0.11
No	Yes	Yes	5.56	0.10	6.40	0.12
Yes	No	No	4.96	0.09	6.66	0.10
Yes	No	Yes	7.58	0.09	7.76	0.11
Yes	Yes	No	5.98	0.09	7.08	0.12
Yes	Yes	Yes	8.59	0.09	8.24	0.13

Table 3

Composition of the Clusters in Terms of Age

Participants	Clusters		Total
	Additive Rule and Moderate Well-being	Disjunctive and High Well-Being	
Adolescents	34 (48%)	37 (52%)	71
Young Adults	77 (74%)	27 (26%)	104
Middle-Aged Adults	29 (51%)	28 (49%)	57
Total	140	92	232

Note: Percentages in bold are significant at $p < .001$ in the 3 (adolescents/young adults/middle-age adults) \times 2 (Clusters) Pearson's chi-square test.

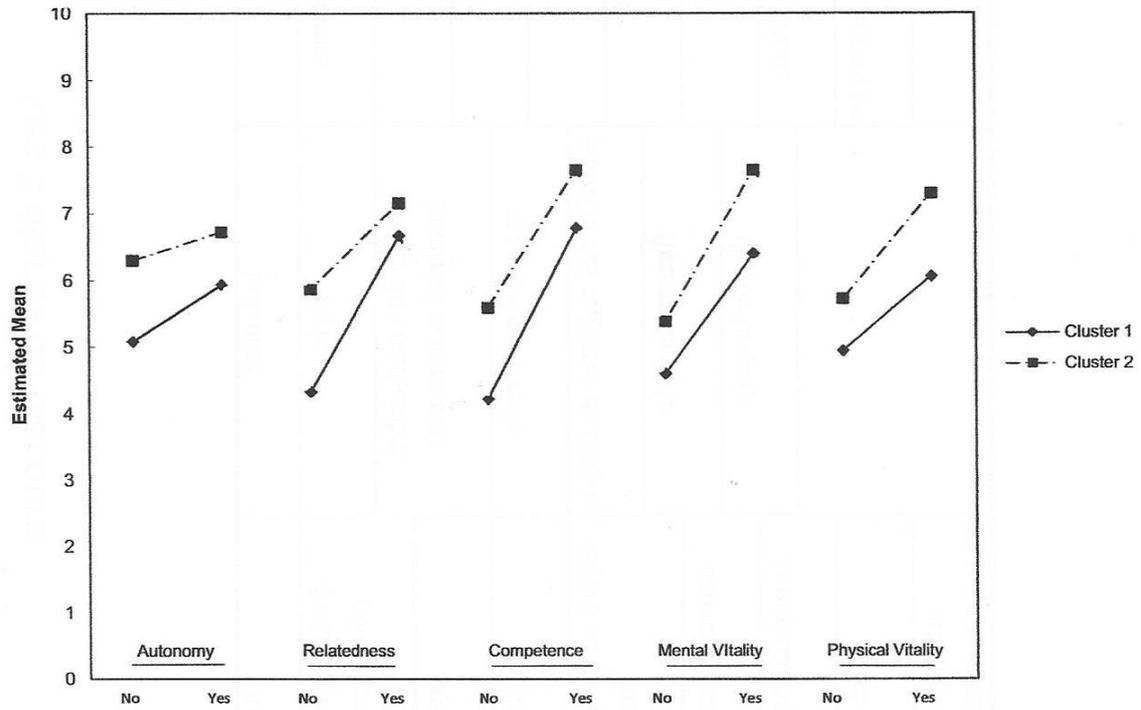
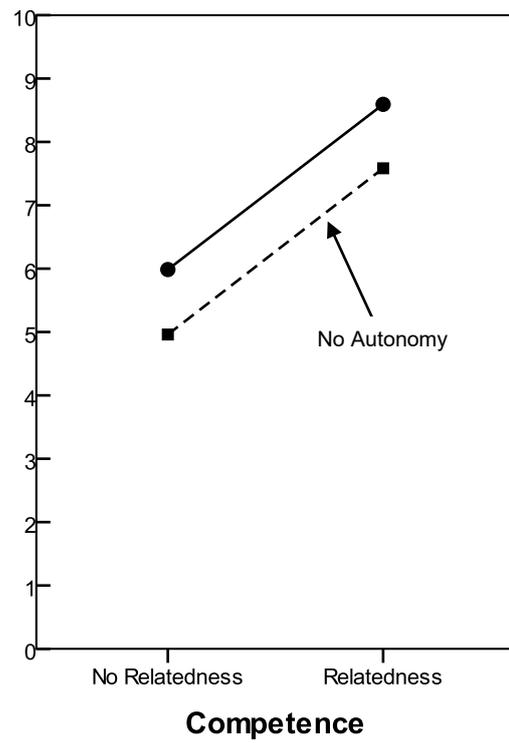
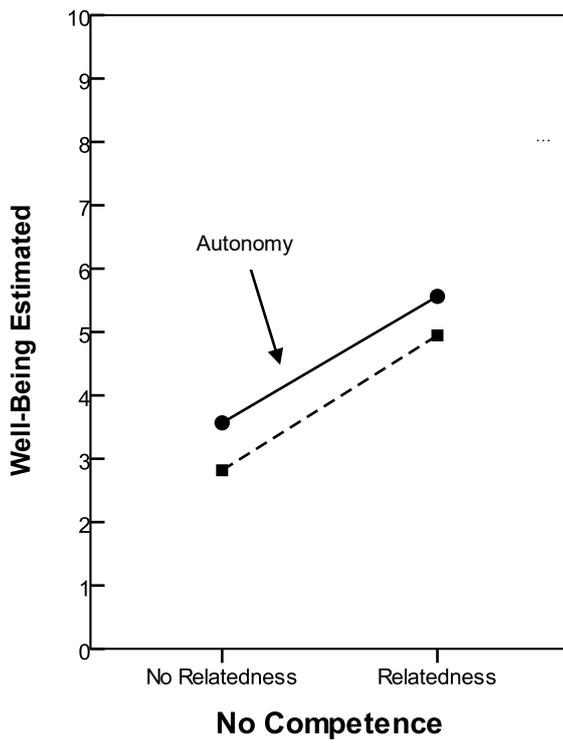


Figure 1. Means for each factor for both clusters

CLUSTER 1



CLUSTER 2

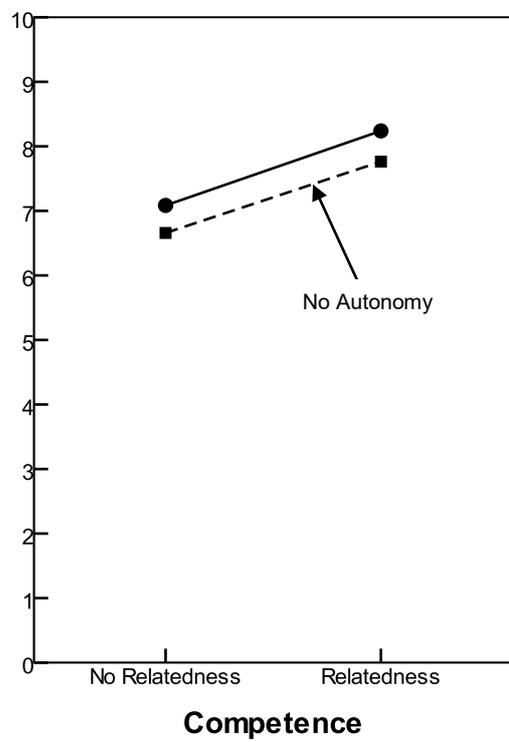
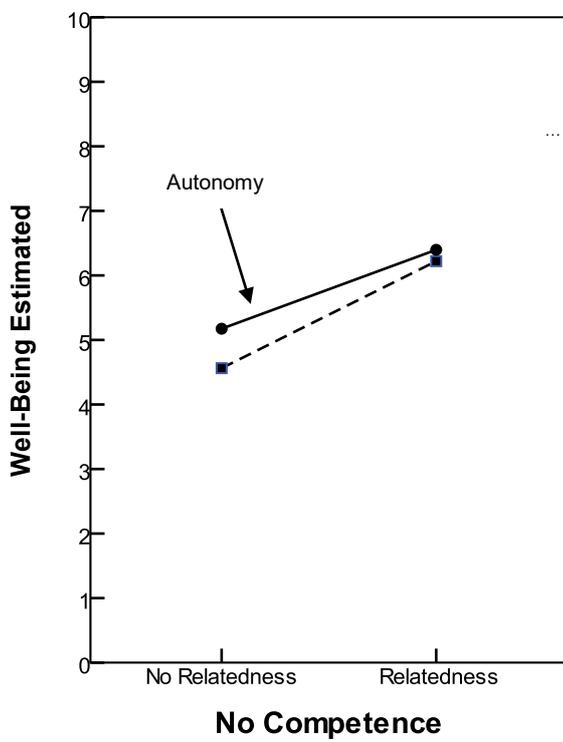


Figure 2: Effect of autonomy, relatedness, and competence on judgments of well-being in both clusters