



Relationship between Emotional Intelligence and Self-Concept in Individuals with Spinal Cord Injury

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Author's contribution

The sole author designed, analyzed and interpreted and prepared the manuscript.

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ABSTRACT

The present study aims to identify different profiles in emotional intelligence (EI) and self-concept of the participants with disabilities according to functionality of spinal cord injury. In addition, significant differences in self-concept domains among profiles previously identified are also analysed. The Trait Meta-Mood Scale-24 (TMMS-24) and AF5 Self-concept Questionnaire were administered to 98 participants with physical disabilities by traffic accidents (42 tetraplegics and 56 paraplegics). Cluster analyses allowed identifying three different EI profiles: a group of participants with low EI profile, a group with predominance of high emotional repair and regulation and, finally, a group of participants with high EI. Results also revealed significant statistical differences in most domains of self-concept among profiles. Results suggest the need of going in depth on EI knowledge and design enhancement of self-concept programs for people with spinal cord injury.

Keywords: Emotional intelligence; Self-concept; physical disability; spinal cord injury; intervention programs.

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1. INTRODUCTION

In recent decades, there has been an increasing interest in elements related to the well-being and quality of life of individuals suffering from spinal cord injury, resulting in multiple studies [1].

TheA spinal cord injury is a condition which produces alterations in muscle sensation or automatic functions distinguishing, as Dijkers [2] indicated, between paraplegia and tetraplegia. The first occurs when there is damage to the thoracic, lumbar or sacral, which affects the lower extremities. When the injury affects the cervical area, the individual will suffer from tetraplegia, losing movement and sensation in both the upper and lower halves of the body. Thus, depending on the degree of functionality, the psychosocial consequences may affect differently the adaptation of the affected person and his or her family in their everyday lives [2,3].

One variable which is gaining special interest in terms of successfully overcoming, coping with and adapting to complex events, is Emotional Intelligence (EI) [4-5].

The concept of EI was defined some years ago by Mayer and Salovey [5] as “the ability to perceive accurately, appraise, and express emotion; the ability to access and/or generate feelings when they facilitate thought; the ability to understand emotion and emotional knowledge; and the ability to regulate emotions to promote emotional an intellectual growth”Although there are different instruments to measure EI, on the basis of this definition, one of the most broadly used is the *Trait Meta-Mood Scale* (TMMS) developed by Salovey, Mayer, Goldman, Turvey, and Palfai [6], which empirically identifies three dimensions or skills involved in emotional reasoning: emotional attention, emotional understanding and emotional regulation.

However, although these skills make up EI, the involvement of each one and their relationship to the construct is more complex. For example, as noted by different authors, negative and statistically significant relationships have been found between the ability of recover from adversity and depression [7,8], alexithymia, irritability, and somatic symptoms [9], whereas a positive association was found with the ability of perception [8,9]. This is reflected in adolescents [7,10,11] and in adults [12-13].

In several studies, there is an emphasis on the relationship between EI, as measured using

TMMS, and psychological adjustment, reflected for example in subjective well-being [14], empathy and self-concept [15].

In relation to disability, empirical evidence has shown that self-concept is closely related to the success of coping and quality of life of people living with a spinal cord injury. This has led to notable interest in the strengthening of the same in different areas [15-17].

This construct is considered one of the most important aspects present in the individual, given that it consists mainly of feelings and ideas that one has of oneself. This allows individuals to improve their lives both on a personal and social level [17-19].

In this sense, it is suggested that self-concept should include references on how one views him or herself, not only in physical terms but also related to academic/professional and social perspectives.

Considering the relationship between this construct and disability caused by a spinal cord injury, the International Classification of Functioning, Disability, and Health [20] established that disabilities result from the interaction of the individual experiencing the situation with the physical and attitudinal in different environments.

However, it is not only the attitude of the rest of society which determines the integration of disabled individuals, but also their own self-perception (their self-concept), which is especially relevant given that it determines goals and expectations, thus guiding behaviour [3].

Therefore, it is very likely that if an individual sees him or herself in a negative light, the result will be an unfavourable image and unfavourable treatment by others [21]. This is likely to be accentuated in people with spinal cord injury [22]

This is explained by the frequency of negative influences received by disabled individuals, who have often experienced social rejection and negative interpersonal experiences since childhood. These circumstances point out the hypothesis that the individuals with spinal cord injuries is an at-risk group in terms of developing a negative self-concept [23,24].

Taking into account the published literature to date on the self-concept and its relationship with

the EI in people with spinal cord injuries, we do not currently have found previous studies to analyze this relationship. Focusing on EI, no studies have aimed to analyse the existence of combinations of EI components (attention, understanding and emotional regulation) which lead to different profiles of this construct within this group. Finally, there are no published studies on the differences in the concept of EI between different EI profiles of patients with spinal injury to consider both the general self-concept as its dimensions (for example, academic/social, emotional, etc.).

Based on these considerations, this study has three main objectives:

First, to determine self-concept and EI in a sample of individuals with spinal cord injuries. This will be analysed based on the degree of functionality of the spinal cord injury. Specifically, we expect to find:

H1. Differences between self-concept and EI terms of functionality related to the spinal cord injury. In particular, it is expected to observe worse self-concept and lower EI in people suffering from a SCI showing higher functionality limitations.

The second objective is to identify whether participants have combinations of different EI dimensions which might result in different profiles, which could be defined based on the weight carried by each dimension within each profile. Specifically, we expect to find:

H2. Differences between in EI profiles based on the weight carried by each EI component.

Finally, in case of different EI profiles, it will be determined if there are statistically significant differences between them considering the different self-concept scores. From this objective, is expected to.

H3. Differences between in self-concept in function of IE profile.

2. METHODS

2.1 Participants

A series of transversal cases were studied using purposive sampling – for accessibility reasons - of participants with spinal cord injury from the ASPAYM association (Association of Paraplegics

and Individuals with Significant Physical Disabilities) based in the autonomous community of Valencia: an association with 900 members. The eligible population initially consisted of 142 members over the age of 18 with spinal cord injuries caused by road traffic accidents who attended some of the meetings held periodically by the association in Alicante. Of these, 98 participants (the final study sample) agreed to participate, after attending the meetings in which the researcher, linked to the association, explained the study objective and invited them to participate. The participants were classified according to the severity of the medial lesion. The criteria for selecting participants on the basis of severity were the classification established by the American Association of Spinal Injury (ASIA) in 1982.

2.2 Instruments

The first questionnaire was created *ad hoc* for the study and included questions designed to gauge the socio-demographic profile of the participants (gender, age, degree of functionality of the injury).

Trait Meta-Mood Scale-24 (TMMS-24; Fernández-Berrocal, Extremera & Ramos [25]). This instrument is the Spanish adaptation of the TMMS-48 created by Salovey et al. [6]. This scale consists of 24 items which are responded to using a 5-point Likert scale (1 = completely disagree to 5 = completely agree). The EI range criteria for participants were established on three levels, based on the minimum (24) and maximum (124) scores. Values between 92 and 124 indicate a high level of EI; between 58 -91, moderate EI; and values between 24 and 57, slight EI.

The items are distributed across three scales: emotional attention, emotional understanding and emotional regulation. The scale is formed of three dimensions, each with 8 items: attention to own feelings, emotional clarity and repair of emotions. Emotional attention is defined as the ability to adequately perceive and express one's feelings, understanding of feelings is the understanding of emotional states and emotional repair is the ability to correctly regulate emotional states. This test was selected because of its easy application, since it was validated for young people [10], and adults [25]. The original version of the scale was validated in the Spanish sample [9]. The three factors correlate appropriately and in the anticipated direction with classic criteria

variables such as depression, anxiety, rumination and life satisfaction [25]. Furthermore, there are internal consistency rates of over 0.83 (attention, $\alpha = 0.84$; understanding, $\alpha = 0.82$; emotional regulation, $\alpha = 0.81$). In this study, reliability (α) was 0.78 for attention, 0.81 for emotional understanding and 0.80 for emotional regulation. In line with criteria established by Nunnally and Bernstein [26], rates situated between 0.70 and 0.80 for the overall questionnaire were considered adequate.

The Self-Concept Scale Form 5 (AF-5) by García & Musitu [27]. The AF5 is based on a multi-dimensional view of self-concept, a perspective which currently has the greatest empirical weight. This instrument is based on Shavelson, Hubner & Stanton's theoretical model [28] and consists of 30 items distributed across five dimensions: academic/professional (items 1, 6, 11, 16, 21 and 26), social (items 2, 7, 12, 17, 22 and 27), emotional (items 3, 8, 13, 18, 23 and 28), family-based (items 4, 9, 14, 19, 24 and 29) and physical (items 5, 10, 15, 20, 25 and 30); in other words, six items for each. Participants were asked to respond to the items using a Likert-style scale, placed in order from those with the most positive connotation to those with the most negative (where 1 = completely disagree and 5 = totally agree). Thus, the range of potential scores for the questionnaire had a minimum overall score of 30 and a maximum of 150 (values between 111 and 150 indicate a high level of self-concept, between 71 and 110, a moderate level of self-concept; and values between 30 and 70, a low level of self-concept).

This scale was chosen because it had been used in other studies with individuals with similar characteristics to those in this study [29]. It is easy to administer and can be applied to children and adults with different academic levels; furthermore, the factorial structure of the scale items satisfactorily confirms the theoretical dimensions; the components explain 51% of the total variance (Cronbach's alpha of 0.84).

As for the psychometric properties of the scale for this study, analysis of internal consistency indicated appropriate reliability ($\alpha = 0.78$); furthermore, variance explained 61.02% of variability.

2.3 Procedure

To collect data, the scales were applied to the participants sample. The sample came from

various associations devoted to assisting people with spinal cord injury.

It was first explained to the participants and subsequently invited to participate.

Anonymity was guaranteed. The questionnaires were administered. The data collection process was adjusted to ethical criteria based on consent forms. The questionnaires were administered by the psychologist researcher, linked to the association, explained the purpose of the study and proposed their participation. At the same meetings once the participants had their written consent. The procedures followed comply with the ethical standards of the human experimentation committee responsible (institutional or regional), and in accordance with the World Medical Association and the Declaration of Helsinki.

Questionnaire completion was adapted to each participant's conditions. They were completed in an time of approximately 15 minutes. Data collection was carried out between January and December 2014.

2.4 Statistical Analysis

For the socio-demographic data, frequencies and percentages were calculated. In order to explore the existence of statistically significant differences in self-concept and EI, based on type or degree of severity of the spinal cord injury, variance analysis (ANOVA) was used. To identify EI profiles, the 2-step cluster analysis method was used; this exploratory tool is designed to reveal the natural groupings within a set of information which, otherwise, would not be evident. In addition, the procedure is able to automatically determine the optimal number of clusters.

Profiles were defined based on different combinations of the three EI dimensions assessed by the TMMS-24 scale by Fernández-Berrocal et al. [25]: Attention, Understanding and Emotional Regulation.

Subsequently, cluster analyses of variance were conducted to analyse the statistical significance of the differences existing between the groups in terms of Self-concept factors. Finally, post-hoc testing was conducted to identify the groups between which differences existed. It was used the Scheffé method because the groups did not contain the same number of participants and this

test does not require equal sample sizes. We also calculated the effect size (difference of standardized means or *d* index; Cohen [30] to calculate the magnitude of the differences. The interpretation of the effect size was easy: Values less than or equal to 0.20 indicate a negligible or null effect size, those between 0.20 and 0.49 a small effect size, between 0.50 and 0.79 a moderate effect size, and over 0.80 a large effect size. The data were analyzed with the SPSS version 19.0 statistical package.

Table 1. Profile of participants

Profile of participants		N	%
Gender	Man	48	49.0
	Woman	50	51.0
Age	21-30	21	21.4
	31-40	23	23.5
	41-50	29	29.6
	>50	25	25.5
Labor situation	Studying	11	11.2
	Unemployed	34	34.7
	Working	16	16.3
	Disability retirement	37	37.8
Functionality of spinal cord injury	Paraplegic	56	57.1
	Tetraplegic	42	42.9
	Total	98	100.0

3. RESULTS

3.1 EI and Self-Concept Based on Degree of Functionality of the Spinal Cord Injury

Upon examining the mean EI scores between the groups (see Table 2), a high level for this ability was found in participants ($M = 93.46$, $S.D. = 10.54$), with no statistically significant differences being found between the groups based on degree of functionality of the spinal cord injury [$t_{(96)}=4.72$, $p = .058$].

As for self-concept, participants were found to have moderate scores on the scale ($M = 76.26$, $S.D. = 16.72$). No statistically significant differences were found according to the degree of functionality of the spinal cord injury [$t_{(96)} = 1.56$, $p = .26$].

3.2 Identification of EI Profiles

The cluster method, aiming to achieve maximum homogeneity in each group and the greatest possible differences between them, determined three groups for EI dimensions. Thus, EI was

integrated by group formed of 31 (31.63%) individuals with low skills in the three EI dimensions (cluster 1), a group with predominant skills in understanding and regulation (cluster 2) - consisting of 32 individuals (32.65%) - and a third group with predominantly high EI skills (cluster 3), made up of 35 (35.71%) participants (see Fig. 1).

Table 2. Means and standard deviations obtained in EI and self-concept according to the degree of functionality of the injury

Degree of functionality of the injury	EI		Self-concept	
	M	S.D.	M	S.D.
Paraplegia	97.20	11.45	76.92	15.14
Tetraplegia	85.66	10.88	74.28	18.20
Total	93.46	10.54	76.26	16.72
t	4.72*		1.56	

3.3 Inter-Group Differences in Self-Concept Dimensions

Upon considering the mean scores of the overall self-concept scale (see Table 3), statistically significant differences were found between the three clusters ($F_{(2, 95)} = 7.40$, $p < .05$, $\eta^2 = .32$): Group 3 had higher means than Group 2 ($d = 0.12$) and than Group 1 ($d = 0.49$). Similarly, Group 2 presented mean scores higher than those of Group 1 ($d = 0.36$).

Upon examining post-hoc factors and comparisons to determine which groups contained the differences, the following was found in regards to Factor 1, Academic/professional Self-concept: the group with the highest scores in the three EI dimensions, that is, Group 3, had significantly higher means than Groups 2 and 1, ($F_{(2, 95)} = 4.26$, $p < .05$, $\eta^2 = .32$), with a moderate effect size in the post-hoc analysis between Group 3 and Group 2 ($d = 0.22$) and a high effect size between the comparison of Group 3 with Group 1 ($d = 0.42$). Similarly, Group 2 revealed higher scores than those in Group 1 ($d = 0.36$).

In relation to Factor 2, social Self-concept, statistically significant differences were observed between the clusters, ($F_{(2, 95)} = 3.94$, $p < .05$, $\eta^2 = .34$), finding that the group with the highest scores in the three EI dimensions, in addition to Group 2, had higher scores than Group 1. Thus, Group 3 had significantly higher means in comparison with Group 1 ($d = 0.41$) and Group 2 in comparison with Group 1 ($d = 0.46$).

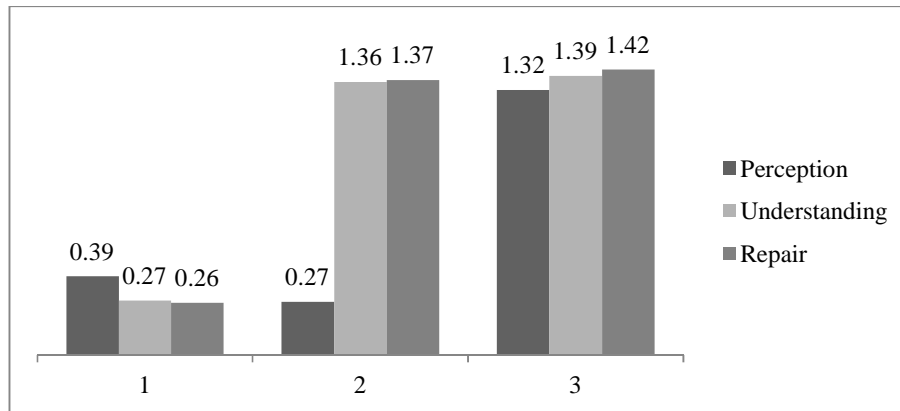


Fig. 1. Graphic representation of the three-cluster model: Cluster 1 (low generalized EI). Cluster 2 (high Repair, low Perception). Cluster 3 (high generalized EI)

Table 3. Means and standard deviations obtained for the three groups by EI and eta squared (η^2) values for each of the self-concept dimensions

Dimensions	Group 1 Low EI		Group 2 High repai. High under. Low perc p.		Grupo 3 High EI		Total		$F_{(2, 95)}$	p	η^2
	M	S.D.	M	S.D.	M	S.D.	M	S.D.			
Factor 1. Academic/labor	22.20	5.70	24.42	5.14	26.82	4.51	24.80	5.90	4.26	.011	.32
Factor 2. Social	21.42	4.56	25.08	5.22	24.85	4.40	24.4	5.03	3.94	.022	.34
Factor 3. Family	21.02	4.50	26.10	6.15	26.62	3.70	24.67	6.10	16.46	.000	.44
Factor 4. Emotional	21.32	6.12	27.12	7.14	27.16	4.52	25.06	7.02	9.68	.000	.48
Factor 5. physical	21.82	5.72	22.05	4.86	21.94	5.33	22.02	5.30	2.61	.072	.09
Total	66.90	20.04	76.14	23.20	80.65	19.25	76.26	16.72	7.40	.003	.32

The same pattern was found for Factor 3, Family-based Self-concept, and for Factor 4, Emotional Self-concept. In this case, for the family-based factor (Factor 3), it was observed that Group 3's scores were higher than Group 1's, ($F_{(2, 95)} = 16.46$, $p < .001$, $\eta^2 = .44$), ($d = 0.50$). Similarly, Group 2 presented higher means than those of Group 1 ($d = 0.51$). As for Factor 4, Expressing emotions, statistically significant differences were again found between the three clusters, with Group 3 standing out with its higher mean scores than those of Group 1, ($F_{(2, 95)} = 9.68$, $p < .001$, $\eta^2 = .48$, $d = 0.53$), and with Group 2's mean scores surpassing those of Group 1, ($d = 0.52$).

4. DISCUSSION

This study attempts to examine the relationship between EI and self-concept in individuals suffering from spinal cord injury, based on the

degree of functionality of their injuries. To do so, several objectives were proposed. The *first objective*, the degree of EI and self-concept was analysed in a group of individuals with spinal cord injuries and the results show that participants had moderate levels in regards to both constructs. Thus, the analyzes reflect statistically significant differences in the function of the level of functionality of the spinal cord injury, corroborating the first hypothesis. These results corroborate the ideas of other authors who have highlighted the struggle triggered in individuals with spinal cord injury to successfully face obstacles derived from their spinal cord injury [21,31].

The results of the *second objective* revealed the existence of profiles with different combinations of EI dimensions. Thus, by means of cluster analysis, we identified three different motivational profiles, corroborating the first hypothesis. A

group with a profile of low scores in the three EI components (group 1), a second group with high scores in Repair and low scores in Perception (group 2), a group with low scores in all three EI dimensions (group 3).

These profiles allow us to justify the results obtained in previous studies. Thus, those studies in which low EI has been negatively linked with deficiencies in well-being and psychological adjustment, a lower quantity and quality of interpersonal relationships and a greater presence of disruptive behaviour [10,11,32] could be linked to a profile with low scores in all three EI dimensions (group 1). Similarly, studies which highlight a differential relationship between EI dimensions and other variables related to interpersonal adjustment (e.g., depression) [10,33] corroborate a profile in which there are high scores for understanding and regulation but low scores for attention (group 2). Finally, high scores in all three EI dimensions would be associated with social and personal type variables [11,34-36] and may be associated with a profile of high scores in the three dimensions (group 3).

In terms of the *third objective* base the results support the third suggested hypothesis, that is, the mean scores of the clusters revealed statistically significant differences in self-concept based on the weight carried by EI dimensions. These data provide consistency to the validity of the existence of different EI profiles and help us to understand the relationship between EI and self-concept. In fact, the data shows that participants with high levels of EI have a more positive perception of themselves than those with low EI scores for the different self-concept dimensions.

demonstrate that in most self-concept factors, groups with high scores for the three EI dimensions, as well as the clusters with low scores for attention and high scores for understanding and emotional regulation, stand out. In this sense, different authors have highlighted the fundamental role of EI in the lives of individuals experiencing adversities, as can be the case with those affected by spinal cord injury. Therefore, it is logical that there should be a relationship between the dimensions forming this construct and self-concept [37,38].

These results are reinforced when examining the effect size, which indicates that in the majority of the self-concept factors, the magnitude of these

differences is great with regards to participants with low scores in EI dimensions. This can be observed in factors relating to the development of personal skills, such as academic/professional self-concept. These results are in accordance with those described by other authors [33,39] in which, using TMMS on a sample of young participants, a positive relationship was found between academic performance and regulation skills.

Also, academic work and intellectual development imply the ability to use and regulate emotions to facilitate thought, increase concentration, control impulsive behaviour and increase productivity under stressful conditions [11]. In this process, special relevance is given to the skill of regulation, one of the fundamental EI components [5,11].

These same dimensions are essential for self-concept factors relating to sociability, interaction and co-existence (social self-concept and family-based self-concept). In these factors, we can observe that the groups with the highest scores for the EI dimensions of regulation and emotional understanding revealed higher mean scores.

These data were congruent with the data presented by Extremera & Fernández-Berrocal [40], which examined the connections between EI and the quality of interpersonal relationships in a sample of young participants, finding that the young people with the highest scores in regulation and emotional understanding also presented the highest scores in positive factors of social support (camaraderie, intimacy, affection and alliance) and lower scores for negative interaction factors (conflict and emotional inhibition).

Finally, upon examining the physical self-concept factor, there were no differences observed between the three EI profiles (low EI group, high EI group, group with high understanding and emotional regulation). Perhaps, regrettably, the stereotypes and trends set by society tend to distance many people with disabilities from the standards of beauty [38,41]. This may result in lower levels of self-esteem in terms of physical self-concept, regardless of the weight carried by each EI dimension for self-concept.

Based on these results, it can be deduced that EI is strongly associated with other characteristics compromising personality, such as self-concept, which favours the successful adaptation of the individuals to the environment [6,11].

This study has some limitations which should be kept in mind. The main limitation is that each person experiences spinal cord injury characteristics in a unique way and these consist of a complex combination of factors (personal differences in experiences, different temperaments and contexts) and this should be taken into account when explaining variability in EI profiles and in self-concept. In terms of our methodology, the main difficulty lies in the conceptualisation of EI and its method of measurement. Currently, there are multiple questionnaires which attempt to analyse EI, which hinders comparison of results between studies. In future research, this bias should be monitored to attempt to increase the internal validity of the results.

5. CONCLUSION

According to this study, the results can be considered of interest insofar as they suggest the following: whilst EI may be linked to a better adjustment of individuals with spinal cord injury in terms of interpersonal and social development, not all dimensions of EI carry the same weight in this adjustment.

Likewise, the neurological criterion has been used to study the severity of the spinal cord injury. It would be interesting to study other criteria of functionality of the disability

Finally, the participants of this study volunteered to complete the questionnaires, so they might have different expectations and motivations to participate in comparison with people who were reluctant to participate. In future research, this factor should be controlled in order to increase the internal validity of the results.

In spite of these limitations, the results of this study are of interest, as they underline that, although EI is related to better individual adjustment, not all the dimensions of EI contribute equally. In this way, it may be relevant for the design and application of training programs and for the development of emotional skills such as Understanding and Emotional Regulation, since a pattern of high scores for these dimensions results in higher self-concept in those suffering from spinal cord injury. As this study reflects, there are evidences to support the hypothesis that individuals with spinal cord injuries are an at-risk group in terms of developing a negative self-concept. therefore, an adequate self-concept is necessary to ensure

good personal and social adjustment for at-risk groups, future research should focus on continue to explore the relationship between the EI of individuals with spinal cord injury and their self-concept.

CONSENT

As per international standard or university standard, patient's written consent has been collected and preserved by the author.

ETHICAL APPROVAL

As per international standard or university standard, written approval of Ethics committee has been collected and preserved by the author.

COMPETING INTERESTS

Author has declared that no competing interests exist.

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