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The Bar-On Emotional Quotient Inventory (EQ-i): Evaluation of Psychometric Aspects in the Dutch Speaking Part of Belgium

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1. Introduction

Psychology in the 20th century has been dominated by the importance given to cognitive intelligence. It has become increasingly clear however, that IQ-scores are not always good predictors of academic or professional success (McClelland, 1973; Goleman, 1995). The apparent inability of traditional measures of cognitive intelligence (e.g. IQ) to predict success in life, led to the development of the concept of emotional intelligence (EI), first labelled as such by Salovey and Mayer (1990). The idea itself however was not new.

In order to find an answer to the question *“why do some people succeed in possessing better emotional well-being than others?”*, and expanding into *“why are some individuals more able to succeed in life than others?”*, Bar-On started his research in 1980 with a systematic review of variables (i.e. abilities, competencies, skills) which he believed to be responsible for success in general (Bar-On, 1997a). He defined the concept of EI as *“an array of personal, emotional and social competencies and skills that influence one’s ability to succeed in coping with environmental demands and pressures”* (Bar-On, 1997, p14). The general idea is that a large part of success seems to be determined by non-IQ factors and that emotional intelligence can be seen as a meta-ability, comprising an important set of those factors (such as motivation, impulse-control, mood-regulation, empathy, ...), which determine how well we use other abilities, such as cognitive intelligence.

However, there are arguments that the concept of EI is not clearly defined, that different definitions and tests are being used - not always including the same aspects, and that many of the measures are neither reliable nor valid (Ciarrochi, Chan & Caputi, 2000). In essence there are two views on EI (Hedlund & Sternberg, 2000): some argue that emotional intelligence includes everything that is not measured by IQ but instead is related to success (Bar-On, 1997; Goleman, 1995); others advocate an ability model of emotional intelligence, that measures the ability to perceive and understand emotional information (Mayer, Caruso & Salovey, 2000). According to Petrides and Furham (2001) it would be more beneficial to describe trait EI and ability EI as two separate constructs instead of one being measured in two different ways. Some researchers even questioned whether emotional intelligence is anything more than a set of personality variables for which adequate measures already exist (Davies, Stankov & Roberts, 1998). Although the definitions of EI may differ among the

many researchers, instead of being contradictory to one another, they appear to be complementary and they all share a common purpose which is to extend the traditional view of intelligence by underlining the importance of social, emotional and personal factors regarding intelligent behaviour (Dawda & Hart, 2000).

Furthermore, some of the developed measures for EI (Bar-On, 1997; Schutte, Malouff, Hall, Haggerty, Cooper, Golden & Dornheim, 1998; Mayer, Caruso & Salovey, 1999) do include extensive reliability and validity studies, showing reasonable to good psychometric properties for these tests. Over the last years a growing number of scientific articles on emotional intelligence and its measures have been published (e.g. Armstrong, Galligan & Critchley, 2011; Davis & Humphrey, 2012; Qualter, Gardner, Pope, Hutchinson & Whiteley, 2011; Schutte & Malouff, 2011; Zeidner, Shani-Zinovich, Matthews & Roberts, 2005), showing not only a growing interest in this concept, but also providing scientific support for some of its measures (e.g. EQ-i - Bar-on Emotional Quotient Inventory (1997a, 1997); MSCEIT - Mayer-Salovey - Caruso Emotional Intelligence Test, 2002).

In this article we focus on the Bar-on Emotional Quotient Inventory (EQ-i; Bar-on, 1997a, 1997), one of the first scientific developed measures that attempts to assess EI. Bar-on worked extensively on developing a multi factorial and theoretically eclectic measure for EI, the Bar-on EQ-i, which measures the *potential* to succeed rather than the success itself (Bar-On, 1997). According to Bar-On the core of emotional intelligence is 'understanding oneself and others, being able to relate to people and possessing the ability to adapt and cope with one's surroundings' which in term will increase one's chances of success when dealing with environmental demands. Because EI renders the way in which someone applies his knowledge to certain situations, it can also help to predict future success. (Bar-on, 1997a). An extensive body of reliability and validity research, demonstrated with samples from several different countries over a period of 17 years, was published in the technical manual (Bar-on, 1997). We restrict ourselves to an overview of the most important results and we refer to the manual for more details.

The reliability studies included the investigation of the internal consistency and test-retest reliability and showed good reliability. For all the subscales, the internal consistency coefficients were high, ranging from a .69 (Social Responsibility) to .86 (Self-Regard), with an overall average internal consistency coefficient of .76 and thus indicating a very good homogeneity. Results for the test-retest reliability in a South African sample showed an average coefficient of .85 after one month and .75 after four months. Subscales Self-Regard, Happiness and Impulse Control appeared to be more stable over time in comparison to the other subscales. (Bar-On, 1997).

A principal component factor analysis was carried out by Bar-On (1997) to examine factorial validity. He used the criteria of eigenvalues greater than one to determine that a 13 factor solution 'afforded the greatest interpretability' (p99), but of this 13 factors only the first five factors each explained more than 2.25% of variance (Bar-On, 1997). However, results of a study conducted by Palmer and colleagues (2001) did not support this 13 factor structure. Instead they found a six factor solution by performing a principal axis factoring on a normal population sample of 337 participants, using parallel analysis (Horn, 1965) and the scree test (Cattell, 1966) to determining the best factor solution.

Dawda & Hart (2000) examined the reliability and validity of the EQ-i in a sample of 243 university students. Their results supported overall good reliability and validity of the EQ-i and further promoted the EQ-i as a broad measure of emotional intelligence. Nevertheless, they also suggested a limited usefulness of the intermediate EQ composite scales, due to the fact that the Interpersonal, Adaptation and Stress Management EQ scales contain subscales that display considerable different convergent and discriminant validity indexes. Therefore, when assessing more specific aspects of emotional intelligence, the use of the EQ subscale scores (which are mostly more internally consistent) would be more appropriate. Although the EQ-i scores did not seem to be affected by response or gender bias, they considered further research necessary.

In order to examine Bar-On's (1997) suggestion that emotional intelligence is an important factor in predicting academic success, Newsome et al (2000) tried to determine the relationship between academic achievement and emotional intelligence, personality and cognitive ability in a sample of university students. They found evidence that academic achievement could be predicted by cognitive ability and personality measures (extraversion and self-control), but their results provided no support for the incremental validity of emotional intelligence in predicting academic achievement. Instead of rejecting the construct or hypothesis, the authors attributed the failure to establish conclusive findings to the lack of consensus on a definition of emotional intelligence and how it should be measured. Parker et al (2004) argued that a number of methodological problems more precisely the fact that Newsome used a heterogeneous group of students, could have been the reason for not finding a relationship between academic success and emotional intelligence. O'Connor and Little (2003) investigated whether academic success could be predicted by emotional intelligence and found EI not to be a valid predictor. Other researchers however were in line with Bar-On's findings (1997) and stated that emotional intelligence could indeed be considered to be a valid predictor for academic performance (Khajepour, 2011; Parker, Creque, Barnhart, Harris, Majeski, Wood, Bond & Hogan, 2004; Parker, Summerfeldt, Hogan & Majeski, 2004; Parker, Hogan, Eastabrook, Oke & Wood, 2006; Qualter et al., 2011; Van der Zee, Thijs & Schakel, 2002).

Numerous studies have also showed that higher levels of emotional intelligence were associated with a better subjective well-being and with greater life satisfaction and positive affect (Austin, Saklofske & Egan, 2005; Gallagher & Vella-Brodrick, 2008; Schutte, Malouff, Simunek, McKenley & Hollander, 2002; Schutte et al., 2011). Furthermore emotional intelligence also appeared to be negatively associated with stressful events and distress. People scoring high on EI were more successful in dealing with negative life event stress (Armstrong et al., 2011). A meta-analytic study of 44 effect sizes done by Schutte, Malouff, Thorsteinsson, Bhullar & Rooke (2007) on a sample of 7898 participants showed a strong association between emotional intelligence and mental health. Martins, Ramalho & Morin (2010) confirmed these results in their comprehensive meta-analysis based on 105 effect sizes and 19.815 participants. Ciarrochi, Dean & Anderson (2002) investigated whether EI moderated the relationship between stress and mental health variables such as depression, hopelessness and suicidal ideation. They used emotion perception (EP) and managing other's emotion (MOE) as EI variables. Results of their study showed that both EP and MOE moderated the link between stress and mental health. Moreover, EP and MOE proved to be distinct of other measures (e.g. the big five personality factors, self-esteem, trait anxiety), implying that emotional intelligence ought to be considered as a separate construct. Their

study also demonstrated the importance of EI in understanding the connection between mental health and stress.

The construct of alexithymia (i.e. inability to express feelings with words; from Greek, namely a=lack, lexis=word and thymos=emotion) was first introduced in the seventies by Nemiah and colleagues (1970) and appears to be inversely related to the construct of emotional intelligence. Parker, Taylor and Bagby (2001) confirmed the relationship between those two constructs in a community sample of adults, using the Twenty-Item Toronto Alexithymia Scale (TAS-20) and the EQ-i. Also contrary to the conclusion (that EQ-i appears to be an unreliable self-report measurement) of Davies et al. (1998), Parker and colleagues (2001) corroborated the findings of Bar-On (1997a) and found acceptable levels of internal consistency for all EQ-i scales. Similar studies have also demonstrated negative correlations between emotional intelligence and alexithymia (Austin et al., 2005; Karimi & Besharat, 2010). Finally, when exploring the relationship between emotional intelligence and the severity of social anxiety in patients with generalised social phobia, Jacobs et al (2008) concluded that there was indeed a significant correlation between both variables.

The above mentioned authors started important validation work, however, there is still a need for more independent studies as many researchers pointed out, to further examine the construct validity of the measure and the relationship between emotional intelligence and other related constructs are still considered interesting topics of research (Ciarrochi et al., 2000; Hedlund et al., 2000; Bar-On, 2000; Reiff, Hatzes, Bramel & Gibbon, 2001; Derksen, Kramer & Katzko, 2002). We therefore evaluate the psychometric properties of the Dutch version of the EQ-i (Derksen, Jeuken & Klein-Herenbrink, 1997) in a Flemish population (Flanders is the Dutch speaking part of Belgium). For this purpose the EQ-i and Minnesota Multiphasic Personality Inventory - 2 (MMPI-2; Derksen, de Mey, Sloore, & Hellenbosch, 2006) were administered to a non-clinical Flemish sample. Basic reliability was tested by Cronbach Alpha and an exploratory factor analysis was carried out to examine the factorial validity. Convergent and divergent validity of the EQ-i with the MMPI-2 was evaluated and some demographic aspects were used to test the EQ-i's discriminative power between the possible subgroups. Finally a regression analysis was used to investigate which MMPI-2 variable would best predict EQ-i scores. Departing from the collected demographic data we assumed that if the EQ-i is a good measure of emotional intelligence, we should be able to see this in the relationship between EQ-i scores and respectively educational level, employment status and degree of psychopathology (i.e. MMPI-2 profile).

Research generally revealed a relationship between emotional intelligence and academic success, using grade point averages as a measure of academic success (Schutte et al., 1998; Reiff, 2001; Van Der Zee et al., 2002). A study of the incremental validity of emotional intelligence in predicting academic and social success beyond personality and academic intelligence done by Van Der Zee and colleagues (2002) demonstrated that emotional intelligence could indeed account for the additional variance. Swart's (1996) study of academic success in first-year students in South-Africa showed significant differences in EQ-i mean scores between academically successful and unsuccessful students, proving that academically successful people score significantly higher on the EQ-i (Swart 1996, in Bar-On, 1997). We wanted to test if we could replicate these findings. Because grade points averages are only one way of labelling academic success and since their usefulness in comparing different levels of education is questionable, we opted to use amount of

education (i.e. highest level of education) as a possible measure of academic success. Moreover we expected emotional intelligence to be positive related with the general level of education, as described by Sjöberg (2001). With regard to the relationship between emotional intelligence and academic success as well as occupational success we were especially interested in which of the EQ-i subscales contributed to this relationship. Several authors (Emmons & Kaiser, 1996; Parker et al., 2004; Reiff, 2001; Zeidner, Matthews & Roberts, 2009) pointed for example to interpersonal skills, self-esteem, goal orientation, adaptability and optimism as important factors in relation to academic achievement and employment status, and consequently to mental health. Therefore we expected EQ-i subscales analogous to these concepts, such as self-regard, self-actualization, stress-tolerance, flexibility and optimism to be of particular importance as aspects of emotional intelligence contributing to educational level and employment status.

With regards to emotional well-being we hypothesized that people who experience none or a few emotional problems or disorders would score higher on emotional intelligence than people with emotional problems or disorders. Considering the inverse relationship between emotional intelligence and alexithymia and the findings of Parker et al (2001) that suggested that high emotional intelligence might be a possible protective factor for mental (and physical) health, we assumed some of the EQ-i subscales such as self-regard, interpersonal relationship, stress tolerance and optimism will be good predictors.

2. Method

2.1 Procedure

All the data for this study was collected by third year psychology students who received course credits in return. They administered both tests (EQ-i and MMPI-2) to non-clinical volunteers. An informed consent was signed by all participants. The assessment measures are described in more detail below. In addition some biographic and demographic data was also collected (such as information on gender, age, education, etc.). Our sample was very heterogeneous with regard to geographic location, education level and occupation.

We first discuss results of an unpublished study into the general reliability of the EQ-i, performed in an earlier stage of data collection. In that study we investigated internal consistency using Cronbach Alpha comparing results with the original study done by Bar-On (1997). Furthermore we did a principal axis factor analysis (Direct Oblimin with Kaiser Normalisation) and performed parallel analysis (Horn, 1965; O'Connor, 2000) to determine which factor solution would best represent our data. In this procedure eigenvalues were extracted from random data sets which had the same number of cases and variables and were therefore similar to the actual dataset. When the eigenvalue of the real data set was larger than the mean eigenvalue from the random data set, the factor was retained (O'Connor, 2000).

On the complete sample, general statistics for the EQ-i results were calculated, and a comparative analysis of EQ-i profiles was performed for different groups (i.e. gender, education level and occupational status). Significant differences that reached at least a medium (.40) effect size (Cohen's *d*, 1988) were interpreted. In the second part of our research divergent validity between the EQ-i and the MMPI-2 was evaluated using Pearson correlations coefficients. Because multiple comparisons were made, a Bonferroni correction was applied to

determine significance. The conventional .05 was divided by the amount of tests (e.g. for the validity and clinical scales .05 was divided by the number of analysis; $21 \times 13 = 273$, $.05/273 = .00018$). Correlations were transformed into Fisher Z-scores using the transformation tables (Cohen, 1988). Only a large ($z = .50$) effect sizes was interpreted. Finally using regression analysis we investigated which MMPI-2 variables would best predict EQ-i scores.

2.2 Participants

The sample used for general reliability analyses consisted of 187 valid EQ-i protocols (82 men, 105 women) with participants ranging in age between 18 and 85 and a mean age of 36.73 (SD = 18.14).

Our final sample consisted of 967 participants (415 men, 552 women), between the age of 18 and 81 years old with a mean age of 41.05 (SD = 13.12). Biographical data showed that 55% of our population was either married or living together, whereas 21% was not involved in a serious relationship at the time of the assessment. Furthermore, 55% had a university or college education, another 21% finished high school, indicating that our population had a relatively high educational level. Our sample consisted of students (11 %), 58% was employed and another 15% was either unemployed or retired. These data indicate some biases: e.g. a large amount of the sample has a university or college degree and a higher number of women (57%) was present. As such our sample might not be completely representative for the total population.

2.3 Measures

2.3.1 EQ-i

The EQ-i (Bar-On, 1997) was used to assess emotional intelligence. This is a 133-item self-report inventory, where respondents indicate on a 5-point Likert scale (1= "Very seldom or not true of me"; 5= "Very often true of me") how representative the statements are for themselves. Standard scores are calculated, in accordance with IQ-scores, with a mean score of 100 and a standard deviation of 15. Test scores include a Total EQ-score, five Composite Scale scores, and 15 Content Scale scores (see Table 1). In addition the EQ-i also contains some scales that assess response style and validity: Positive Impression scale, Negative Impression scale, Omission Rate and Inconsistency Index. In accordance to the Bar-On EQ-i technical manual (p.41-42) EQ-i profiles with an Inconsistency Index score higher than 12, an Omission Rate higher than 6% and scores of 130 or more on the Positive and Negative Impression Scale were considered invalid. Protocols containing a response of "2" (Seldom true of me) or "1" (Very seldom or Not true of me) on item 133 "I responded openly and honestly to the above sentences", and thus rendering the results invalid, were also left out of our analysis.

The Dutch version of the EQ-i (Derksen et al, 1997) was administered using the standard instructions and computer-scoring by the test publisher for The Netherlands and Belgium, Pen Tests Publisher (PEN).

2.3.2 MMPI-2

The Dutch version of the Minnesota Multiphasic Personality Inventory-2 (MMPI-2; Derksen et al., 2006) - one of the most widely used self-report personality inventories (Butcher,

Derksen, Sloore & Sirigatti, 2003) - was used as an external criterion to evaluate the EQ-i. Currently, the MMPI-2 is predominantly used to evaluate psychopathology in a variety of populations and to assess aspects of personality in both clinical and non-clinical populations. Subjects obtain T-scores on 7 validity, 10 basic clinical scales and 15 content scales. The Dutch version of the MMPI-2 was administered according to the standard instructions. All MMPI-2 profiles met the following inclusion criteria: Cannot Say raw scores < 30, VRIN and TRIN T-score < 80, L scale T-score < 80, K scale T-score < 75, F scale and Fb scale T-score < 110 (Derksen et al., 2006, p70 – 77).

3. Results and discussion

3.1 Reliability of EQ-i scales

3.1.1 Internal consistency

The internal consistency was evaluated by examining Cronbach alpha’s for each scale (table 1). The coefficients range from average $\alpha=.66$ (Reality testing) to high $\alpha= .87$ (Self regard). When comparing our results to the Bar-On study (1997) we found our coefficients to be slightly lower than the US-study with the exception of Emotional Self-Awareness (ES), Interpersonal Relationship (IR) and Social Responsibility (RE). Overall our results showed a very good reliability.

EQ-i	Belgium N=187	USA N=3931
ES	.83	.80
AS	.76	.81
SR	.87	.89
SA	.67	.80
IN	.76	.79
EM	.75	.75
IR	.80	.77
RE	.72	.70
PS	.77	.80
RT	.66	.75
FL	.71	.77
ST	.79	.84
IC	.78	.79
HA	.78	.81
OP	.77	.82

Note: ES = Emotional Self-Awareness, AS = Assertiveness, SR = Self-Regard, SA = Self-Actualisation, IN = Independence, EM = Empathy, IR = Interpersonal Relationship, RE = Social Responsibility, PS = Problem Solving, RT = Reality Testing, FL = Flexibility, ST = Stress Tolerance, IC = Impulse Control, HA = Happiness, OP = Optimism

Table 1. Internal consistency

3.1.2 Exploratory factor analysis

A Principal axis factor analysis was carried out on the 117 items of the 15 subscales, to examine the factorial structure of the EQ-i. The 15 items of the validity scales and item 133 were not used. A parallel analyses yielded 7 factors accounting for 38.8% of the total variance (15.2%, 6.3%, 5.2%, 3.9%, 3.1%, 2.7%, 2.4%). In line with previous research (Bar-On, 1997a; Palmer et al., 2003) we looked at items loading $\geq .40$. Results are shown in table 2.

	Item nr.	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7
SR	11*	.558				.524		
	24	.646				.576		
	40	.472	.144		.239	.284	-.152	.144
	56	.596		.202		.399	-.124	.243
	70	.651		.129		.429		.289
	85	.744	.137		.291	.357		.212
	100	.717					-.152	
	114	.740				.123	-.191	
	129	.615	.131		.251	.244	-.263	.116
RE	16		.386		.122	-.171		.386
	30	-.285	.225	.435		-.107		
	46		.215	.204		.102		.337
	61*		.301	-.164	.383			.246
	72*		.526	.114	.422			.229
	76		.275	.545	.128			
	90	.125	.267	.124	.248			.412
	98*	-.197	.556	.205	.392	-.120		.170
	104	.141	.177	.364	.262	-.213		
	119*	-.129	.261	.100	.313	-.155	.207	.129
IC	13	.151		.566			-.268	
	27		-.375	.224	-.112		-.198	
	42		.112	.674	.140			.144
	58			.235		-.110	-.204	
	73			.470	.137		-.291	
	86			.733				
	102			.624	.315			
	117	.156		.656			-.120	
	130	.153		.639			-.177	.118
PS	1	.123		.128	.448	.107	-.111	
	15			.112	.583			
	29		.103	.180	.623	.178		
	45	.162			.739	.100	-.116	
	60		.155		.700		-.102	
	75	.297				.586	-.178	
	89		.175		.722	.122	-.157	.137

	Item nr.	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7
	118	.249				.530	-.116	.148
ES	7	.131	.783					.107
	9		.669		.237		-.101	
	23*	.155	.686			.122	-.129	.244
	35*	.359	.459	.235		.310	-.211	.159
	52	.126	.713				-.151	.177
	63	.378	.371		.257	.160		
	88*	.274	.333	.169	.349	.252	-.223	
	116	.150	.692			.234	-.141	.240
AS	22		.278		.117	.452		.149
	37	.238	.334			.335	-.216	
	67	.249	.205	-.242	.287	.421	-.192	
	82	.322				.458	-.317	
	96	.344	.488	-.169	.225	.319		.169
	111	.289	.233	-.396	.140	.472		.100
	126	.291	.271	-.155	.153	.658		.162
IN	3		.100			.401	-.289	.117
	19	.269		-.153		.608		
	32			-.107	.217	.587	-.266	
	48	.214			.156	.669	-.202	
	92	.168	.146	-.269	.240	.570	-.231	.101
	107			.208		.454	-.292	-.167
	121	.105		.233		.522	-.234	-.105
FL	14	.357	.126	-.164		.396	-.416	.357
	28		.328	.225	.311	.147	-.459	.251
	43		.185	.152			-.321	
	59	.289		-.102		.128	-.425	.411
	74	.114	.213		.292	.133	-.439	.251
	87	.227	.109			.193	-.467	.460
	103	.239	.121	.225		.176	-.643	.259
	131			-.185	-.105	.179	-.492	
ST	4	.250	.261	.174	.258	.265	-.437	
	20*	.113	.174		.283	.302	-.532	
	33	.420				.305	-.581	
	49	.422		.109		.344	-.601	.194
	64	.421		.184		.451	-.265	.199
	78	.339		.297	.165	.170	-.585	
	93			.123		.295	-.487	
	108*	.375	.299		.451	.472	-.310	.148
	122	.447			.137	.501	-.260	.133
IR	10		.517	.103			.113	.320
	23*	.155	.686			.122	-.129	.244

	Item nr.	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7
	31*	.456	.395	-.114	.259	.210		.306
	39	.294	.355	-.385	.113	.187	-.178	.201
	55*		.413	-.199	.238		-.105	.150
	62*	.393	.331	-.229	.251	.174		.334
	69	.164	.390		.207	.305		.508
	84	.149	.551		.240		-.105	.287
	99	.295	.424		.358		-.228	.408
	113	.337	.419	-.213	.287	.117		.247
	128	.238	.264	-.108	.194	.220	-.107	.466
EM	18	-.136	.385		.118	.132		.322
	44		.601		.259		-.136	.156
	55*		.413	-.199	.238		-.105	.150
	61*		.301	-.164	.383			.246
	72*		.526	.144	.422			.229
	98*	-.197	.556	.205	.392	-.120		.170
	119*	-.129	.261	.100	.313	-.155	.207	.129
	124		.218		.399	-.260	.212	.117
RT	8	.285	.170		.331	.212		
	35*	.359	.459	.235		.310	-.211	.159
	38	.120	.226	.227		.111		.237
	53	.200	.301	.276		.169	-.133	.386
	68	.202	.336	.369		.366		.427
	83			.248		.220	.169	
	88*	.274	.333	.169	.346	.252	-.223	
	97			.513	.172	.146		
	112	.196	.148		.387	.221	-.194	
	127	.284		.167	.228	.497	-.225	.381
OP	11*	.558				.524	-.323	
	20*	.113	.174		.283	.302	-.532	
	26	.483	.156		.124	.116	-.496	.235
	54	.470	.118		.161		-.234	.175
	80	.274	.291		.269	.284	-.381	.315
	106	.413	.195		.206		-.378	.228
	108*	.375	.299		.451	.472	-.310	.148
	132	.575	.106			.403	-.257	.235
HA	2	.409		.110			-.168	.476
	17	.119	.239					.412
	31*	.456	.395	-.114	.259	.210		.306
	47	.615	.197	.103			-.316	.382
	62*	.393	.331	-.229	.251	.174		.334
	77	.437		.131	-.167	.278	-.324	.434
	91	.623	.202	.152			-.258	.575

	Item nr.	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7
	105	.341	.150	.146	.322		-.118	.218
	120	.478	.231	-.185	.283			.318
SA	6	.268	.418	.151	.296	.139	-.276	.256
	21	.398	.217			.417	-.338	.160
	36	.337	.149	.292		.273	-.201	.315
	51	.286	.135		.129	.162	-.273	.572
	66					.217	-.200	.512
	81	.251	.392		.390	.186	-.359	.421
	95	.253			.286		-101	.448
	110	.157		-.133	.301			.217
	125	.375	.333	.137		.343	-.169	.165

All factor loadings >.40 are in bold face, item loadings <.10 have been omitted. * Items used in different subscales.
Note: ES = Emotional Self-Awareness, AS = Assertiveness, SR = Self-Regard, SA = Self-Actualisation, IN = Independence, EM = Empathy, IR = Interpersonal Relationship, RE = Social Responsibility, PS = Problem Solving, RT = Reality Testing, FL = Flexibility, ST = Stress Tolerance, IC = Impulse Control, HA = Happiness, OP = Optimism

Table 2. Factor loading for EQ-i , subscales (direct-oblim).

The first factor we identified contained high loadings ($\geq .40$) from all items of Self-Regard, the majority of items from Optimism and Happiness and half the items from Stress Tolerance. Contrary to Palmer (2003) and Bar-On (1997) we didn't find items above .40 of the subscale Self Actualisation on factor 1, but only moderate loadings >.25. Other than that our results are similar to the findings of Bar-On (1997) and Palmer et al. (2003). This factor was named 'Self-Contentment' by Bar-on (1997) because items 'relate to contentment with oneself and one's life' (p.100). Palmer et al. preferred the term 'Emotional Disposition' which is a name we also favour. We found high item loadings ($\geq .40$) from subscales Interpersonal Relationship, Empathy and Emotional Self-Awareness on factor 2. Unlike Palmer et al. items from the subscale Social Responsibility didn't show high loadings with this factor but instead we found the items of Emotional Self-Awareness to load highly onto this second factor. Palmer et al. labelled this factor 'Interpersonal EQ'. Our third and fourth factor appeared to be very similar to factor 3 and 4 of the Palmer et al. study. Our third factor consisted almost entirely of Impulse Control items and one or two items from Social Responsibility and Reality Testing. This factor is therefore named 'Impulse Control'. The fourth factor that emerged had high item loadings from the subscale Problem Solving and two items shared by subscales Social Responsibility and Empathy and another two shared by Stress Tolerance and Optimism, this factor was labelled 'Problem Solving'. Contrary to findings of Palmer et al., we did not find the factor which he called 'Character', consisting mainly of high item loadings from subscales Flexibility and Independence. Instead we found two separate factors for Palmer et al.'s sixth factor: our fifth factor containing high item loadings from most items of subscales Independence and Assertiveness and a few items from Self-Regard, Problem Solving and Stress Tolerance, and a sixth factor including high item loadings from most items of Flexibility and Stress Tolerance. Our results are more in line with the findings of Bar-On (1997) who also found a (sixth) factor containing items from subscales Assertiveness and Independence. We labelled our fifth factor

‘Independence/ Assertiveness and our sixth factor ‘Flexibility/Stress Tolerance’. Finally the seventh factor included items from Self-Actualisation, Interpersonal Relationships, two items from Happiness and Flexibility and one item from Reality Testing and was named ‘Interpersonal Adaptation/Self Actualisation’. Palmer’s et al.’s last factor was labelled Emotional Self-Awareness pertaining most items from subscale Emotional Self-Awareness, this was contrary to our findings.

3.2 General EQ-i profile

Table 3 shows the mean EQ-i profile of our sample of 967 participants. For the overall sample the total EQ (102.34), as well as the specific scale scores (ranging from 99.78 on Self Regard to 105.74 on Emotional Self-Awareness) can be considered as average scores. This is in accordance with earlier research on normal samples (Bar-on, 1997), although our scores are sometimes slightly lower.

	MEAN N=967	Men N=415	Women N=552
Total EQ-Score	102.34	102.69	102.08
Intrapersonal*	101.94	103.22	100.98
ES***	105.74	103.02	107.79
AS*	101.81	103.22	100.74
SR***	98.78	100.99	97.12
SA	101.38	102.09	100.85
IN***	100.16	103.45	97.68
Interpersonal***	102.35	97.61	105.91
EM***	104.58	99.32	108.54
IR***	102.93	100.47	104.78
RE***	100.34	94.84	104.47
Adaptability	104.00	104.98	103.26
PS***	103.64	105.82	101.99
RT*	104.67	103.40	105.62
FL*	100.78	102.35	99.60
Stress Management***	99.62	102.12	97.75
ST***	99.23	103.39	96.11
IC	99.91	99.87	99.94
General Mood	101.25	102.17	100.56
HA	100.52	100.59	100.47
OP**	101.92	103.66	100.61

Differences significant at *p≤.05;**p ≤.01;***p≤.0008
Effect sizes (cohen’s d, 1988): small (>.20), **medium (>.40)**, *large (>.80)*
Note: ES = Emotional Self-Awareness, AS = Assertiveness, SR = Self-Regard, SA = Self-Actualisation, IN = Independence, EM = Empathy, IR = Interpersonal Relationship, RE = Social Responsibility, PS = Problem Solving, RT = Reality Testing, FL = Flexibility, ST = Stress Tolerance, IC = Impulse Control, HA = Happiness, OP = Optimism

Table 3. Comparison of mean profiles

With regard to gender differences (table 3), our results confirm the findings reported by Bar-on (1997): although no significant difference is seen between males and females in total EQ-score, several gender differences do exist with respect to some factorial components. When considering small ($>.20$) and medium effect ($>.40$) sizes, women seem to have better interpersonal skills (i.e. empathy, interpersonal relationship, social responsibility) than men, while the latter seem to have a higher self-regard, are more independent and better in problem solving, can cope better with stress and are more flexible. Although differences between men and women are small they are consistent and seem to compensate each other in overall EI. A study from Dawda et al. (2000) on 243 university students also showed no significant difference between EQ Total score but contrary to our findings they only found men to score significantly higher than women on independence and optimism and lower on social responsibility. Reiff et al (2001) on the other hand did find that the female students in his sample of 128 college students, scored significantly higher on interpersonal skills than their male fellow students.

3.3 Level of education

Looking at education level as a measure for academic success, we divided our subjects into three groups: **Group 1** (N=84) did not complete high-school; **Group 2** (N=198) has successfully finished high-school; and **Group 3** (N=531) has a college or university education. By means of a one-way ANOVA we evaluated whether EQ-i scores could discriminate between these groups. Results (table 4) show that overall EQ-scores increase with level of education.

Cohen's d effect sizes (Cohen, 1988) were calculated to further analyse these differences and results (table 5) showed that: EQ-scores especially seemed to differentiate the group that did not finish high-school from the group with a college education (almost all medium effect sizes $>.40$). Differences between the high school and no education group and between the high school and the college group were less distinctive, with only small effect sizes. Our results regarding academic success were mostly consistent with the findings reported by Swart (1996, in Bar-On, 1997), who compared successful and unsuccessful university students (based on their grades). Although we found a higher number and more significant differences, this was probably due to the fact that our groups were much more distinctive from each other as far as level of academic success was concerned. This confirms that EI is indeed linked to academic success (measured by education level).

3.4 Employment status

By means of a one-way ANOVA we compared the EQ-i profiles of students, employed or unemployed (i.e. unemployed, housewife or retired) individuals. Scores of the student and the unemployed populations are generally slightly lower than those of the working groups (table 6).

To analyse the differences we calculated Cohen's d effect sizes. Results presented in table 7 show that there were only two medium effects ($>.40$, for social responsibility (RE)) meaning that both the working and the unemployed population can cooperate with others and are more responsible and dependable than the student group. Other effects were only small ($>.20$) and appeared to differentiate the working group from the two other groups, the

working group scored significantly higher on: Total EQ, Intrapersonal, Self-Actualisation, Adaptability and Optimism. The group of the unemployed scored significantly lower as compared to the remaining groups on: flexibility, stress management and happiness. As for the student group, they only scored significantly lower on problem solving than the two other groups. The working group score higher on reality testing than the students furthermore they have a better general mood and are more flexible than the unemployed. Both working group and students can cope better with stress than the unemployed.

	No HS N=84	High school N=198	College N=531
Total EQ-Score***	95.48	99.35	104.56
Intrapersonal***	97.06	99.28	103.76
ES***	99.27	103.96	107.28
AS**	98.50	99.09	103.39
SR	96.64	97.14	99.93
SA***	95.58	98.82	103.37
IN	98.69	98.41	100.99
Interpersonal**	96.67	101.30	103.4
EM**	100.54	103.55	105.22
IR***	96.98	101.31	104.35
RE	97.61	100.88	100.29
Adaptability***	96.70	101.08	106.22
PS**	98.81	101.88	105.32
RT*	100.50	103.89	105.69
FL***	93.23	96.53	103.19
Stress Management***	93.93	96.56	101.79
ST***	93.11	96.70	101.36
IC*	96.90	97.59	101.25
General Mood**	96.26	99.22	102.94
HA**	95.76	98.83	102.12
OP*	97.92	100.08	103.28

Differences significant at *p≤.05;**p ≤.01;***p≤.0008
Note: ES = Emotional Self-Awareness, AS = Assertiveness, SR = Self-Regard, SA = Self-Actualisation, IN = Independence, EM = Empathy, IR = Interpersonal Relationship, RE = Social Responsibility, PS = Problem Solving, RT = Reality Testing, FL = Flexibility, ST = Stress Tolerance, IC = Impulse Control, HA = Happiness, OP = Optimism

Table 4. Profiles according to level of education

	No HS vs HS	No HS vs College	HS vs College
Total EQ-Score***	.25	.58	.34
Intrapersonal***	.15	.45	.31
ES***	.32	.55	.22
AS**	.04	.32	.27
SA***	.21	.49	.32
Interpersonal**	.31	.42	.14
EM**	.22	.33	.12
IR***	.28	.46	.21
Adaptability***	.27	.60	.32
PS**	.18	.40	.21
RT*	.22	.33	.12
FL***	.20	.60	.41
Stress Management***	.15	.46	.32
ST***	.24	.55	.30
IC*	.04	.25	.23
General Mood**	.19	.41	.25
HA**	.19	.39	.23
OP*	.14	.34	.20

Differences significant at * $p \leq .05$; ** $p \leq .01$; *** $p \leq .0008$
Effect size (Cohen's d , 1988): small ($>.20$), **medium** ($>.40$), *large* ($>.80$)
Note: ES = Emotional Self-Awareness, AS = Assertiveness, SA = Self-Actualisation, EM = Empathy, IR = Interpersonal Relationship, ;PS = Problem Solving, RT = Reality Testing, FL = Flexibility, ST = Stress Tolerance, IC = Impulse Control, HA = Happiness, OP = Optimism

Table 5. Effect sizes according to level of education

	Student N=109	Working N=561	Unemployed N=150
Total EQ-Score*	99.78	103.50	99.76
Intrapersonal*	99.72	103.04	99.54
ES	104.06	106.17	104.71
AS	102.94	102.11	100.07
SR	95.99	99.83	97.52
SA ***	98.32	102.92	97.94
IN	98.20	101.09	98.09
Interpersonal	99.77	102.38	103.14
EM	102.83	104.23	105.51
IR	104.04	102.96	101.51
RE***	93.70	100.31	104.15
Adaptability*	101.09	105.26	101.27
PS*	99.76	104.74	103.11
RT*	100.87	105.84	103.45
FL**	102.00	101.30	96.45
Stress Management*	99.19	100.67	96.02
ST***	98.29	100.82	94.39
IC	100.18	100.03	98.89
General Mood*	99.63	102.46	98.45
HA*	101.54	101.38	97.61
OP**	97.50	103.26	99.97

Differences significant at *p≤.05;**p ≤.01;***p≤.0008
Note: ES = Emotional Self-Awareness, AS = Assertiveness, SR = Self-Regard, SA = Self-Actualisation, IN = Independence, EM = Empathy, IR = Interpersonal Relationship, RE = Social Responsibility, PS = Problem Solving, RT = Reality Testing, FL = Flexibility, ST = Stress Tolerance, IC = Impulse Control, HA = Happiness, OP = Optimism

Table 6. Profiles according to working status

	Student vs working	Working vs unemployed	Student vs unemployed
<i>Total EQ-Score*</i>	<u>.24</u>	<u>.24</u>	.00
Intrapersonal*	<u>.22</u>	<u>.24</u>	.01
SA ***	<u>.29</u>	<u>.32</u>	.02
RE***	.40	<u>.25</u>	.66
Adaptability*	<u>.26</u>	<u>.24</u>	.01
PS*	<u>.32</u>	.10	<u>.21</u>
RT*	<u>.31</u>	.16	.16
FL **	.04	<u>.26</u>	<u>.32</u>
Stress Management*	.09	<u>.27</u>	.19
ST***	.16	.09	<u>.24</u>
General Mood*	.17	<u>.26</u>	.07
HA*	.01	<u>.24</u>	<u>.25</u>
OP**	<u>.34</u>	<u>.21</u>	.14

Differences significant at * $p \leq .05$; ** $p \leq .01$; *** $p \leq .0008$
Effect size (Cohen's *d*, 1988): **small** ($>.20$), **medium** ($>.40$), **large** ($>.80$)
Note: ES = Emotional Self-Awareness, AS = Assertiveness, SR = Self-Regard, SA = Self-Actualisation, IN = Independence, EM = Empathy, IR = Interpersonal Relationship, RE = Social Responsibility, PS = Problem Solving, RT = Reality Testing, FL = Flexibility, ST = Stress Tolerance, IC = Impulse Control, HA = Happiness, OP = Optimism

Table 7. Effect sizes according to working status

These differences are comparable with those presented in Bar-On's manual (1997), although they are less extreme. This is logical however, since Bar-On compared two groups that were at the opposite end of the continuum of occupational success (i.e. unemployed versus top leadership positions). Our employed group on the other hand is a mixed group, making the scores more average and the differences with the unemployed group less extreme. This indicates that differences in occupational success are indeed linked to differences in EQ-i scores

3.5 Concurrent validity of the EQ-i

The calculated correlations between the different EQ-i scales and the MMPI-2 Clinical and Content Scales were transformed into Fisher's z-scores. Results displayed in tables 8a and 8b show that overall EQ-i scores tend to correlate negatively with MMPI-2 scores, indicating that people high on emotional intelligence factors show less behavioural and personality problems and psychopathology (as measured by the MMPI-2) than people scoring low on emotional intelligence.

Looking more specifically at the highest correlations with a large effect size (.50), we see that people who score high on (clinical) depression (scale 2D and Dep of the MMPI-2) – seem to have little self-regard (SR: -.55 and -.66), feel unhappy (HA: -.60 and -.74) and pessimistic

(OP: -.50 and -.55) and have a low general mood (-.62 and -.76). Those who are socially introverted (0Si) and uncomfortable (Sod) have EQ-i scores that indicate they are not very assertive (-.63 and -.50) and are unhappy about their interpersonal relationships (IR: -.65) and their life in general (general mood: -.60 and -.52). They have a low total EQ (-.63 and -.52), and low intrapersonal scores (-.66 and -.52).

	L	F	K	Hs	D	Hy	Pd	Mf	Pa	Pt	Sc	Ma	Si
TotalEQ-score	.31	-.45	.55	-.11	-.54		-.20	-.10	-.18	-.49	-.28		-.63
Intrapersonal	.22	-.35	.42		-.54		-.15	-.10	-.13	-.47	-.23	.16	-.66
ES	.11	-.22	.29		-.25					-.20	-.14	.10	-.40
AS	.11	-.21	.30		-.38			-.12		-.32	-.12	.18	-.63
SR	.25	-.37	.40	-.11	-.55		-.27	-.17	-.23	-.51	-.26	.11	-.52
SA	.13	-.33	.28	-.11	-.44		-.21		-.12	-.37	-.21	.13	-.44
IN	.21	-.16	.28		-.32					-.33			-.41
Interpersonal	.20	-.38	.33		-.23		-.11			-.20	-.20		-.46
EM		-.18	.14										-.18
IR		-.34	.32		-.39					-.27	-.18	.19	-.65
RE	.27	-.29	.21				-.12						
Adaptability	.28	-.35	.46		-.38		-.16		-.15	-.40	-.26		-.10
PS	.19	-.17	.17		-.20		-.12			-.25	-.18		-.19
RT	.31	-.41	.46		-.27		-.25	-.12	-.23	-.38	-.33	-.16	-.25
FL	.13	-.21	.38		-.35					-.26		.14	-.47
Stress Management	.30	-.28	.52		-.29		-.14		-.19	-.28	-.13	-.14	-.27
ST	.21	-.27	.42	-.12	-.45			-.11	-.16	-.40	-.13		-.46
IC	.26	-.20	.40				-.13		-.15			-.28	
General Mood	.19	-.42	.40	-.15	-.62	-.11	-.29	-.13	-.25	-.55	-.30	.14	-.60
HA	.13	-.42	.35	-.17	-.60	-.15	-.33	-.11	-.27	-.47	-.32		-.55
OP	.21	-.31	.33		-.50		-.18	-.12	-.16	-.47	-.20	.16	-.50

Fisher z-scores: small ($z=.10$), **medium ($z=.30$)**, large ($z=.50$) and all significant at $p\leq.0001$

Note: ES = Emotional Self-Awareness, AS = Assertiveness, SR = Self-Regard, SA = Self-Actualisation, IN = Independence, EM = Empathy, IR = Interpersonal Relationship, RE = Social Responsibility, PS = Problem Solving, RT = Reality Testing, FL = Flexibility, ST = Stress Tolerance, IC = Impulse Control, HA = Happiness, OP = Optimism, F = Infrequency, L = Lie, K = Correction, Hs = Hypochondriasis, D = Depression, Hy = Hysteria, Pd = Psychopathic Deviate, Mf = Masculinity-Femininity, Pa = Paranoia, Pt = Psychastenia, Sc = Schizophrenia, Ma = Hypomania, Si = Social Introversion

Table 8a. Correlation matrix EQ-i - MMPI-2 (validity and clinical scales) in Fisher z-scores

	Anx	Frs	Obs	Dep	Hea	Biz	Ang	Cyn	Asp	Tpa	Lse	Sod	Fam	Wrk	Trt
TotalEQ-score	<u>-.59</u>	-.28	<u>-.68</u>	<u>-.73</u>	-.34	-.25	-.39	-.31	-.25	-.29	<u>-.73</u>	<u>-.52</u>	-.39	<u>-.74</u>	<u>-.69</u>
Intrapersonal	-.49	-.21	<u>-.60</u>	<u>-.63</u>	-.28	-.14	-.20	-.23	-.15	-.13	<u>-.78</u>	<u>-.52</u>	-.30	<u>-.66</u>	<u>-.65</u>
ES	-.21	-.13	-.30	-.31	-.17		-.18	-.17	-.13	-.17	-.37	-.37	-.18	-.31	-.43
AS	-.31	-.18	-.42	-.38	-.20			-.20	-.10		<u>-.58</u>	<u>-.50</u>	-.19	<u>-.50</u>	-.45
SR	<u>-.54</u>	-.16	<u>-.54</u>	<u>-.66</u>	-.28	-.17	-.26	-.17	-.10	-.15	<u>-.66</u>	-.42	-.32	<u>-.62</u>	<u>-.54</u>
SA	-.34	-.13	-.40	<u>-.56</u>	-.19	-.11	-.14	-.18	-.11		-.49	-.38	-.23	-.46	<u>-.51</u>
IN	-.32	-.19	<u>-.50</u>	-.37	-.16		-.10	-.15	-.12		<u>-.56</u>	-.25	-.16	<u>-.50</u>	-.39
Interpersonal	-.21	-.20	-.29	-.42	-.17	-.17	-.27	-.21	-.35	-.22	-.34	-.46	-.21	-.35	-.39
EM							-.13	-.13	-.14	-.11	-.10	-.17		-.10	-.18
IR	-.28	-.12	-.33	-.42	-.19	-.12	-.21	-.20	-.12	-.17	-.44	<u>-.65</u>	-.20	-.39	-.44
RE	-.10		-.14	-.19		-.16	-.21	-.13	-.29	-.19	-.15	-.17	-.16	-.22	-.20
Adaptability	<u>-.50</u>	-.29	<u>-.58</u>	<u>-.55</u>	-.30	-.27	-.35	-.28	-.22	-.27	<u>-.55</u>	-.33	-.32	<u>-.60</u>	<u>-.54</u>
PS	-.23	-.10	-.25	-.27	-.11		-.17				-.31	-.11	-.15	-.33	-.26
RT	-.45	-.23	<u>-.54</u>	<u>-.51</u>	-.30	-.39	-.39	-.30	-.26	-.30	-.46	-.21	-.39	<u>-.54</u>	-.46
FL	-.40	-.29	-.47	-.41	-.25	-.13	-.25	-.25	-.15	-.23	-.42	-.41	-.17	-.42	-.47
Stress Manag	<u>-.58</u>	-.29	<u>-.55</u>	-.46	-.33	-.27	<u>-.59</u>	-.31	-.27	-.45	-.42	-.18	-.36	<u>-.51</u>	-.41
ST	<u>-.56</u>	-.32	<u>-.59</u>	-.49	-.31	-.15	-.31	-.23	-.16	-.22	<u>-.54</u>	-.33	-.27	<u>-.59</u>	-.47
IC	-.37	-.16	-.31	-.27	-.22	-.27	<u>-.62</u>	-.26	-.26	-.47	-.19		-.31	-.27	-.28
General Mood	<u>-.56</u>	-.19	<u>-.55</u>	<u>-.76</u>	-.30	-.16	-.27	-.20	-.12	-.15	<u>-.60</u>	<u>-.52</u>	-.32	<u>-.62</u>	<u>-.59</u>
HA	<u>-.51</u>	-.14	-.45	<u>-.74</u>	-.31	-.16	-.25	-.20	-.11	-.16	-.47	<u>-.52</u>	-.33	<u>-.50</u>	<u>-.54</u>
OP	-.46	-.20	<u>-.51</u>	<u>-.55</u>	-.22	-.12	-.21	-.16		-.11	<u>-.59</u>	-.39	-.22	<u>-.59</u>	<u>-.50</u>

Fisher z-scores: small ($z=.10$), **medium ($z=.30$)**, large ($z=.50$) and all significant at $p\leq.0001$
Note: ES = Emotional Self-Awareness, AS = Assertiveness, SR = Self-Regard, SA = Self-Actualisation, IN = Independence, EM = Empathy, IR = Interpersonal Relationship, RE = Social Responsibility, PS = Problem Solving, RT = Reality Testing, FL = Flexibility, ST = Stress Tolerance, IC = Impulse Control, HA = Happiness, OP = Optimism, ANX = Anxiety, FRs = Fears, OBS = Obsessiveness, DEP = Depression, HEA = Health Concerns, BIZ = Bizarre Mentation, ANG = Anger, CYN = Cynicism, ASP = Antisocial Practices, TPA = Type A, LSE = Low Self-Esteem, SOD = Social Discomfort, FAM = Family Problems, WRK = Work Interference, TRT = Negative Treatment Indicators.

Table 8b. Correlation matrix EQ-i - MMPI-2 (Content scales) in Fisher z-scores

Low Self-Esteem (Lse), as can be expected, has a strong negative correlation with the intrapersonal scale (-.52, i.e. self-regard (-.66), independence (-.56), Assertiveness (-.58)) and with adaptability (-.55), stress tolerance (-.54) and general mood (-.60 i.e optimism (-.62)). Furthermore, people who are obsessive (scale 7Pt and Obs) and experience anxiety (Anx), show a low total EQ (-.49, -.68 and -.59), have a low self-regard (-.51, -.54 and -.54), are not able to deal with stress (Stress management, -.55 and -.58 and stress tolerance, -.59 and -.56) and don't feel overall happy with their life (general mood: -.55, -.55 and -.56). Finally, people exhibiting behaviours or attitudes that contribute to bad work performance (Wrk) also have a low total EQ score (-.74), low intrapersonal skills (-.66, i.e. self-regard: (-.62), Assertiveness

(-.50), independence (-.50)), are pessimistic (-.53) and unhappy (-.59), and have less stress tolerance (-.53). Overall, we can conclude that there is a good concurrent validity between the two tests. However, only a few of the scales presented a large effect size, while most others only showed small or at best medium effect sizes. This indicates that although there is a link between the two tests, the EQ-i is measuring something different than the behavioural and personality characteristics measured by the MMPI-2, supporting its construct validity.

3.6 Regression analysis

In order to investigate which of the MMPI-2 variables best predicts EQ-i, a regression analysis was performed. Our previous analysis and results determined which variables (namely those with medium ($z=.30$) and large ($z=.50$) effect sizes) were put into the regression analysis. After controlling for gender, education and employment the MMPI-2 scales accounted for a large proportion of the variance in the different EQ-i scales (range from 7% to 47%). Results are summarized in table 9. All mentioned predictors correlated negatively with the EQ-i scales unless otherwise specified.

The MMPI-2 scales L, scale 0(Si), Work Interference, Depression, Obsessiveness, Low Self-Esteem and Cynicism explained 47% of the variance in the Total EQ-i score. The Intrapersonal scale was best predicted by 7(Pt), 0(Si) and content scales Low Self-Esteem, Depression, and Obsessiveness. Both F and Anxiety scales had a positive β coefficient. Clinical scale 0(Si) and content scale Negative Treatment Indicators were found to be the only two predictors for Emotional Self-Awareness. Assertiveness was negatively predicted by scale 0(Si) and Low self esteem. Scale 0(Si), 7(Pt), Depression and Low Self-Esteem explained 44% of the variance for Self-Regard. Self-Actualisation was best predicted by scale 0(Si), 2(D), Depression and Low Self-Esteem and positively by Anxiety. The Independence scale was best predicted scale 7(Pt), 0(Si), Low Self-Esteem, Obsessiveness, Work Interference and positively by both Anxiety and Negative Treatment Indicators. The validity scale F, clinical scale 0(Si) and content scales Antisocial Practices and Social Discomfort were the predictors for the Interpersonal scale. Interpersonal Relationships were best predicted by a combination of F scale, scale 0(Si), Depression and Social Discomfort. Low Self-Esteem and Work Interference were observed to be predictors for the Problem Solving scale. The MMPI-2 validity scales L and K both had a positive relationship with Reality Testing while scale 8(Sc), Obsessiveness, Low Self-Esteem and Bizarre Mentation were negatively correlated. A combination of scale 0(Si), Anxiety, Obsessiveness and Social Discomfort proved to be good predictors for Flexibility. The best predictors for Stress Management, were scales Anxiety, Obsessiveness and Anger. For Stress Tolerance the content scale Cynicism had a positive β coefficient while scale 7(Pt), 0(Si), Anxiety, Fears, Obsessiveness and Work Interference were negative predictors. Both Anger and Type A content scales proved to be good predictors for the Impulse Control scale and explained 30% of the total variance. A combination of Scale 0(Si), 2(D), 7(Pt), Depression, Obsessiveness and Health Concerns (positively) accounted for 47% of the variance in General Mood. Happiness was predicted by scale 2(D), 4(Pd), Depression, Social Discomfort and Work Interference (positively). Finally significant predictors for the Optimism scale were validity scale F (positive β coefficient), clinical scale 7(Pt) and 0(Si) and content scales Low Self-Esteem, Depression and Work Interference.

EQ-i scales		Δ adj. R ²	Significant predictors
Total EQ-Score	Education*	.04	
	MMPI-2 scales	.51	L (+), Si, WRK, DEP, OBS, LSE, CYN (+)
Intrapersonal	Education *	.03	
	MMPI-2 scales	.49	F(+), Pt, Si, LSE, DEP, OBS, ANX (+)
ES	Gender*	.03	
	MMPI-2 scales	.21	Si, TRT
AS	Education*	.02	
	MMPI-2 scales	.34	Si, LSE
SR	Gender & education*	.01	
	MMPI-2 scales	.45	Si, Pt, DEP, LSE
SA	Education & employment*	.04	
	MMPI-2 scales	.27	Si, D, ANX, DEP, LSE
IN	Gender*	.03	
	MMPI-2 scales	.32	Pt, Si, ANX (+), LSE, OBS, WRK, TRT(+)
Interpersonal	Gender & Education*	.10	
	MMPI-2 scales	.24	F, Si, ASP, SOD
IR	Gender & education *	.02	
	MMPI-2 scales	.36	F, Si, DEP, SOD
Adaptability	Education & employment*	.04	
	MMPI-2 scales	.33	K, Pt, OBS, SOD, WRK,
PS	Gender & education*	.03	
	MMPI-2 scales	.10	LSE, WRK
RT	Gender, education & employment	.02	
	MMPI-2 scales	.40	L (+), K (+), Sc, OBS, LSE, BIZ
FL	Education*	.05	
	MMPI-2 scales	.24	Si, ANX, OBS, SOD
Stress Management	Gender & education*	.04	
	MMPI-2 scales	.35	ANX, OBS, ANG
ST	Gender, education & employment	.09	
	MMPI-2 scales	.36	Si, Pt, ANX, FRS, OBS, CYN (+), WRK
IC	Education*	.01	
	MMPI-2 scales	.31	ANG, TPA
General Mood	Education &	.02	

	employment*		
	MMPI-2 scales	.49	Si, D, Pt, DEP, HEA (+), OBS
HA	Education *	.02	
	MMPI-2 scales	.45	D, Pd, DEP, SOD, WRK (+)
OP	Education & employment*	.02	
	MMPI-2 scales	.37	F (+), Pt, Si, LSE, DEP, WRK,

Note: ES = Emotional Self-Awareness, AS = Assertiveness, SR = Self-Regard, SA = Self-Actualisation, IN = Independence, EM = Empathy, IR = Interpersonal Relationship, RE = Social Responsibility, PS = Problem Solving, RT = Reality Testing, FL = Flexibility, ST = Stress Tolerance, IC = Impulse Control, HA = Happiness, OP = Optimism, F = Infrequency, L = Lie, K = Correction, D = Depression, Pd = Psychopathic Deviate, Pt = Psychastenia, Sc = Schizophrenia, Si = Social Introversion, ANX= Anxiety, FRS= Fears, OBS= Obsessiveness, DEP= Depression, HEA= Health Concerns, BIZ= Bizarre Mentation, ANG= Anger, CYN= Cynicism, ASP= Antisocial Practices, TPA= Type A, LSE= Low Self-Esteem, SOD= Social Discomfort, FAM= Family Problems, WRK= Work Interference, TRT= Negative Treatment Indicators.

* The variables: Gender, Education and Employment were only mentioned in the table when they were retained in and thus contributed to the model.

All significant predictor had negative β coefficients except the ones marked (+)

Table 9. Stepwise regression

4. Conclusions and directions for future research

Overall, the present study provided support for the reliability and validity of the Bar-On Emotional Quotient Inventory (Bar-On, 1997b), as a measure of emotional intelligence, in a Flemish sample.

The internal consistency proved to be satisfactory. Results of the exploratory factor analysis did not confirm Bar-On’s (1997) findings claiming a 13 factor structure of the EQ-i, but partially supported the alternative findings of Palmer et al.(2003) who found six factors. The current study found evidence for a seven factor structure using parallel analysis, which is known to be a more accurate method when determining the correct number of components (Zwick, & Velicer, 1986). Another main difference with the Bar-On study is that we used a principal axis factor analysis (Direct Oblimin with Kaiser Normalisation) instead of an orthogonal (Varimax) rotation procedure which could also explain why our results are more similar to these of Palmer et al. (2003). Our first factor was very similar to the first factor found by Bar-On and Palmer et al. and was labelled Emotional disposition with items from Self-Regard, Optimism, Happiness and Stress Tolerance and only moderate loadings of items from Self-Actualisation. The second factor called Interpersonal EQ had high loadings from items of Interpersonal Relationship, Empathy and Emotional Self-Awareness. Factor 3 was named: Impulse control and our fourth factor to emerge was Problem Solving. Both factors were very similar to the third and fourth factor found by Palmer et al. Palmer et al. (2003) found a sixth factor which consisted of items loading from Flexibility and Independence, we on the other hand found two separate factors for that. Our 5th factor consisted of items loading from Independence and Assertiveness which was similar to one of the 13 factors found by Bar-On and our sixth factor Flexibility/Stress Tolerance had items loading from those two scales. Our last factor Interpersonal Adaptation/Self-Actualisation

included loadings from Self-Actualisation, Interpersonal Relationships, Happiness and Flexibility. It would probably be useful replicate this study in larger, and independent samples.

With regards to gender effects, our results were consistent with the findings of Bar-On (1997), revealing no difference in overall emotional intelligence between males and females. However, consistent gender differences were found with respect to some components (i.e. interpersonal and intrapersonal skills, Problem Solving, Flexibility and Stress Tolerance) although differences were small.

When looking at educational level as a measure for academic success, results showed that overall EQ-scores increase with level of education. The least educated group showed significantly lower scores than the highest educated group with regards to many aspects of emotional intelligence. These results confirmed recent studies which stated that emotional intelligence is linked to academic success (Khajehpour 2011, Parker et al., 2004, Parker et al., 2004, Parker et al., 2006, Qualter et al., 2011, Van der Zee et al., 2002). Based on our study, we don't have enough evidence to come to any conclusions about the predictive value of emotional intelligence, but it seems clear that there is some connection to educational level. We obtained similar results regarding employment status: the unemployed group scored significantly lower on Total EQ and on several subscales than the employed group. Again these findings correspond with those reported by Bar-On (1997), indicating a link between emotional intelligence and occupational success. Interesting to note is that lower levels of education or unemployment, seemed to result in significantly lower scores on the same scales. This could simply be a reflection of the fact that the unemployment rate might be higher within the lower education group and that in the current study both groups largely contained the same individuals, and thus as a logical consequence had comparable EQ-scores. Another possible explanation however is that the same aspects of EI, that are associated with a higher risk of academic failure, also pose an increased risk for later unemployment.

Regarding the concurrent validity between the EQ-i and the MMPI-2 we found that people high on emotional intelligence experience fewer psychological problems and pathology than people low on emotional intelligence. This is in line with previous research of Schutte et al., (2007); Martins et al., (2010) etc... claiming a strong association between emotional intelligence and mental health. Our observations were made based on a non-clinical population, it would also be interesting to investigate emotional intelligence in clinical settings, for example the link between emotional intelligence and different clinical syndromes or personality disorders. Furthermore it would be useful to study the impact of emotional intelligence in relation to treatment and prediction of treatment outcome.

We also explored the incremental validity of MMPI-2 scales to predict emotional intelligence beyond the control variables (gender, employment, education). In general the MMPI-2 scales appeared to be good predictors for the EQ-i scales with large proportions of the variance explained. Especially clinical scales 2(D), 7(Pt) and 0(Si) proved to be significant negative predictors. Furthermore results showed that content scales Obsessiveness, Low Self-Esteem, Depression and Social Discomfort were strong negative predictors for some of the EQ-i scales. For a few EQ-i scales, Anxiety was a good negative predictor, while for other scales Anxiety was a positive predictor.

Finally some attention should be given to the fact that we did not include the Restructured Clinical (RC - Tellegen, Ben-Porath, McNulty, Arbisi, Graham & Kaemmer, 2003) scales in our research, this will be an important follow up study, also taking other scales of the Restructured MMPI-2 (Ben-Porath & Tellegen, 2008; Tellegen & Ben-Porath, 2008) into account, once the Dutch manual is published. The RC scales were originally developed to correct the high intercorrelations and extensive covariance problem of the clinical scales and were added to the MMPI-2 in 2003. Studies showed an improved convergent and discriminant validity. In 2008 a new version of the MMPI-2, the MMPI-2-RF (Restructured Form) was developed. This much shorter version with 338 items selected from the MMPI-2 item pool has the RC scales at its core.

To summarise, the present study provided support for the validity of a measure of emotional intelligence, the Bar-on Emotional Quotient Inventory (Bar-on, 1997) in a Flemish sample and supported its relation to academic success, professional success and psychological wellbeing.

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