EMOTIONAL INTELLIGENCE AS A PREDICTOR OF ADOLESCENT RISK BEHAVIOR PARTICIPATION AND PERCEPTION

By

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ABSTRACT

The current study aimed to investigate emotional intelligence as a predictor of adolescent risk participation and risk perception. While research has suggested that certain personality traits relate to adolescent risk behavior and perception, the extent to which emotional intelligence relates to risk behavior participation and perception is unknown. In addition, it is unknown to what extent emotional intelligence provides incremental validity over personality traits in the explanation of adolescent risk behavior participation and perception. The study included 171 students between the ages of 15 and 24 from Midwestern educational settings. Students reported risk behavior on the Adolescent Risk Behaviour Questionnaire. Emotional intelligence was measured using the Mayer-Salovey-Caruso Emotional Intelligence Test, and personality traits were measured using the NEO-PI R. The results showed that the predictive validity of emotional intelligence differs in relation to age and the incremental validity of emotional intelligence over personality traits also differs across the age range. The relationship of emotional intelligence with risk behavior participation and risk perception revealed that despite higher levels of emotional intelligence and similar endorsement of risk perception, college-aged students reported higher levels of risk behavior participation. Implications for educational intervention and future study are discussed.

Keywords: Emotional Intelligence, Adolescence, Risk Behavior, Personality, Incremental Validity.

INTRODUCTION

Drawing on Gardner's multiple intelligence theory and the theory of social intelligence, Salovey and Mayer (1990) conceptualized the construct of emotional intelligence. Since then, researchers have attempted to redefine and measure the construct (e.g., Bar-On, 1997; Goleman, 1995; Gowing, 2001), but Mayer and Salovey have continued to argue for defining emotional intelligence as an ability (Mayer, Salovey, & Caruso, 2004), as opposed to the more popularized mixed-model or trait emotional intelligence theories that include personality-like constructs and are measured through self-report (e.g., Bar-On, 1997; Schutte, et al., 1998). They write, "If emotional intelligence does not refer exclusively to emotion or intelligence, then it becomes quite unclear to what it does refer" (Mayer, Caruso, & Salovey, 2000, pg. 103).

The Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT, Mayer, Salovey, & Caruso, 2002) was developed to measure the four branches of emotional intelligence: perceiving emotion, using emotion, understanding emotion, and managing emotion. The MSCEIT was found to be highly reliable and factor analysis confirmed the fit to the four-branch model of emotional intelligence (Mayer, Salovey, Caruso, & Sitarenios, 2003). These findings answered the criticisms proposed by Roberts, Zeidner, and Matthews (2001) and showed the MSCEIT to be a strong measure of ability model emotional intelligence. Similar to the MSCEIT, developers created measures of emotional intelligence for adolescents and children that also measure the four branches of emotional intelligence (Mayer, Perkins, Caruso, & Salovey, 2001).

While ability model assessments are available across all age groups, much of the research in emotional intelligence has been conducted with trait model self-report scales. It goes beyond the scope of this paper to provide a full review of such studies, and as such, the

focus of this paper will continue to be ability model emotional intelligence. Self-report measures tend to correlate quite highly with personality measures (Newsome, Day, & Catano, 2000; Saklofke, Austin, & Minski, 2003; Wolfradt, Felfe, & Koster, 2001), and this relationship with personality constructs has lead some scholars to question if emotional intelligence is a construct worthy of study or if it is nothing more than cognitive intelligence and personality. As Brody (2004) suggests, the validity of emotional intelligence as a meaningful construct partially lies in its demonstration of incremental validity over cognitive intelligence and personality.

In a study of emotional intelligence, verbal intelligence and the responses to difficult social situations, Mayer, Perkins, Caruso, and Salovey (2001) argued that emotional intelligence provided incremental predictive validity over cognitive intelligence. Students described a recent social situation in which friends asked them to do something they felt uncomfortable doing. In addition to questions about the specific situation, each student took the MEIS-A and the Peabody Picture Vocabulary test (PPVT; Dunn & Dunn, 1981). The results suggested that students with high emotional intelligence were better able to stand up to others who pressured them to participate in behaviors with which the students felt uncomfortable and thought were wrong or destructive. It is also worth noting that two students with similar verbal intelligence scores had emotional intelligence scores more than two standard deviations apart. The student with the higher emotional intelligence was able to stand up to her peers' requests, whereas the student with lower emotional intelligence did as his friends asked even though he felt the action was wrong (Mayer et al., 2001). Subsequent to this study, other investigations have attempted to measure the incremental predictive validity of emotional intelligence and the conclusions are mixed. Researchers found that emotional intelligence was not incrementally predictive of academic achievement (Barchard, 2003; Rode et al., 2007); life skills (Bastian, Burns, & Nettelbeck, 2005); personal feelings about physical appearance (Brackett, Mayer, & Warner, 2004), peer attachment and

psychological well being (Rossen & Kranzler, 2009). Other investigations found mixed results within peer and parent social support and negative interactions (Lopes et al., 2003) and across male and female participants (Brackett et al., 2004; Lyons & Schnieder, 2005). While still other researchers reported significant incremental predictive validity of emotional intelligence over cognitive intelligence and personality with regard to social and emotional functioning (Davis & Humphrey, 2012), illegal drug and alcohol use (Brackett et al., 2004; Rossen & Kranzler, 2009), deviant behavior (Brackett et al., 2004), positive interactions with others (Lopes et al., 2003; Rossen & Kranzler, 2009), and public speaking effectiveness (Lyons & Schnieder, 2005). Most of these studies were conducted with undergraduate students, and in order to better understand the generalizability of the results, research with other populations is needed. Several of the targeted behaviors for incremental validity studies were risk behaviors (i.e., alcohol and drug use, deviant behavior) and the results were positive. Emotional intelligence may be another individual difference in the explanation of how adolescents and young adults navigate risk participation, of the incremental validity studies, ability model emotional intelligence measures have been utilized to study the relationship between specific risk behaviors (i.e., alcohol and drug use) and emotional intelligence, but the number of studies using these measures with adolescents is extremely limited. Other than the previously cited studies on adolescent mental social and emotional functioning (Davis & Humphrey, 2012) and adolescent responses to peer pressure (Mayer et al., 2001), our literature search found only one other published journal article in which the researchers used an ability model assessment to measure emotional intelligence. Research on emotional intelligence and incidence of tobacco and alcohol use found that emotional intelligence accounts for a small portion of the variance in tobacco and alcohol use (Trinidad & Johnson, 2002). The results suggested that students with high emotional intelligence may be better equipped to ward off peer pressure and have a greater ability to resist the use of tobacco and alcohol.

Personality Correlates of Adolescent Risk Behavior

While ability model emotional intelligence research is in its infancy, a myriad of studies on correlates with adolescent risk behavior have been conducted over the years, and personality correlates were often included in these studies. Sensation seeking is a personality trait that was first examined by Zuckerman (1979) in his development of a sensation seeking scale. He defined sensation seeking as the need for novel experiences and the willingness to take certain risks to obtain such experiences. Many researchers have found links between sensation seeking and various risk behaviors in adolescents (Arnett, 1992, 1996; Greene, Kramar, Walters, Rubin, & Hale, 2000; Zuckerman & Neeb, 1980). High sensation seeking in adolescence explained a 7 percent variance in risky sexual behavior (Gillis, Meyer-Baulburg, & Exner, 1992) and high sensation seekers are up to seven times more likely to report alcohol use than low sensation seekers (Donohew, Palmgreen, & Lorch, 1994).

Risk behaviors were also linked to locus of control (Werner, 1986) and self esteem (Gerrard, Gibbons, Reis-Bergan, & Russell, 2000). These investigations examine a specific personality measure that is usually compared to one or two specific risk behaviors. To gain a more global understanding of the relationship between personality traits and risk behaviors, not only do several personality traits need to be examined simultaneously, but also more global personality assessment tools may be needed. Goldberg (1993) discussed the merits of the Five Factor Model (FFM) of personality. Costa and McCrae (1992) developed the NEO-PI, NEO-FFI, and other personality inventories based on the FFM. The FFM, as measured by the NEO-PI, is stable after the age of 30, is similar across different cultures, and is stable across other environmental differences such as socioeconomic status, race and health (McCrae & Costa, 1997). This is strong evidence in support of the FFM as a basic foundation for personality.

Gullone & Moore (2000) used the NEO-FFI and the Adolescent Risk Taking Questionnaire (ARQ, Gullone, Moore, Moss, & Boyd, 2000) and found that risk behaviors are related to extroversion, agreeableness and conscientiousness. Specifically, they found a lower prevalence of risk behavior in adolescents who perceived the behavior as highly risky and found that low levels of conscientiousness and high levels of agreeableness predicted rebellious and reckless risk behavior. Extroversion was predictive of only thrill seeking behavior.

Limitations of the Research and Purpose of the Study

A great deal of the research in this area has focused on a single risk behavior such as smoking or unprotected sexual intercourse. This is a limitation because it does not show the interactions of various types of risk behaviors (Gullone & Moore, 2000; Moore & Parsons, 2000). In addition, most of the current research has focused on negative risk behavior, and does not consider the relationship of negative risks with risk behaviors that are more socially accepted, such as participation in extreme sports. There is some evidence that participation in risk behavior at some level may be psychologically beneficial for adolescent development (Chassin, Pearson, and Sherman, 1989; Shedler & Block, 1990); and therefore, the study of different types of risk may lead to a better understanding of adolescent and young adult participation in these types of behaviors.

Another limitation of the current research is that little attention is paid to young adults in the risk behavior research and little attention is paid to adolescents in the emotional intelligence literature. Most of the incremental validity studies previously reported used samples of undergraduate students, and very few studies have examined risk behaviors of young adults. Yet, each year the national statistics find that the accident mortality rates remain high through the early twenties. Irwin (1993) also emphasized the need to study older adolescents and young adults. He found that national mortality rate increases 214% from early adolescence (age 10-14) to late adolescence (age 15-19). This is the largest percent increase in mortality between any consecutive age group. The increase in mortality rate was linked to intentional and unintentional injuries from risky behaviors such as dangerous driving and self-harm.

Even though it may seem quite clear to researchers which

behaviors are defined as risky, some researchers suggest that adolescent perception of risk is different from that of an adult. In their development of a risk behavior questionnaire, Alexander, Kim, Ensminger, Johnson, Smith, and Dolan (1990) based their items on adolescent report of risky behavior. They suggested that, "risk taking may best be defined within the adolescent's own social context" (pg. 560). Gullone and Moore (2000) found that older adolescents believed most behaviors to be less risky than younger adolescents. The perception of less risk by older adolescents was associated with an increased prevalence for engagement in risk behaviors. Yates and Stone (1992) also acknowledge that risk is a subjective construct and is only meaningful in the eyes of the person taking the risk.

Lastly, the number of research studies measuring emotional intelligence with instruments developed to measure emotional intelligence as it was originally intended to be measured, as an ability, is exceedingly low. The present study will be one of the few to measure adolescent emotional intelligence using an ability model measure. The purpose of the current study was to investigate the relationship between ability model emotional intelligence, personality and risk behavior participation and perception in a sample of adolescents and young adults. The research questions investigated were I) to what extent will the sample participants with high emotional intelligence be less likely to engage in Rebellious risk, Reckless risk, and Anti-social risk behaviors, but equally likely to participate in Thrill seeking behaviors compared to those with low emotional intelligence, and ii) to what extent will scores on the emotional intelligence measure have incremental validity over the NEO-FFI in the prediction of risk behavior participation and perception in adolescents and young adults.

Methods

Participants

Participants were 171 students (53 males and 118 females) between the ages of 15 and 24 (M = 18.14, SD = 2.3) recruited from two Midwestern high schools and from the population of undergraduate and graduate

psychology students at a small Midwestern university. Over 95% of the participants were Caucasian. The college participants were between the ages of 18 and 24 (M = 19.6, SD = 1.5) with a mean cumulative GPA of 3.3 (Range = 2.2 – 4.0, SD = 0.5) and mean education of 13.1 years (Range = 12 – 17, SD = 1.2). The high school participants were between the ages of 15 and 18 (M = 16.1, SD = 1.1) with a mean cumulative GPA of 3.3 (Range = 1.2 – 4.0, SD = 0.6) and mean education of 9.8 years (Range = 9 – 11, SD = 0.8).

Procedure

Participants took part in one 60-minute testing session. Participants were given basic instructions on how to fill out the questionnaires and reminded that their responses on the forms were confidential. The emotional intelligence measure (MSCEIT or MSCEIT-YV), the NEO Five Factor Index (NEO-FFI) and the Adolescent Risk-taking Questionnaire (ARQ) were given in group format with each group containing no more than 20 participants to allow the examiner time to efficiently answer individual questions.

Measures

Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT)

The MSCEIT is an emotional intelligence assessment based on the ability model of emotional intelligence, and is described in detail in the previous text. It is a series of eight subtests (141 items) and is available for the assessment of individuals ages 18 and older. The test gives an overall score of emotional intelligence, two area scores, four branch scores (based on the four factor model of emotional intelligence), and subtest scores. The MSCEIT general score split-half reliability is 0.93 for consensus scoring and 0.91 for expert scoring. The area scores (Experiential and Strategic) spilt-half reliabilities are both .90 for consensus scoring and are 0.88 and 0.86 respectively for expert scoring. The four branch score reliabilities range from 0.76-0.91 for consensus and expert scoring. The subtest reliabilities range from 0.55-0.88 for consensus and expert scoring (Mayer et al, 2003). Split half reliabilities are reported for the MSCEIT due to item heterogeneity and each branch of the test is comprised

of two different subtests (Lopes, Salovey, & Straus, 2003; Mayer, Salovey, & Caruso, 2002).

Mayer-Salovey-Caruso Emotional Intelligence Test –Youth Version (MSCEIT-YV)

The MSCEIT-YV is an emotional intelligence assessment for ages 14-17 based on the ability model of emotional intelligence. It is very similar to the adult version, the MSCEIT. It is a series of eight subtests (184 items) that is currently available as a research-only instrument. The publishing company is in the process of normative data collection across the country that will result in the creation of standard scores and the consensus scoring option for the test. The test gives a total score of emotional intelligence, two area scores, and four branch scores (based on the four factor model of emotional intelligence). There are currently no published reliability or validity data for this instrument; and therefore, this study will calculate internal consistency and split half reliabilities and measure predictive validity and construct validity (with respect to the developmental aspect of the theory) of the MSCEIT-YV.

Adolescent Risk Behavior Questionnaire (ARQ)

The ARQ is a comprehensive risk-taking questionnaire designed for use with adolescents. It assesses socially acceptable risks as well as more socially unacceptable risks. It has two parts that are scored separately: (i) a 22-item behavior questionnaire that evaluates the incidence of risky behaviors and (ii) a 22-item risk beliefs questionnaire that evaluates the adolescent's perception of risk involved with each behavior. Each questionnaire is based on a five point Likert Scale. A total score and four factor scores are calculated from each questionnaire. The four factor scores are: Thrill-seeking risk (e.g., roller blading, sky diving), Rebellious risk (e.g., smoking, staying out late), Reckless risk (e.g., speeding, drinking and driving) and Anti-social risk (e.g., cheating, teasing others). Reliability is reported as above 0.8 for all but the anti-social factor of which the reliability ranged from 0.66-0.79 depending on age and gender.

NEO Five Factor Index (NEO-FFI)

This is a 60-item questionnaire that measures the five-factor model of personality (neuroticism, openness, extroversion, agreeability, and conscientiousness). Each item is based on a five point Likert Scale and respondents are asked to make a rating based on what is most true for them. High scores on the test represent high levels of the particular trait. Internal consistency ranged from 0.68 for Agreeableness to 0.86 for Neuroticism. Test-retest reliability ranged from 0.75 - 0.83. Correlations with the NEO-PI-R ranged from 0.77 for Agreeableness to 0.92 for Neuroticism.

Data Analysis

There are two methods to score the emotional intelligence tests: consensus scoring and expert scoring. The expert scoring method was used to score the MSCEIT and MSCEIT-YV. This method was chosen because the MSCEIT-YV does not yet have a normative group available for consensus scoring and both versions of the tests needed to be scored using the same method. Raw scores were generated wherein the experiential area score is the sum of branch one and branch two scores, the strategic area score is the sum of branch three and four scores, and the full scale emotional intelligence score is the sum of both area scores. The college sample and the high school sample were analyzed separately because the MSCEIT-YV scores were not yet normed nor in the same standard form as the MSCEIT scores.

Pearson correlations were calculated in order to investigate the relationships between emotional intelligence, personality and risk. ARQ full-scale and subscale scores were compared with the full-scale area and branch scores on the MSCEIT/MSCEIT-YV, and with each of the five factors of the NEO-FFI. After gender was , stepwise multiple regression was used to understand the ability of the emotional intelligence test and the NEO-FFI to predict risk behaviors and risk beliefs. Incremental validity was also assessed through multiple regression by a calculation of variance change. Each of the five NEO FFI factors were entered into a hierarchical regression formula with the MSCEIT total score and branch scores entered as the second step. The variance change was calculated by subtracting the variance with the MSCEIT from the original variance of the personality factor.

Results

Descriptive statistics for the measures used in this study are shown in Table 1. Most of the scale and subscale scores resulted in adequate reliabilities; however, a few of the subscales had reliabilities below what was expected based on previous work by the scale developers. Of the risk behavior subscales, three showed poor reliabilities in this sample. The Cronbach's alpha coefficients were 0.43 for the thrill seeking scale, 0.35 for the reckless scale, and 0.52 for the anti-social scale. The reliabilities for the risk beliefs subscales were higher than those of the behavior scales, although one of the scales showed a poor reliability (0.48 for the reckless scale).

The MSCEIT Reasoning area scores resulted in a coefficient alpha of -0.05. The reliabilities of the Understanding and Managing branches also showed poor reliabilities with alphas of -0.14 and 0.17 respectively. The spilt-half reliabilities were similar to the coefficient alphas with the Reasoning area, Understanding and Managing branch scores resulting in poor reliabilities.

Scale	Mean	SD	Reliability[a]
MSCEIT - Total	100.98	13.9	α = 0.78, r = 0.59
MSCEIT - Experiential	104.82	14.9	α = 0.87, r = 0.76
MSCEIT - Strategic	97.51	12.72	α =-0.05, r =-0.18
MSCEIT - Perceiving emotions	105.4	13.4	α = 0.87, r = 0.71
MSCEIT - Using emotions	101.47	15.34	α = 0.70, r = 0.60
MSCEIT - Understanding emotions	97.38	14	α =-0.14, r =-0.21
MSCEIT - Managing emotions	99.85	14.19	α = 0.17, r =-0.25
MSCEIT-YV - Total	207.44	37.35	α = 0.90, r = 0.75
MSCEIT-YV - Experiential	117.04	16.84	α = 0.91, r = 0.82
MSCEIT-YV - Strategic	90.4	23.99	α = 0.62, r = 0.32
MSCEIT-YV - Perceiving emotions	58.32	9.85	α = 0.85, r = 0.84
MSCEIT-YV - Using emotions	58.72	12.73	α = 0.87, r = 0.70
MSCEIT-YV - Understanding emotions	55.81	15.53	α = 0.31, r = 0.18
MSCEIT-YV - Managing emotions	34.59	10.99	α = 0.64, r = 0.75
ARQ-Risk Behavior Total	23.98	8.21	α = 0.75
ARQ - Risk Behavior Thrill seeking	6.95	2.99	α = 0.43
ARQ - Risk Behavior Rebellious	7	4.07	α = 0.80
ARQ - Risk Behavior Reckless	4.12	2.36	α = 0.35
ARQ - Risk Behavior Anti social	5.9	2.48	α = 0.50
ARQ-Risk Beliefs Total	48.82	9.44	α = 0.84
ARQ - Risk Beliefs Thrill seeking	10.62	3.58	α = 0.66
ARQ - Risk Beliefs Rebellious	12.26	3.14	α = 0.70
ARQ - Risk Beliefs Reckless	15.61	2.3	α = 0.48
ARQ - Risk Beliefs Anti social	10.33	8.21	α = 0.59
NEO FFI Neuroticism	22.46	7.9	α = 0.84
NEO FFI Extroversion	31.33	6.39	α = 0.83
NEO FFI Openness	25.75	6.41	α = 0.73
NEO FFI Agreeableness	31.08	6.31	α = 0.73
NEO FFI Conscientiousness	31.18	6.17	α = 0.79

[a]Reported are Cronbach alpha internal consistency reliabilities for all measures. Split half reliabilities were added for the MSCEIT and MSCEIT-YV.

Table 1. Descriptive Statistics on Included Measures

These scores are not comparable to the data from the MSCEIT manual (Mayer et al., 2002) and data from Lopes et al. (2003) who reported a split-half reliability of 0.88 for the total score and branch score split half reliabilities ranging from 0.60 for the managing emotions branch to 0.89 for the perceiving emotions branch. Split half reliabilities are normally preferred over internal consistency reliability for the MSCEIT due to item heterogeneity and because each branch of the test is comprised of two different subtests (Mayer, et al., 2002; Lopes, et al., 2003).

Internal consistency reliability was also calculated for the MSCEIT-YV. The total emotional intelligence reliability was calculated using all 184 items and was found to be excellent (=0.90). Similarly, internal consistency reliabilities were calculated for the four branch scores and the area scores. The internal consistency reliabilities for the experiential and reasoning area scores in this sample were 0.91 and 0.62 respectively. The Perceiving and Using branch scores were found to have excellent reliabilities with alphas of 0.85 and 0.87 respectively. The reliabilities of the Understanding and Managing branch showed moderate reliabilities alphas of 0.31 and 0.64 respectively. The MSCEIT-YV total score split-half reliability was found to be 0.75 in this sample. The area scores (Experiential and Reasoning) spilt-half reliabilities are 0.82 and 0.32 respectively. The four branch score reliabilities range from 0.18 for the Understanding branch to 0.84 for the Perceiving branch.

Emotional Intelligence and Risk Behavior

College sample

Total emotional intelligence was not significantly correlated with total risk behavior or any of the four risk behavior subscales. Table 2 shows the Pearson correlations between the MSCEIT and the ARQ for the college participants. Neither of the area emotional intelligence scores was significantly correlated with the risk behavior scales. The Perceiving emotions branch score was inversely correlated with thrill seeking behaviors (r = -0.236, p = 0.019) and the Managing emotions branch score was positively correlated with anti-social behaviors (r

	Perceive	Using	Under-stand	Manage	Experi-ential	Reason-ing	Total EI
Total Behaviors	-0.093	-0.17	0.04	0.104	-0.164	0.071	-0.042
Thrill Behavior	-0.236*	0.011	-0.087	-0.099	-0.16	-0.111	-0.174
Rebellious Behavior	0.018	-0.172	0.086	0.095	-0.09	0.103	0.028
Reckless Behavior	-0.006	-0.176	0.053	0.099	-0.103	0.07	-0.005
Anti-social Behavior	-0.054	-0.125	0.042	0.215*	-0.106	0.132	0.026
Total Beliefs	0.045	-0.145	-0.306***	-0.028	-0.034	-0.274**	-0.191
Thrill Beliefs	-0.022	-0.250*	0.15	0.025	-0.135	-0.126	-0.149
Rebellious Beliefs	-0.011	-0.024	-0.360**	-0.091	-0.088	-0.330**	-0.220*
Reckless Beliefs	0.217*	-0.006	-0.196	0.074	0.135	-0.136	-0.01
Anti-social Beliefs	0.026	-0.101	-0.275**	-0.086	-0.02	-0.275**	-0.182

$* p \leq 0.05 \; ** p \leq 0.01 \; *** p \leq 0.001$

Table 2. Pearson Correlations for the MSCEIT and ARQ in College Participants

= 0.215, p = 0.033). The direction of these correlations is opposite of the direction expected.

The data from the risk beliefs scales of the ARQ provides very different data from that of the risk behavior scales. Total emotional intelligence showed a significant negative correlation with rebellious risk perception (r = -0.200, p = 0.029), but resulted in no significant correlations with the other risk beliefs scales. Analysis of the branch and area scores showed several significant inverse correlations. Understanding emotions was inversely correlated with total risk beliefs score (r = -0.306, p = 0.002), rebellious risk perception (r = -0.360, p < 0.001), and antisocial risk perception (r = -0.275, p = 0.006). These significant correlations within the Understanding emotions branch drove the Reasoning emotions area scores to significance.

Multiple regression analysis revealed that Understanding emotions predicted scores of total risk perception (= -0.306, p = .002, r2 = 0.094) after controlling for gender, while the other branch scores, area scores and the total score of emotional intelligence did not predict risk perception. In an analysis of the risk belief subscales, Using emotion predicted thrill-seeking beliefs (= -0.236, p = .021, r2 = 0.067), Understanding emotion predicted rebellious beliefs (= -0.357, p = .001, r2 = 0.125) and antisocial beliefs (= -0.321, p = .005, r2 = 0.101). High scores on the Perceiving emotion branch (= 0.279, p =

.010) and low scores on the Understanding emotion branch (= -0.331, p = .002) together best predicted reckless beliefs (r2 = 0.138). Emotional intelligence did not predict risk behaviors participation.

High school sample.

Emotional intelligence showed the opposite relationships in the high school sample as in the college sample Table 3. Total emotional intelligence was negatively correlated with reckless behavior (r = -0.277, p = 0.018). Analysis of the emotional intelligence branch scores revealed several significant correlations. Understanding emotions was significantly correlated with total risk behaviors (r = -0.249, p = 0.035) and reckless behaviors (r = -0.318, p = 0.006). Managing emotions was significantly correlated with reckless behaviors (r = -0.329, p = 0.005). Again, these correlations drove the Reasoning emotions area score to be significantly correlated with both total risk behaviors (r = -0.246, p = 0.037) and reckless behaviors (r = -0.357, p = 0.002).

Of the ARQ risk beliefs scales, thrill seeking risk perception was the only scale that was significantly correlated with emotional intelligence. The managing emotions branch score and the Reasoning area score were positively correlated with thrill seeking risk perception (r = 0.240, p = 0.042 and r = 0.247, p = 0.037 respectively).

After controlling for gender in the first step, stepwise multiple regression analyses showed Understanding

	Perceive	Using	Under-stand	Manage	Experi-ential	Reason-ing	Total EI
Total Behaviors	0.053	-0.001	-0.249*	0.185	0.03	-0.246*	-0.144
Thrill Behavior	-0.023	0.078	-0.194	0.001	0.045	-0.125	-0.06
Rebellious Behavior	0.067	-0.043	-0.142	0.141	0.006	-0.157	-0.098
Reckless Behavior	-0.017	-0.129	-0.318**	0.329**	-0.107	-0.357**	-0.277*
Anti-social Behavior	0.113	0.088	-0.044	0.068	0.321	-0.06	0.021
Total Beliefs	-0.047	0.064	0.107	0.222	0.021	0.171	0.119
Thrill Beliefs	0.014	0.106	0.221	0.240*	0.088	0.247*	0.198
Rebellious Beliefs	-0.089	0.019	0.062	0.158	-0.038	0.113	0.055
Reckless Beliefs	-0.075	0.073	0.084	0.134	0.011	0.115	0.079
Anti-social Beliefs	-0.005	0.008	-0.029	0.184	0.004	0.066	0.044

$* p \leq 0.05 \; ** p \leq 0.01$

Table 3. Pearson Correlations for the MSCEIT-YV and ARQ in High School Participants

emotions to be a predictor of total risk behaviors (= -0.249, p = 0.035, r2 = 0.062). When Using emotions was added to Understanding emotions, the model resulted in greater predictive validity of total risk behavior (Table 4) in that high scores on Using emotions and low scores on Understanding emotions best predicted total risk behavior. In an analysis of the risk behavior subscales, the Reasoning area score was predictive of reckless behaviors (= -0.378, p = 0.003, r2 = 0.123). Table 5 shows the stepwise regression models for total risk in both the college and high school participants.

Incremental Validity of Emotional Intelligence

College sample

Emotional intelligence was not significantly correlated with risk behavior scales and did not show significant predictive value in risk behavior; and therefore, incremental validity of emotional intelligence over personality measures was not analyzed. Table 5 shows the correlational analysis between the NEO.

FFI five factors and the ARQ risk behavior scales. Stepwise multiple regression showed Conscientiousness was a significant predictor of total risk behaviors (= -0.229, p =

0.022, r2 = 0.053).

Table 5 also shows the correlational analysis of risk belief scales and the NEO FFI. Stepwise multiple regression showed a model with Extroversion, Neuroticism, and Conscientiousness best predicted total risk beliefs. The significant correlations between the emotional intelligence scales and risk belief scales were tested for incremental validity when controlled for personality factors. Table 6 shows the final models for tested incremental validity of emotional intelligence. Total emotional intelligence showed an increase in variance (not a significant difference) for each statistically significant model for prediction of total risk beliefs, rebellious risk perception, and antisocial risk perception. There were significant increases in accounted for variance when the Understanding branch score was added to personality factors (Table 6).

High school sample

Emotional intelligence was not significantly correlated with the risk belief scales and did not show significant predictive value in risk beliefs; and therefore, incremental validity of emotional intelligence over personality measures was not analyzed. Table 7 shows the

College Participants	Beta	p-value	R^2
Understanding emotions High School Participants	-0.330	0.003	0.106
Model 1 Understanding emotions	-0.287	0.019	0.077
Model 2 Understanding emotions	-0.558	0.001	0.139
Using emotions	0.396	0.030	

a Total risk beliefs predicted in the college participants and total risk behavior predicted in the high school participants

Table 4. Stepwise Regression Models for Prediction of Total Risk[a]

	NEO-N	NEO-E	NEO-O	NEO-A	NEO-C
Total Behaviors	0.02	0.092	0.201*	-0.107	-0.229*
Thrill Behavior	-0.312**	0.197*	0.175	0.168	-0.127
Rebellious Behavior	0.094	0.003	0.208*	-0.201*	-0.124
Reckless Behavior	0.179	-0.112	0.046	-0.122	-0.162
Anti-social Behavior	0.121	0.169	0.055	-0.1	-0.255*
Total Beliefs	0.145	0.226*	-0.205*	-0.074	0.218*
Thrill Beliefs	0.245*	0.078	-0.182	-0.200*	0.168
Rebellious Beliefs	-0.002	0.187	-0.257*	0.002	0.224*
Reckless Beliefs	0.087	0.229*	-0.106	0.147	0.143
Anti-social Beliefs	0.077	0.260**	-0.08	-0.078	0.145

* p≤0.05 ** p≤0.01

Table 5. Pearson Correlations for the NEO FFI Five Factors and ARQ in College Participants

Personality Factor		R^2	R^2 with EI[a] Added (Change)	R^2 with Under[b] Added
Total Risk	Neuroticism	0.021	0.053 (.03)	0.109 (.09)**
Beliefs	Extroversion	0.09	0.107 (.02)	0.136 (.05)*
	Conscientiousness	0.146	0.171 (.03)	0.19 (.04)*
Rebellious Risk Beliefs	Openness	0.066	0.095 (.03)	0.166 (.10)***
Anti-Social Risk Beliefs	Extroversion	0.068	0.088 (.02)	0.106 (.04)*

* p≤0.05 ** p≤0.01 *** p≤0.001 a Total emotional intelligence b Understanding branch

Table 6. Change in R^2 in Regression Models of College Participants

	NEO-N	NEO-E	NEO-O	NEO-A	NEO-C
Total Behaviors	-0.032	0.146	-0.147	-0.424**	-0.268*
Thrill Behavior	-0.148	0.253*	0.034	-0.112	0.035
Rebellious Behavior	0.04	-0.037	-0.106	-0.272*	-0.284*
Reckless Behavior	-0.199	0.163	-0.313**	-0.374**	-0.177
Anti-social Behavior	0.2	0.06	-0.054	-0.454**	-0.304*
Total Beliefs	0.051	0.004	0.066	0.418**	0.255*
Thrill Beliefs	-0.006	-0.056	-0.14	0.278*	0.087
Rebellious Beliefs	0.072	0.027	0.094	0.366**	0.277*
Reckless Beliefs	0.253*	0.001	0.232	0.318**	0.165
Anti-social Beliefs	-0.135	0.048	0.074	0.410**	0.312**

* p≤0.05 ** p≤0.01

Table 7. Correlations for the NEO FFI Five Factors and ARQ in High School Participants

correlational analysis between the NEO FFI five factors and the ARQ risk belief scales. Multiple regression showed Agreeableness was a significant predictor of total risk beliefs (= 0.418, p < 0.001, r2 = 0.175).

Table 7 also shows the correlational analysis of risk behavior scales and the NEO FFI. Stepwise multiple regression showed a model with Agreeableness, Extroversion, and Conscientiousness best predicted total risk behavior. The significant correlations between the emotional intelligence scales and risk behavior scales were tested for incremental validity when controlled for personality factors.

Table 8 shows the final models for tested incremental validity of emotional intelligence. Total emotional intelligence showed no change in variance over personality factors for the prediction of total risk behavior, but did show an increase in accounted for variance for reckless risk behavior; although, this increase was not significant. Understanding emotions and Managing emotions showed an increase in accounted for variance over Agreeableness and Extroversion for prediction of both total risk behavior and reckless risk behavior, but did not show a significant increase for Openness.

Discussion

Emotional Intelligence and Adolescent Risk

The findings of the present study suggest that emotional intelligence is related to risk behavior in high school students; however, in college students, the present results indicate that emotional intelligence is related to risk perception, but not to risk behavior. The mechanism behind this is not understood, as risk perception across these two age groups is not well studied. College students

	Personality Factor	R^2	R^2 with Ei[a] (Change)	R^2 with Under[b]	R^2 with Manage[c]
Total Risk	Agreeableness	0.18	0.18 (0)	0.196 (.02)	0.186 (.01)
Behavior	Extroversion	0.277	0.277 (0)	0.286 (.01)	0.285 (.01)
	Conscientiousness	0.319	0.319 (0)	0.323 (0)	0.322 (0)
Reckless	Agreeableness	0.14	0.168 (.03)	0.185 (.05)	0.203 (.06)*
Risk	Extroversion	0.236	0.267 (.03)	0.27 (.05)	0.306 (.07)*
Behavior	Openness	0.319	0.33 (.01)	0.334 (.03)	0.351 (.03)

* p 0.05
a Total emotional intelligence added
b Understanding branch added
c Managing branch added

Table 8. R^2 in Regression Models of High School Participants

are known to engage in many risk behaviors such as binge drinking, unprotected sex, and drug use (Arnett, 1996). The college participants in the present study endorsed a higher level of risk behavior than the high school participants, but endorsed similar risk perception of the same behaviors as the high school participants. Perhaps the social context of college life (e.g., no parental guidance, peer pressure) leads the older adolescent to engage in such behavior even as the brain perceives risk. Those with high emotional intelligence are overcome by the social circumstances even though they perceive the action is of a higher risk value. There is clearly a difference in the cognition of risk between high school students and college students, and future research in this area is needed.

In the high school sample, only reckless behaviors (not rebellious behaviors or antisocial behaviors) were correlated with emotional intelligence. These are behaviors such as drinking and driving, speeding and unprotected sex. The two branches of emotional intelligence that were related to reckless behaviors were Understanding emotions and Managing emotions. Adolescents who have a low ability to understand how emotions change over time, who have an inefficiency in their ability to use emotions in problem solving and who impulsively act on emotion may have difficulty understanding the consequences of reckless actions on self and others. In addition, Using emotions and Understanding emotions together make up 14% of the variance in the prediction of risk behaviors in high school students and the Reasoning area score of the MSCEIT-YV provides 13% of the variance in the prediction of reckless risk behavior, which suggests that emotional intelligence may serve as a protective factor in high school students who are faced with the choice to participate in reckless risk behaviors.

The present data support the hypothesis that adolescents with high emotional intelligence are equally likely to participate in thrill seeking behaviors as those with lower emotional intelligence. In the high school sample, students with high emotional intelligence were more likely to perceive thrill seeking behaviors as risky, but equally

likely to participate in these behaviors. Perhaps students with high emotional intelligence understand the risk to benefit ratio of participation in such activities as competitions, extreme sports and martial arts. Others have also identified the importance of positive risk during adolescence. Moore and Gullone (1996) found that adolescents' risk behavior is influenced by the perceived positive outcomes of the behavior whether the behavior is socially acceptable or not. Erickson (1968) described a healthy adolescence as a time when a person searches for his/her identity through experimentation with societal values and family beliefs, exploration of different roles and testing limits. Without this exploration, Erickson stated that identity would not be reached, which would result in difficulties during subsequent stages of adult development (Erickson, 1968). The high emotionally intelligent students in the present study showed an exploration of positive risk as Erickson proposed a healthy adolescent would do; and therefore, it can be concluded that high school students with high emotional intelligence may be successfully navigating through the identity stage of development.

The regression model for the prediction of risk behaviors revealed that a higher score on the Using emotions branch and a low score on the Understanding branch best predicted total risk behavior. As discussed earlier, the Using emotions branch represents the ability to direct emotions towards thought and the ability to generate emotions on demand. This branch is thought to develop prior to the development of Understanding emotions (Mayer & Salovey, 1997), and the ability to make decisions based on emotional information without the ability to fully understand emotions may drive an adolescent to participate in negative behavior. The present results indicate that the ability to use emotions in decision making without the ability to understand emotions (or the consequence of the decision made based on emotion) creates a developmental window where the discrepancy in emotional intelligence abilities may be described as a risk factor rather than a protective factor.

It is also interesting to note that the upper level abilities of emotional intelligence are those significantly related to

risk behavior in the high school sample. Ability model emotional intelligence is a developmental model where children develop the ability to perceive emotions first with the ability to assimilate, understand, and manage emotions following as development continues (Mayer and Salovey, 1997). The present results suggest that adolescents who participate in reckless behavior have no more trouble perceiving and using emotions than those who chose not to participate in these activities. High school students with lower Understanding and Managing emotional intelligence may be slower to develop those brain areas that house the ability to use emotion in decision-making and problem solving.

There is an abundance of research on emotion, decision-making and the prefrontal cortex, especially the orbitofrontal and ventromedial cortices. Research with people who experienced a lesion (due to stroke, tumor resection or traumatic brain injury) in these areas of the brain exhibited poor decision-making due to a deficit in emotional regulation. Lesion patients participated in a gambling task where they were asked to choose cards that resulted in a reward or punishment. The ventromedial lesion patients preferred cards that gave high immediate reward although provided low long-term reward, and also preferred cards that gave low immediate punishment but had high long-term punishment effects (Bechara, Tranel, & Damasio, 2000). This suggests that people with these lesions have trouble making advantageous long-term decisions, but instead are focused on immediate returns that subsequently result in negative consequences. This data was linked to emotion by testing emotional responses through skin conductance during the gambling task. The ventromedial lesion patients did not experience the emotional signal as did the normal participants (Bechara, 2004a; Bechara, et al., 2000), and it is this difference that indicates that emotion plays a vital role in decision-making and that areas of the prefrontal cortex are vital in the connection between emotion and decision-making.

Adolescent brains may be similar to adult lesion brains because the adolescent frontal cortex has yet to fully mature. Adolescent brains are structurally different from

those of adults and children, and it is well known that maturation of cognitive function continues through the adolescent years (Case, 1985; Kolb & Fantie, 1989; Stuss, 1992). Researchers have found that there is a surge of gray matter development between the ages of 10 and 12, followed by a decrease of gray matter into the 20's as more efficient connections in the brain are created (Begley, 2000). The area of primary maturation is in the frontal lobes (Gibson, 1991; Jernigan, Press, & Hesselink, 1990), which are the brain areas responsible for executive functions such as organizing and planning (Stuss, 1992), self-control (Segalowitz & Davies, 2004), and emotional regulation (Bechara, 2004b; Rolls, 1998). It is also reported that the emotion centers in the adolescent brain light up on scans during emotional situations while the reasoning portions remain dark (Begley, 2000), which suggests that teens may act on emotions without thought about the action or its consequence. Through neuropsychological testing, there is evidence that performance on tests of executive function (i.e., Wisconsin Card Sorting Task and Stroop Task) are lower in early adolescence compared to late adolescence (Davies & Rose, 1999), and indicates the development of vital brain areas (frontal lobes) necessary for good performance in such executive functions tasks across adolescence. Segalowitz and Davies (2004) studied more specific areas of the frontal lobes with electrophysiological measures and found that the orbitofrontal, dorsolateral and ventromedial cortices (area linked to emotional decision-making) are still developing into late adolescence.

Incremental Validity of Emotional Intelligence

This study also hypothesized that emotional intelligence has incremental validity over personality measures. The data in the present study are similar to previous studies that reported mixed results with emotional intelligence providing incremental validity over personality factors for some target variables and not for others (e.g., Brackett et al., 2004; Rossen & Kranzler, 2009). Our data show that emotional intelligence provides incremental validity over personality factors in the prediction of risk behavior in high school students and provides incremental validity over personality in the prediction of risk beliefs in college students. In the high school sample, total emotional intelligence, Understanding emotions, and Managing emotions provided incremental validity in the prediction of reckless risk behavior with Managing emotions providing the greatest increase in accounted for variance (7%) over Extroversion. No emotional intelligence measure provided incremental validity over personality in the prediction of total risk behavior in the high school sample. In the college student sample, total emotional intelligence and Understanding emotions provided incremental validity over personality factors in the prediction of risk beliefs with Understanding emotions providing the greatest increase in accounted for variance (10%) over Openness in the prediction of rebellious risk beliefs. These data suggest that emotional intelligence does provide some incremental validity over the NEO FFI, but the data is specific to type of risk behavior and may not provide increased prediction value over a general measure risk behavior. In addition, emotional intelligence provides the greatest incremental validity for risk perception in the college student sample. This suggests that, in young adults, emotional intelligence may best predict certain cognitive processes related to risk behavior rather than the overt behaviors themselves.

Limitations

Limitations include the use of the NEO FFI in the measurement of personality in the high school participants. Whereas the NEO FFI has been used extensively with adults, it is used less frequently with adolescents. Research using the NEO FFI with adolescents should continue to solidify these results. The use of the research version of the MSCEIT-YV is also a limitation as it is not yet in its final published form.

The reliabilities of the some of the ARQ subscales and MSCEIT/MSCEIT-YV are poor, which indicates that the predictive validity may not as impressive for the sample as the data show. The reliabilities are lower than those reported by the test developers and others who have published work using these scales, and may be due to the limited demographics of the participant sample, which is mainly Caucasian females who are approximately 18 years of age. Gullone, Moore, Moss, and Boyd (2000)

found that the reliability of the antisocial subscale was lower in girls than in boys (= 0.66).

There are demographic limitations to this study. The sample is not representative of the nation's population, the college sample contains a high percentage of females, and the older age groups have a small number of participants. Future efforts should focus on recruitment of minorities and males, and better stratify the sample for age. Studying various cultures will provide greater insight into the potential socio-cultural mechanisms at play in emotional intelligence.

Applications and Future Research

As research on the ability model of emotional intelligence is expanded, there are applied areas of psychology that may benefit. Educational programs based on emotional intelligence and industrial/organizational programs are currently available. These programs are largely based on Goleman's popularized emotional intelligence (Mayer & Cobb, 2000), which he claims can predict 80% of success in life (Goleman, 1995). This high percentage was highly attractive to curriculum developers and researchers who searched for a construct beyond traditional intelligence that would explain students who were smart, but who achieved at a lower level scholastically and socially (Mayer & Cobb, 2000). By 1997, there were at least 22 formal educational programs that emphasized emotional intelligence, with some threading emotional intelligence throughout the school's entire curriculum (Elias, et al., 1997). Education experts must take care not to trivialize the concept of emotional intelligence because there is a growing body of research that supports the predictive validity of the original conceptualization of emotional intelligence. If emotional intelligence is an ability, an intelligence, then there is a possibility that these abilities can be sharpened through proper educational instruction as crystallized intelligence is sharpened through literacy programs. Mayer and Cobb (2000) write that educators and curriculum developers should be judicious in their foundation for emotional intelligence based curricula because good, sound research can easily be overlooked for popular theory. They feel that if emotional intelligence becomes more

solidly established as a construct, it could then be implemented in educational policy in several ways. They speculate that emotional reasoning may be promoted through courses in liberal arts by discussing the emotions of a character in a story or talking about emotions that are evoked during a piece of music.

Currently, the research is not conclusive about the possible outcomes from the implementation of emotional intelligence based curricula. The current data is mixed on the relationship between emotional intelligence and achievement. Woitaszewski and Aaisma (2004) used the MEIS-A to assess the role of emotional intelligence to the academic success of gifted high school students. They found no correlation between the MEIS-A total score (they did not report branch scores) and grade point average ($r = .046$) or scores on the Test of Cognitive Skills/Second Edition ($r = -.029$). However, Brackett, et al. (2004) used the MSCEIT in a sample of college students and found that verbal SAT score was significantly correlated with the Experiential area score ($r = 0.23$, $p < 0.001$), Reasoning area score ($r = 0.39$, $p < 0.001$) and total emotional intelligence ($r = 0.35$, $p < 0.001$). In addition, they found that college grade point average was significantly correlated with the Reasoning area score ($r = 0.18$, $p < 0.01$) and total emotional intelligence score ($r = 0.14$, $p < 0.05$). More recently, Grehan, Flanagan, and Malgady (2011) found that in a sample of school psychology graduate students, emotional intelligence was significantly and moderately correlated with graduate level academic achievement and internship ratings. They concluded that it may be possible to add emotional intelligence type items to graduate student evaluations in order to identify those students who need some development in emotional intelligence.

As these discrepancies are resolved with more research, it is possible that we could see positive outcome data for emotional intelligence based curricula in areas of academic achievement and adolescent behavior. Furthermore, future emotional intelligence research might also focus on students who are diagnosed with behavioral disorders. These students might benefit most

from a curriculum of this type as they commonly engage in risk behavior and have low academic achievement (Huesmann, Eron, & Yarmel, 1987; McMichael, 1979; Tremblay, et al., 1992).

Conclusions

As past researchers have found, ability model emotional intelligence is related to various adolescent risk behaviors and provides incremental validity over personality measures in the prediction of such behaviors. However, the present study provides greater insight of these relationships through a developmental lens. In younger adolescents, emotional intelligence is related to participation in some types of risk behaviors, and the more sophisticated emotional intelligence abilities (Using and Understanding emotion) may be help protect high school students from participation in behaviors such as drinking and driving and unprotected sex. In older adolescents, however, emotional intelligence is related to perception of risk, but not to participation in the behaviors. Older adolescents with high emotional intelligence may be overcome by social circumstances even though they perceive the action is of a higher risk value. The mechanism behind this requires more study, and it may be the case that personality, cognitive intelligence or some prominent social variable plays a larger role in whether older adolescents choose to participate in certain risk behaviors.

In searching for such a combination of variables that will best predict risk behavior participation and perception, the current findings suggest that the addition of emotional intelligence to personality factors does improve the prediction model. Emotional intelligence as measured using ability model assessment does provide incremental validity over personality variables in the prediction of some risk behavior variables, but this increase in prediction is specific to type of risk behavior and may not provide increased prediction value over a general measure risk behavior.

With more study in this area, the potential for applied areas of psychology to benefit are many. As emotional intelligence may act as a protective factor over certain personality traits, it may be possible to develop educational curricula that teach students to sharpen their abilities to use and understand emotion in decision-making. It also may be possible to create developmentally focused curricula that will increase emotional intelligence of younger adolescents and help older adolescents make better use of their more fully developed emotional intelligence in order to decrease participation in potentially negative risk behavior and maximize participation in potentially positive risk behaviors. The body of emotional intelligence research is small and future research seems endless, but we must first overcome the popular theories and get back to basic science in order to give emotional intelligence the proper evaluation needed for it to become a construct embraced by all of psychology.

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