

Ψ I J E P

International Journal of
Educational Psychology

Volume 2, Number 3



The Contributions of Psychological Maturity and Personality in the Prediction of Adolescent Academic Achievement - Elisa Camps & Fabia Morales-Vives - 246

Reductions in Negative Automatic Thoughts in Students Attending Mindfulness Tutorials Predicts Increased Life Satisfaction - Paul Ritvo, Khushboo Vora, Jane Irvine, Myriam Mongrain, Saam Azargive, Muhammad Abid Azam, Meysam Pirbaglou, Crissa Guglietti, Noah Wayne, Daniel Felipe Perez and Rob Cribbie - 272

Effects of Peer Tutoring on Reading Self-Concept - Marta Flores & David Duran - 297

Let's Share Perspectives! Mentalistic Skills Involved in Cooperation - Francesc Sidera, Elisabet Serrat, Jèssica Serrano, Carles Rostan, Agnès Caño, Anna Amadó - 325

Articles

Reviews

The Anti-Education Era: Creating Smarter Students Through Digital Learning [Book Review] Todd Lilly - 353



Instructions for authors, subscriptions and further details:

<http://ijep.hipatiapress.com>

The Contributions of Psychological Maturity and Personality in the Prediction of Adolescent Academic Achievement

Elisa Camps¹ & Fabia Morales-Vives^{1,2}

1) Department of Psychology, Universitat Rovira i Virgili, Spain.

2) Research Center for Behavior Assessment

Date of publication: October 24th, 2013

Edition period: October 2013 - February 2014

To cite this article: Camps, E., & Morales-Vives, F. (2013). The Contributions of Psychological Maturity and Personality in the Prediction of Adolescent Academic Achievement. *International Journal of Educational Psychology*, 2(3), 246-271. doi: 10.4471/ijep.2013.27

To link this article: <http://dx.doi.org/10.4471/ijep.2013.27>

PLEASE SCROLL DOWN FOR ARTICLE

The terms and conditions of use are related to the Open Journal System and to [Creative Commons Attribution License](#) (CCAL).

The Contributions of Psychological Maturity and Personality in the Prediction of Adolescent Academic Achievement

Elisa Camps & Fabia Morales-Vives
Universitat Rovira i Virgili

Abstract

Numerous studies show that intelligence and impulsiveness are important predictors of academic achievement in adolescence. However, it is not clear what contribution is made by the big five personality traits, because some studies suggest that Conscientiousness, Extraversion and Openness to experience are predictors while others show precisely the opposite. Direct aggression, through its relationship with impulsiveness, is another factor that has been linked to academic achievement. However, no previous studies have been made on the relationship that indirect aggression and psychological maturity have with academic achievement. For this reason, the purpose of this study is to determine the relative importance of psychological maturity, indirect aggression and the big five personality traits in predicting academic achievement in adolescents. As was expected, results show that intelligence and impulsivity are important predictors of academic performance. As far as psychological maturity is concerned, only the Work orientation component is related to academic performance. However, indirect aggression is not related to academic performance. The results pertaining to the big five personality traits suggest that Conscientiousness and Openness to experience are important for predicting academic achievement.

Keywords: academic achievement, psychological maturity, personality, indirect aggression.

La Contribución de la Madurez Psicológica y de la Personalidad en la Predicción del Rendimiento Académico de los Adolescentes

Elisa Camps & Fabia Morales-Vives
Universitat Rovira i Virgili

Resumen

Numerosos estudios muestran que la inteligencia y la impulsividad son predictores del rendimiento académico en la adolescencia. Sin embargo, no está claro cuál es la contribución de los cinco grandes factores de personalidad, ya que mientras algunos estudios sugieren que Responsabilidad, Extraversión y Apertura a la experiencia son predictores, otros estudios muestran lo contrario. Otro factor que se ha relacionado con el rendimiento académico es la agresividad directa, a través de su relación con la impulsividad. Sin embargo, no existen estudios previos sobre la relación entre agresividad indirecta, madurez psicológica y rendimiento académico. Por tanto, el objetivo del presente estudio consiste en determinar cuál es la importancia relativa de la madurez psicológica, la agresividad indirecta y los cinco grandes factores de personalidad en la predicción del rendimiento académico en adolescentes. Como se esperaba, los resultados muestran que la inteligencia y la impulsividad son importantes predictores. En cuanto a la madurez psicológica, sólo el componente de Orientación al trabajo está relacionado con el rendimiento académico. Sin embargo, la agresividad indirecta no es un predictor. Respecto a los cinco grandes factores de personalidad, los resultados sugieren que Responsabilidad y Apertura a la experiencia son relevantes en la predicción el rendimiento académico.

Palabras clave: Rendimiento académico, madurez psicológica, personalidad, agresividad indirecta.

The high rates of academic failure have been a matter of social concern in recent decades. For this reason, there has been increasing interest in identifying those variables that are related to academic achievement so that academic failure can be prevented. The current study focuses on the extent to which psychological maturity and personality traits contribute to the prediction of academic achievement.

A considerable number of studies show that intelligence is one of the most important predictors of academic performance (e.g., Laidra, Pullmann & Allik, 2007; Rosander, Bäckström & Stenberg, 2011; Steinmayr & Spinath, 2009; Strenze, 2007). The amount of variance in academic performance explained by intelligence depends on the level of education (see Jensen, 1980). In fact, Jensen (1980) reported correlations between .60 and .70 in elementary school, correlations of .50 in secondary school, and correlations of .40 at university. This decrease in the correlation between intelligence and academic achievement with age could be explained by the restriction of range because fewer people study at higher educational levels (Pind, Gunnarsdóttir & Jóhannesson, 2003).

Many authors state that personality variables should also be taken into account in the prediction of academic achievement (e.g., Chamorro-Premuzic & Furnham, 2005; Poropat, 2009; Rindermann & Neubauer, 2001). One of the personality traits that has been most consistently related to academic achievement is impulsivity (e.g., Romano, Babchishin, Pagani & Kohen, 2010; Valiente, Eisenberg, Spinrad, Haugen, Thompson & Kupfer, 2013; Vigil-Colet & Morales-Vives, 2005). In fact, impulsivity seems to be inversely related to academic performance and associated with learning problems (Fink & McCown, 1993). Therefore, high impulsivity in adolescence is related to higher academic failure (Vigil-Colet & Morales-Vives, 2005). It seems that impulsivity is a moderator variable in the relationship between intelligence and academic achievement, because students with greater intellectual capacity perform better academically if

they have low levels of impulsivity than if they have high levels (Helmers, Young & Pihl, 1995; Zeidner, 1995). One possible explanation might be that impulsive students are more likely to participate in behaviours without sufficient reflection, engaging in actions that may generate immediate gratification at the expense of future achievement (Block & Block, 1980; Eisenberg, Spinrad & Eggum, 2010). Moreover, students with worse academic performance might be characterized by impulsive styles in the resolution of problems, tending to provide quick answers with little thought, which can lead to error in those cases in which the response requires reflection (Fink & McCown, 1993).

Other studies have focused on the relationship between the Big Five personality traits and academic achievement (e.g., Chamorro-Premuzic & Furnham, 2003a; Komarraju, Karau & Schmeck, 2009; Wagerman and Funder, 2007). The trait most clearly related to academic performance is Conscientiousness (e.g., Chamorro-Premuzic & Furnham, 2003b; Heaven & Ciarrochi, 2012; Rosander, Bäckström & Stenberg, 2011), possibly because students with high responsibility are good at organizing their work and time, and tend to be more hard-working (Entwistle, 1997). Openness to experience also seems to be positively related to academic performance (e.g., Geisler-Brenstein & Schmeck, 1996; Komarraju, Karau & Schmeck, 2009), but according to McCrae and Costa (1985) this is due to the relationship between Openness to experience and intelligence, making it difficult to know whether the relationship between Openness to experience and academic performance is direct or indirect. This trait is also related to better scores in vocabulary and general knowledge (Ackerman & Heggestad, 1997; Ashton, Lee, Vernon, & Jang, 2000). However, other studies failed to replicate the relationship between Openness to experience and academic achievement (Chamorro-Premuzic & Furnham, 2003a; Rothstein, Paunonen, Rush & King, 1994). In general, no significant relationship has been found between the trait Agreeableness and academic performance (De Fruyt & Mervielde, 1996; Rothstein et al., 1994). For the traits Emotional stability

and Extraversion, results are contradictory: while some authors find a negative relationship, others find a positive relationship (Chamorro-Premuzic & Furnham, 2003a,b; Chowdhury, 2006; Heaven & Ciarrochi, 2012; Rosander, Bäckström & Stenberg, 2011; Swanberg & Martinsen, 2010). It should be taken into account that personality and academic performance may be associated because of their relationship with intelligence, as Poropat suggests (2009). Therefore, if the relationship between personality and academic performance is to be understood, the role of intelligence must be taken into account. However, some studies do not include the variable intelligence, which could partially explain the contradictory results found for some personality traits.

Few studies focus on the relationship between aggression and academic performance (Morales-Vives, 2007; Nakamoto & Schwartz, 2010). It seems that direct aggression is related to academic performance through impulsivity (Morales-Vives, 2007). In fact, McMurrin, Blair and Egan (2002) stated that impulsivity can make learning more difficult in the early developmental years and lead to poor problem-solving in later years, which contributes to aggression. As far as we know, there are no studies on the relationship between indirect aggression and academic performance. While direct aggression refers to overt verbal attacks (for example, threatening, insulting or taunting) and physical acts (pushing or hitting), indirect aggression implies harming a target by rejection or exclusion, damaging his/her social position and manipulating peer relationships (for example, gossiping, spreading false rumours or ostracising), without directly confronting the victim (Björkqvist, Österman & Kaukiainen, 1992). According to Björkqvist, Lagerspetz & Kaukiainen (1992), indirect aggression depends on maturation, because a certain level of both verbal and social skills is needed. Taking into account that indirect aggression involves more maturation and verbal skills than direct aggression and it may involve more planning, it could also be related to academic performance, as direct aggression is.

Finally, there is evidence to suggest that there is a relationship between maturity and educational attainment: those students with fewer educational aspirations tend to be less mature (Greenberger, 1982). Therefore, psychological maturity may lead to greater interest in academic content and learning, as well as higher aspirations in life. Moreover, according to Galambos, MacDonald, Naphtali, Cohen & de Frias (2005) there is a relationship between cognitive ability and psychological maturity. They found that psychological maturity is related to a higher crystallized intelligence and better performance on some executive tasks. Taking into account that crystallized intelligence depends on learning processes, psychological maturity and academic performance are expected to be related. The very few studies on this issue suggest that this is the case (Steinberg, Elmen & Mounts, 1989; Oh-Hwang, 1994). However, these studies do not assess intelligence, so other studies need to be made to determine whether this result can be explained simply by the relationship that psychological maturity and academic performance have with intelligence.

In the current study we define psychological maturity as the ability to take on obligations, to make responsible decisions that take into account one's own characteristics and needs, and to accept the consequences of one's own actions. This definition refers specifically to the individual adjustment proposed by Ellen Greenberger and colleagues (e.g., Greenberger, 1984; Greenberger & Sørensen, 1973) within their model of psychosocial maturity, which is divided into three components: Work Orientation, Self-Reliance and Identity. Work Orientation is defined as the individual's willingness to fulfill his or her own obligations (for example, adolescents start their homework and do not stop until they finish). Self-Reliance is defined as a person's willingness to take the initiative, without allowing others to exercise excessive control. And finally, Identity is defined as the adolescent's knowledge of him or herself.

The aim of the current study is to determine the contribution that psychological maturity and several personality traits make to the prediction of adolescent academic performance. The personality traits included in this study are impulsivity, indirect aggression and the Big Five (Extraversion, Conscientiousness, Emotional stability, Agreeableness and Openness to experience). Taking into account the results of previous studies, we expect intelligence and impulsivity to be important predictors of academic performance. With regard to the Big Five personality traits, we also expect Conscientiousness and Openness to experience to be related to academic performance. Despite the few studies that have focused on indirect aggression and psychological maturity, we expect that these two traits will also be related to academic performance, particularly the component Work-orientation of psychological maturity.

Methods

Participants

This study involved the participation of 232 students (109 boys and 123 girls) from two Spanish high schools, in Reus (Tarragona, Spain). The participants were between 14 and 19 years old, and the mean age and standard deviation were 15.5 and 1.3, respectively.

Measures

Primary Mental Abilities (Thurstone, 1938). This questionnaire measures the following components of intelligence: Verbal (PMA-V), Spatial (PMA-s), Numerical (PMA-N), Reasoning (PMA-R) and Word Fluency (PMA-W). PMA-V is defined as the capacity to understand ideas expressed in words. PMA-S is the capacity to imagine and think of objects

in two or three dimensions. PMA-N is the ability to handle numbers and solve numerical problems. PMA-R is the ability to solve logical problems, as well as understanding and planning. PMA-W is the ability to speak and write words easily.

Psychological Maturity Assessment Scale (PSYMAS; Morales-Vives, Camps & Lorenzo-Seva, 2012, 2013). This questionnaire measures three components of psychological maturity: Work orientation (WO), Self-reliance (SR) and Identity (ID). It consists of 26 items, and it includes four items of social desirability to control for this response bias. In fact, this inventory provides individuals' scores free of the following response biases: social desirability and acquiescence. Item responses are made using a 5-point Likert-type scale ranging from 1 (strongly disagree) to 5 (strongly agree). The reliability of the total scale is .82 and the reliability of the subscales are .71 for WO, .78 for SR and .77 for ID. The scales are just seven items long, so these reliabilities can be regarded as adequate.

Impulsivity Scale Bis-11c (Chahin, Cosi, Lorenzo-Seva & Vigil-Colet, 2010). This questionnaire is a modified Spanish version of Barratt's BIS-11 (Barratt, 1985) adapted for children and teenagers. The questionnaire contains 26 items that measure three components of impulsiveness: Motor Impulsiveness (BIS-m), Cognitive Impulsiveness (BIS-c), and Non-Planning Impulsiveness (BIS-np). BIS-m involves acting without thinking, BIS-c a propensity to make quick cognitive decisions on the spur of the moment, and BIS-np a tendency not to plan, which show a greater interest in the present than in the future. Item responses are made using a 4-point Likert-type scale ranging from 1 (never / almost never) to 4 (always / almost always). The internal consistencies of the subscales are .80, .73, and .68, respectively.

Overall Personality Assessment Scale (OPERAS; Vigil-Colet, Morales-Vives, Camps, Tous & Lorenzo-Seva, 2013). This questionnaire is based on the five-factor model of personality, and it measures the following traits: Extraversion (EX), Emotional Stability (ES), Conscientiousness (CO), Agreeableness (AG) and Openness to Experience (OE). The questionnaire

contains 40 items, and the reliability of the subscales are .86 for EX and ES, .77 for CO, .71 for AG and .81 for OE. These scales are just seven items long, so these reliabilities can be regarded as adequate. Responses are made on a 5-point Likert-type scale ranging from 1 (strongly disagree) to 5 (strongly agree). This questionnaire includes four items of social desirability to control for this response bias and it provides individuals' scores free of social desirability and acquiescence.

Indirect Aggression Scales (IAS; Anguiano-Carrasco & Vigil-Colet, 2011). We administered the short version for aggressors. Indirect aggression refers to social manipulation behaviors in which the aggressor acts on the people around the attacked person with the sole aim of harming him/her without facing him/her directly. This inventory consists of 10 items answered on 5-point Likert-type scales ranging from 1 (strongly disagree) to 5 (strongly agree). The questionnaire has an internal consistency of .82. The social desirability response bias was controlled.

Academic performance was assessed by the average grades obtained in school subject areas.

Procedure

The tests were administered collectively to groups of 20–30 participants by a professional psychologist with master's degrees in the measurement and assessment of behaviour. This psychologist was specially trained to administer questionnaires to adolescents. The participants were asked to volunteer to answer the inventories in their classroom. The anonymity and confidentiality of individual results was guaranteed.

Statistical analyses were carried out using SPSS V.20 and MIMR-Raw (Lorenzo-Seva, Ferrando & Chico, 2010). We performed descriptive analysis, correlations and multiple regression analysis to determine the predictive value of the different variables on academic performance. Standardized coefficients (also known as beta weights) are context dependent (Courville & Thompson, 2001) and often do not work well for

explanatory purposes, especially in the presence of substantially correlated predictors, in which case they can also become very unstable (Cooley & Lohnes, 1971; Johnson, 2000). Moreover, multicollinearity can also affect the magnitude of beta weights. For this reason, taking into account that the predictors from the current study are correlated, we used additional indexes to assess the relative importance of these predictors: Johnson's structural coefficients and relative weights (Johnson, 2000). Johnson's relative weights, for example, estimate the relative contribution each variable makes to the prediction of a dependent variable, taking into account both its individual contribution and its contribution when combined with other variables. MIMR-Raw.sps provides the relative weights as percentages (i.e., they are divided by R^2 and multiplied by 100). It also calculates the bootstrap confidence intervals for the relative weights. These additional indexes make it easier to interpret multiple regression results in the presence of multicollinearity (Kraha, Turner, Nimon, Zientek & Henson, 2012).

Results

Table 1 shows the descriptive statistics for the PMA, BIS-11c, PSYMAS, IAS and OPERAS measures. As can be seen, girls had a better academic performance ($t(230) = 2.08, p < .05$, Cohen's $d = 0.27$) and higher scores on Agreeableness ($t(230) = 2.42, p < .05$, Cohen's $d = 0.32$), Openness to experience ($t(230) = 3.61, p < .01$, Cohen's $d = 0.48$), PMA-R ($t(230) = 2.65, p < .01$, Cohen's $d = 0.35$) and PMA-N ($t(230) = 2.26, p < .05$, Cohen's $d = 0.30$). However, boys obtained higher scores on Emotional stability ($t(230) = 4.27, p < .01$, Cohen's $d = 0.56$).

Table 1
Descriptive Statistics

		All	Boys	Girls
Scales		<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>
	AP	5.8 (1.4)	5.6 (1.3)	5.9 (1.4)
PSYMAS	WO	49.3 (9.9)	49.1 (9.9)	49.5 (10.1)
	SR	46.9 (12.3)	47.3 (13.5)	46.5 (11.3)
	ID	49.9 (9.8)	50.6 (9.3)	49.1 (10.3)
	Total	48.3 (10.7)	48.8 (10.8)	47.9 (10.7)
BIS-11c	BIS-m	25.9 (6.0)	25.7 (6.3)	26.1 (5.7)
	BIS-c	12.1 (2.6)	12.4 (2.5)	11.9 (2.7)
	BIS- np	18.4 (4.8)	18.1 (4.9)	18.7 (4.7)
IAS	IA	50.8 (10.4)	52.1 (10.9)	49.7 (9.8)
OPERAS	EX	49.1 (10.0)	48.5 (9.3)	49.7 (10.7)
	CO	43.3 (11.1)	42.7 (10.8)	43.8 (11.4)
	ES	46.0 (11.1)	49.2 (10.4)	43.2 (11.4)
	AG	47.0 (11.0)	45.2 (10.7)	48.7 (10.9)
	OE	42.9 (11.4)	40.1 (10.7)	45.4 (11.5)
	PMA	PMA-V	20.6 (6.7)	20.3 (6.5)
PMA-S		24.7 (12.9)	25.3 (12.5)	24.2 (13.3)
PMA-N		39.3 (11.0)	10.8 (7.3)	12.9 (6.6)
PMA-R		16.8 (6.7)	15.5 (6.9)	17.8 (6.4)
PMA-W		39.3 (10.9)	38.1 (11.2)	40.3 (10.8)

Note. AP = Academic performance, EX = Extraversion, ES = Emotional Stability, CO = Conscientiousness, AG = Agreeableness, OE = Openness to experience, WO = Work orientation, SR = Self-reliance, ID = Identity, IA = Indirect aggression, BIS-c = Cognitive impulsiveness, BIS- np = non-planning Impulsiveness, BIS-m = motor impulsiveness, PMA-V = Verbal, PMA-S = Spatial, PMA-N = Numerical, PMA-R = Reasoning, PMA-W = Word Fluency.

$p < .05$ **p < .01**

The correlations between the study variables are shown in [Table 2](#). There is a significant correlation between academic performance and two personality factors: Conscientiousness and Openness to experience. Academic performance is also correlated with all the scales of impulsivity and intelligence, and one scale of psychological maturity: Work orientation.

Table 2

Correlations between Variables

	AP	EX	ES	CO	AG	OE	WO	SR	ID	IA	BIS-c	BIS-np	BIS-m	PMA-V	PMA-S	PMA-R	PMA-N
EX	-.13																
ES	.06	.29															
CO	.23	.07	.27														
AG	.01	-.01	.23	.36													
OE	.29	.02	.00	.30	.07												
WO	.27	.10	.21	.48	.21	.21											
SR	.04	.16	.22	.26	.05	.12	.27										
ID	.07	.36	.58	.31	.23	.05	.33	.32									
IA	-.07	.05	-.05	-.20	-.39	-.07	-.11	-.19	-.17								
BIS-c	.19	.21	.25	.26	.05	.15	.29	.23	.19	.01							
BIS-np	-.20	.04	-.17	-.55	-.12	-.28	-.23	-.11	-.12	-.02	-.13						
BIS-m	-.28	.17	-.33	-.49	-.36	-.23	-.36	-.13	-.29	.20	-.09	.29					
PMA-V	.32	-.06	.03	.09	-.02	.26	.14	.22	.04	-.02	.23	-.14	-.14				
PMA-S	.23	.12	.12	.03	-.04	.13	.08	.13	.09	-.05	.21	-.03	-.07	.36			
PMA-R	.36	.12	.10	.07	.18	.23	.21	.12	.15	-.22	.19	.01	-.24	.40	.51		
PMA-N	.24	.10	.09	.01	.15	.03	.11	.11	.17	-.14	.24	.07	-.13	.25	.20	.32	
PMA-W	.25	.10	.03	.08	-.03	.31	.16	.18	.03	.00	.13	-.05	-.12	.48	.30	.34	.25

Note. AP = Academic performance, EX = Extraversion, ES = Emotional Stability, CO = Conscientiousness, AG = Agreeableness, OE = Openness to experience, WO = Work orientation, SR = Self-reliance, ID = Identity, IA = Indirect aggression, BIS-cog = Cognitive impulsiveness, BIS-np = Non-planning Impulsiveness, BIS-motor = Motor impulsiveness, PMA-V = Verbal capacity, PMA-S= spatial, PMA-R = reasoning, PMA-N = Numerical capacity.

$p < .05$ $p < .01$

A multiple regression analysis was carried out using the programs SPSS and MIMR-Raw.sps. All the subscales were introduced into the regression equation as potential predictors of academic performance. **Table 3** shows the standardized regression coefficients (Beta) obtained, the structure coefficients, Johnson's relative weights and the bootstrap confidence intervals. The R^2 was .57 ($F = 10.42$, $p < .001$) and the 95% confidence interval was .52 and .69. Only nine predictors (Extraversion, Conscientiousness, Openness to experience, Work orientation, BIS-cog, BIS-*np*, BIS-*m*, PMA-R and PMA-N) turned out to have a significant Beta ($p < .01$), and also significant structure coefficients, with bootstrap 95% confidence intervals that did not include the zero value. Although the Beta of BIS-*np*, PMA-V, PMA-S and PMA-W were not significant, the fact that the structure coefficients and Johnson's relative weights were significant suggests that they should be included in the model as well, because they contribute significantly to the prediction of academic performance. The relative contribution to Multiple R for each predictor ranges between 26.6 and 9.5, as the last column in **Table 3** shows.

Table 3
Structural Coefficients and Relative Weights of Johnson

Scales	Beta	SC	Bootstrap 95% C.I. for SC 95%)		RW	Bootstrap 99% C.I. for RW		
			Lower	Upper		Lower	Upper	
OPERAS	EX	-.21	-.23	-.39	-.03	7.6	1.5	16.5
	CO	.18	.41	.18	.57	5.9	1.7	12.7
	OE	.16	.52	.30	.64	10.2	2.2	19.8
PSYMAS	WO	.13	.48	.26	.61	8.9	2.2	17.2
BIS-11c	BIS-c	.05	.34	.11	.49	3.3	0.5	9.5
	BIS-np	-.07	-.36	-.50	-.15	4.7	0.8	11.8
	BIS-m	-.05	-.48	-.63	-.26	6.4	1.5	14.9
PMA	PMA-V	.09	.57	.30	.71	9.8	1.9	20.4
	PMA-S	.02	.40	.19	.56	4.6	1.5	11.4
	PMA-R	.29	.63	.44	.72	17.6	6.5	26.6
	PMA-N	.17	.41	.20	.58	8.9	1.2	19.3
	PMA-W	.04	.45	.27	.56	5.4	1.5	11.9

Note. SC = Structure coefficient, C.I. = Confidence interval, RW = Relative weight (reported as percentages), EX = Extraversion, CO = Conscientiousness, OE = Openness to experience, AG = Agreeableness, WO = Work orientation, BIS-c = Cognitive impulsiveness, BIS-np = Non-planning impulsiveness, BIS-m = Motor impulsiveness, PMA-V = Verbal capacity, PMA-S = Spatial capacity, PMA-R = Reasoning, PMA-N = Numerical capacity, PMA-W = Word fluency.

Discussion

As Rosander et al. (2011) pointed out, teachers need to know which variables are related to academic performance if they are to implement new teaching methods adjusted to the specific psychological characteristics of students. For this reason, the current study aims to determine the contribution of psychological maturity and several personality traits to the prediction of adolescent academic performance.

In general, the results are consistent with those of previous studies in the domain of impulsivity and intelligence. More specifically, the results show that both psychological maturity and personality traits are important predictors, as previous studies have shown (Busato, Prins, Elshout & Hamaker, 2000; Fink & McCown, 1993; Vigil-Colet & Morales-Vives, 2005). In fact, the current study shows that the three kinds of impulsivity are predictors, but Motor impulsiveness is more influential than the others.

The Work orientation component of psychological maturity is also a predictor of academic performance, as was expected. In fact, previous studies seem to suggest that more mature adolescents tend to show better cognitive and academic performance (Steinberg, Elmen & Mounds, 1989; Oh-Hwang, 1994). Moreover, responsible students may spend more time on their homework and academic activities, and therefore tend to achieve more at school. However, Identity and Self-reliance are not relevant predictors. As far as we know, no previous studies have focused on the role of Self-reliance, but some studies have shown that Identity is related to academic performance (e.g., Berzonsky, & Kuk, 2005; Lounsbury, Huffstetler, Leong & Gibson, 2005). Many of these studies, however, do not control for the effect of intelligence, which may affect the interpretation of the results.

Contrary to our expectations, Indirect aggression did not contribute incrementally to the prediction of academic performance. The fact that the correlation is non-significant suggests that it is neither a direct nor an indirect predictor. However, a previous study shows that direct aggression (involving overt verbal and physical attacks) is an indirect predictor of academic failure, through its relationship to impulsivity (Morales-Vives, 2007).

As expected, results on the Big Five personality traits show that Conscientiousness and Openness to experience are important predictors of academic performance. Previous research also shows the importance of these predictors (Busato et al., 2000; Heaven & Ciarrochi, 2012; Rosander, Bäckström & Stenberg, 2011; Komarraju, Karau & Schmeck, 2009). In the current study Openness to experience is the Big Five personality trait that makes the greatest relative contribution to the prediction of academic performance, and its contribution is even higher than that of impulsiveness. Contrary to what McCrae and Costa (1985) suggest, the results show that the relationship between Openness to experience and academic performance cannot be explained merely by the relationship between Openness to experience and intelligence, because this trait explains part of the variance that is not explained by intelligence. Therefore, the relationship between Openness to experience and academic performance may be explained by the fact that individuals who are more open to experience are more curious and engage in particular intellectual activities. These individuals may be more involved and interested in their studies and academic activities. Previous studies have provided contradictory results on the role of Extraversion: while some have found that it is positively related to academic performance (Furnham & Medhurst, 1995; Rothstein et al., 1994), others have found a negative relationship (Goff & Ackerman, 1992) or no relationship at all (Diseth, 2003). However, the current study shows that it is an important predictor, with a negative relationship. Therefore, less extrovert students tend to show better academic performance. Eysenck and Cookson (1969) stated that the correlation between this personality trait and academic performance changes from positive to negative during secondary school, because the atmosphere in primary school is more social and informal than in

secondary school. This may explain the sign of the relationship in the current study (because the students are from secondary school). Moreover, introverts may have an advantage in the consolidation of learning, lower distractibility and better study habits (Sánchez, Rejano & Rodríguez, 2001). Emotional stability and Agreeableness do not contribute to the prediction of academic performance, as previous studies suggest (De Fruyt & Mervielde, 1996; Rothstein et al., 1994).

In conclusion, the current study discusses some of the variables that must be taken into account when predicting academic performance. According to the results, students who are more impulsive and extroverted, but less work oriented, conscientious and open to experience tend to have more difficulties, so they may require special attention to be paid to their particular needs. However, further studies should be made to replicate these results, because few previous studies have focused on the possible role of indirect aggression and psychological maturity. Moreover, further longitudinal and sequential studies are also needed to broaden the perspective on the relationship between these variables, and their evolution throughout the secondary school and university.

References

- Ackerman, P. L., & Heggestad, E. D. (1997). Intelligence, personality, and interests: evidence for overlapping traits. *Psychological bulletin*, 121(2), 219. doi: 10.1037//0033-2909.121.2.219
- Anguiano-Carrasco, C., & Vigil-Colet, A. (2011). Assessing indirect aggression in aggressors and targets: Spanish adaptation of the Indirect Aggression Scales. *Psicothema*, 23(1), 146-152.

- Ashton, M. C., Lee, K., Vernon, P. A., & Jang, K. L. (2000). Fluid intelligence, crystallized intelligence, and the openness/intellect factor. *Journal of Research in Personality*, *34*(2), 198-207. doi: [10.1006/jrpe.1999.2276](https://doi.org/10.1006/jrpe.1999.2276)
- Barratt, E. S. (1985). Impulsiveness subtraits: Arousal and information processing. In J.T. Spence & C.E. Izard (Eds.), *Motivation, emotion and personality* (pp. 137-145). New York, North-Holland: Elsevier Science.
- Berzonsky, M. D., & Kuk, L. S. (2005). Identity style, psychosocial maturity, and academic performance. *Personality and Individual Differences*, *39*(1), 235-247. doi: [10.1016/j.paid.2005.01.010](https://doi.org/10.1016/j.paid.2005.01.010)
- Björkqvist, K.; Lagerspetz, K. & Kaukiainen, A. (1992). Do girls manipulate and boys fight? Developmental trends regarding direct and indirect aggression. *Aggressive Behavior*, *18*, 117-127. doi: [10.1002/1098-2337\(1992\)18:2<117::AID-AB2480180205>3.0.CO;2-3](https://doi.org/10.1002/1098-2337(1992)18:2<117::AID-AB2480180205>3.0.CO;2-3)
- Björkqvist, K., Österman, K., & Kaukiainen, A. (1992). The development of direct and indirect aggressive strategies in males and females. En K. Björkqvist & P. Niemelä (Eds.), *Of mice and women. Aspects of female aggression* (pp. 51–64). San Diego, CA: Academic Press.
- Block, J., & Block, J. (1980). The role of ego-control and ego-resiliency in the organization of behavior. In W. A. Collins (Ed.), *Development of Cognition, affect, and social relations. The Minnesota Symposia on Child Psychology* (Vol. 13, pp. 39-101). Hillsdale, NJ: Lawrence Erlbaum.
- Busato, V. V., Prins, F. J., Elshout, J. J., & Hamaker, C. (2000). Intellectual ability, learning style, achievement motivation and academic success of psychology students in higher education. *Personality and Individual Differences*, *9*, 1057–1068. doi: [10.1016/S0191-8869\(99\)00253-6](https://doi.org/10.1016/S0191-8869(99)00253-6).
- Chahin, N., Cosi, S., Lorenzo-Seva, U., & Vigil-Colet, A. (2010). Stability of the factor structure of Barrat's Impulsivity Scales for children across

cultures: a comparison of Spain and Colombia. *Psicothema*, 22(4), 983-989.

Chamorro-Premuzic, T., & Furnham, A. (2003a). Personality predicts academic performance: Evidence from two longitudinal university samples. *Journal of Research in Personality*, 37(4), 319-338.

doi: [10.1016/S0092-6566\(02\)00578-0](https://doi.org/10.1016/S0092-6566(02)00578-0)

Chamorro-Premuzic, T., & Furnham, A. (2003b). Personality traits and academic exam performance. *European Journal of Personality*, 17, 237-250. doi: [10.1002/per.473](https://doi.org/10.1002/per.473)

Chamorro-Premuzic, T., & Furnham, A. (2005). *Personality and intellectual competence*. New Jersey: Lawrence Erlbaum Associates.

Chowdhury, M. (2006). Students' Personality Traits and Academic Performance: A Five-Factor Model Perspective. *College Quarterly*, 9(3), 1-9.

Cooley, W. W., & Lohnes, P. R. (1971). *Multivariate data analysis*. New York: Wiley.

Courville, T., & Thompson, B. (2001). Use of structure coefficients in published multiple regression articles: β is not enough. *Educational And Psychological Measurement*, 61(2), 229-248.

doi:[10.1177/00131640121971211](https://doi.org/10.1177/00131640121971211)

De Fruyt, F., & Mervielde, I. (1996). Personality and interests as predictors of educational streaming and achievement. *European Journal Of Personality*, 10(5), 405-425. doi: [10.1002/\(SICI\)1099-0984\(199612\)10:5<405::AID-PER255>3.0.CO;2-M](https://doi.org/10.1002/(SICI)1099-0984(199612)10:5<405::AID-PER255>3.0.CO;2-M)

Diseth, Å. (2003). Personality and approaches to learning as predictors of academic achievement. *European Journal of personality*, 17(2), 143-155. doi: [10.1002/per.469](https://doi.org/10.1002/per.469)

Eisenberg, N., Spinrad, T. L., & Eggum, N. D. (2010). Emotion-related self-regulation and its relation to children's maladjustment. *Annual Review of Clinical Psychology*, 6, 495-525.

doi:[10.1146/annurev.clinpsy.121208.131208](https://doi.org/10.1146/annurev.clinpsy.121208.131208)

- Entwistle, N. J. (1997). *The approaches and study skills inventory for students (ASSIST)*. Edinburgh: Centre for Research on Learning and Instruction, University of Edinburgh.
- Eysenck, H. J., & Cookson, D. (1969). Personality in primary school children. *British Journal of Educational Psychology*, 39(2), 109-122. doi: [10.1111/j.2044-8279.1969.tb02055.x](https://doi.org/10.1111/j.2044-8279.1969.tb02055.x)
- Fink, A. D., & McCown, W. G. (1993). Impulsivity in children and adolescents: Measurement, causes and treatment. In W. McCown, M. Shure., & J. Johnson (Eds.), *The impulsive client, theory, research and treatment* (pp. 279-308). Washington, DC: American Psychological Association.
- Furnham, A. & Medhurst, S. (1995). Personality correlates of academic seminar behavior: a study of 4 instruments. *Personality and Individual Differences*, 19, 197-208. doi: [10.1016/0191-8869\(95\)00026-3](https://doi.org/10.1016/0191-8869(95)00026-3)
- Galambos, N. L., MacDonald, S. W., Naphtali, C., Cohen, A. L., & de Frias, C. M. (2005). Cognitive performance differentiates selected aspects of psychosocial maturity in adolescence. *Developmental neuropsychology*, 28(1), 473-492. doi: [10.1207/s15326942dn2801_2](https://doi.org/10.1207/s15326942dn2801_2)
- Geisler-Brenstein, E., & Schmeck, R. (1996). The revised Inventory of Learning Processes: A multifaceted perspective on individual differences in learning. In M. Birenbaum & F. Dochy (Eds.), *Alternatives in assessment of achievements, learning processes and prior knowledge. Evaluation in education and human services* (pp. 283–317). New York: Kluwer Academic.
- Goff, M., & Ackerman, P. (1992). Personality intelligence relations- assessment of typical intellectual engagement. *Journal of Educational Psychology*, 84(4), 537-552. doi: [10.1037/0022-0663.84.4.537](https://doi.org/10.1037/0022-0663.84.4.537)
- Greenberger, E. (1982). Education and the acquisition of psychosocial maturity. In D. McClelland (Ed.), *The development of social maturity* (pp.155-189). New York: Irvington.

Greenberger, E. (1984). Defining psychosocial maturity in adolescence.

Advances in Child Behavioral Analysis & Therapy, 3, 1-37.

Greenberger, E. & Sørensen, A. B. (1973). Educating Children for Adulthood: A concept of psychosocial maturity. *Center for Social Organization of Schools*, 159.

Heaven, P., & Ciarrochi, J. (2012). When IQ is not everything: Intelligence, personality and academic performance at school. *Personality and Individual Differences*, 53(4), 518–522. doi:

[10.1016/j.paid.2012.04.024](https://doi.org/10.1016/j.paid.2012.04.024)

Helmers, K. F., Young, S. N. & Pihl, R. O. (1995). Assessment of measures of impulsivity in healthy male volunteers. *Personality and Individual Differences*, 19, 927-935. doi: [10.1016/S0191-8869\(95\)00107-7](https://doi.org/10.1016/S0191-8869(95)00107-7)

Jensen, A. R. (1980). Uses of sibling data in educational and psychological research. *American Educational Research Journal*, 17, 153-170. doi: [10.3102/00028312017002153](https://doi.org/10.3102/00028312017002153)

Johnson, J. W. (2000). A Heuristic Method for Estimating the Relative Weight of Predictor Variables in Multiple Regression. *Multivariate Behavioral Research*, 35(1), 1-19.

doi: [10.1207/S15327906MBR3501_1](https://doi.org/10.1207/S15327906MBR3501_1)

Kraha, A., Turner, H., Nimon, K., Zientek, L. R., & Henson, R. K. (2012). Tools to support interpreting multiple regression in the face of multicollinearity. *Frontiers in psychology*, 3, 1-16. doi:

[10.3389/fpsyg.2012.00044](https://doi.org/10.3389/fpsyg.2012.00044)

Komarraju, M., Karau, S. J., & Schmeck, R. R. (2009). Role of the Big Five personality traits in predicting college students' academic motivation and achievement. *Learning and Individual Differences*, 19, 47-52. doi:

[10.1016/j.lindif.2008.07.001](https://doi.org/10.1016/j.lindif.2008.07.001)

Laidra, K., Pullmann, H., & Allik, J. (2007). Personality and intelligence as predictors of academic achievement: A cross-sectional study from elementary to secondary school. *Personality and Individual Differences*, 42(3), 441-451. doi: [10.1016/j.paid.2006.08.001](https://doi.org/10.1016/j.paid.2006.08.001)

- Lorenzo-Seva, U., Ferrando, P. J., & Chico, E. (2010). Two SPSS programs for interpreting multiple regression results. *Behaviour Research Methods*, 42(1), 29-35. doi:10.3758/BRM.42.1.29
- Lounsbury, J. W., Huffstetler, B. C., Leong, F. T., & Gibson, L. W. (2005). Sense of identity and collegiate academic achievement. *Journal of College Student Development*, 46(5), 501-514. doi: 10.1353/csd.2005.0051
- McCrae, R., & Costa, P. (1985). Updating Norman's "Adequate Taxonomy": intelligence and personality dimensions in natural language and in questionnaires. *Journal Of Personality And Social Psychology*, 49(3), 710-721. doi: 10.1037/0022-3514.49.3.710
- McMurrin, M., Blair, M., & Egan, V. (2002). An investigation of the correlations between aggression, impulsiveness, social problem-solving, and alcohol use. *Aggressive Behavior*, 28, 439-445. doi: 10.1002/ab.80017
- Morales-Vives, F. (2007). *El efecto de la impulsividad sobre la agresividad y sus consecuencias en el rendimiento de los adolescentes*. Unpublished doctoral dissertation, Universitat Rovira i Virgili, Tarragona, Spain.
- Morales-Vives, F., Camps, E., & Lorenzo-Seva, U. (2012). *Manual del Cuestionario de Madurez Psicológica PSYMAS*. Madrid: TEA Ediciones, S.A.
- Morales-Vives, F., Camps, E., & Lorenzo-Seva, U. (2013). Development and validation of the Psychological Maturity Assessment Scale (PSYMAS). *European Journal of Psychological Assessment*, 29(1), 12-18 doi: 10.1027/1015-5759/a000115.
- Nakamoto, J., & Schwartz, D. (2010). Is Peer Victimization Associated with Academic Achievement? A Meta-analytic Review. *Social Development*, 19(2), 221-242. doi: 10.1111/j.1467-9507.2009.00539.x
- Oh-Hwang, Y. (1994). A cross-cultural study: Linkages among intelligence, psychosocial maturity, parenting practices, and academic achievement

of adolescents. Unpublished doctoral dissertation, Purdue University, Indiana, United States.

Pind, J., Gunnarsdóttir, E. K., & Jóhannesson, H. S. (2003). Raven's Standard Progressive Matrices: new school age norms and a study of the test's validity. *Personality and Individual Differences*, 34(3), 375-386. doi: [10.1016/S0191-8869\(02\)00058-2](https://doi.org/10.1016/S0191-8869(02)00058-2)

Poropat, A. E. (2009). A meta-analysis of the five-factor model of personality and academic performance. *Psychological bulletin*, 135(2), 322. doi: [10.1037/a0014996](https://doi.org/10.1037/a0014996)

Rindermann, H., & Neubauer, A. C. (2001). The influence of personality on three aspects of cognitive performance: Processing speed, intelligence and school performance. *Personality and Individual Differences*, 30(5), 829-842. Doi: [10.1016/S0191-8869\(00\)00076-3](https://doi.org/10.1016/S0191-8869(00)00076-3)

Romano, E., Babchishin, L., Pagani, L. S., & Kohen, D. (2010). School readiness and later achievement: Replication and extension using a nationwide Canadian survey. *Developmental Psychology*, 46(5), 995. doi: [10.1037/a0018880](https://doi.org/10.1037/a0018880)

Rosander, P., Bäckström, M., & Stenberg, G. (2011). Personality traits and general intelligence as predictors of academic performance: A structural equation modelling approach. *Learning and Individual Differences*, 21(5), 590-596. doi: [10.1016/j.lindif.2011.04.004](https://doi.org/10.1016/j.lindif.2011.04.004)

Rothstein, M. V., Paunonen, S.V., Rush, S.V., & King, G.A. (1994). Personality and cognitive ability predictors of performance in graduate business school. *Journal Of Educational Psychology*, 86(4), 516-530. doi: [10.1037/0022-0663.86.4.516](https://doi.org/10.1037/0022-0663.86.4.516)

Sánchez, M. M., Rejano, E. I., & Rodríguez, Y. T. (2001). Personality and academic productivity in the university student. *Social Behavior and Personality: an international journal*, 29(3), 299-305.

Steinberg, L., Elmen, J. D., & Mounts, N. S. (1989). Authoritative parenting, psychosocial maturity, and academic success among adolescents. *Child development*, 60(6), 1424-1436. doi: [10.2307/1130932](https://doi.org/10.2307/1130932)

- Steinmayr, R., & Spinath, B. (2009). The importance of motivation as a predictor of school achievement. *Learning and Individual Differences, 19*(1), 80-90. doi: [10.1016/j.lindif.2008.05.004](https://doi.org/10.1016/j.lindif.2008.05.004)
- Strenze, T. (2007). Intelligence and socioeconomic success: A meta-analytic review of longitudinal research. *Intelligence, 35*(5), 401-426. doi: [10.1016/j.intell.2006.09.004](https://doi.org/10.1016/j.intell.2006.09.004)
- Swanberg, A. B., & Martinsen, Ø. L. (2010). Personality, approaches to learning and achievement. *Educational Psychology, 30*(1), 75-88. doi: [10.1080/01443410903410474](https://doi.org/10.1080/01443410903410474)
- Thurstone, L. L. (1938). *Primary Mental Abilities*. Chicago: University of Chicago Press. (Adaptación española: *Aptitudes mentales primarias*. Madrid: TEA, 1989).
- Valiente, C., Eisenberg, N., Spinrad, T. L., Haugen, R. G., Thompson, M. S., & Kupfer, A. (2013). Effortful Control and Impulsivity as Concurrent and Longitudinal Predictors of Academic Achievement. *The Journal of Early Adolescence, 33*(7), 946–972. doi: [10.1177/0272431613477239](https://doi.org/10.1177/0272431613477239)
- Vigil-Colet, A., & Morales-Vives, F. (2005). How impulsivity is related to intelligence and academic achievement. *The Spanish Journal Of Psychology, 8*(2), 199-204.
- Vigil-Colet, A., Morales-Vives, F., Camps, E., Tous, J., & Lorenzo-Seva, U. (2013). Development and validation of the overall personality assessment scale (OPERAS). *Psicothema, 25*(1), 100-106. doi: [10.7334/psicothema2011.411](https://doi.org/10.7334/psicothema2011.411)
- Wagerman, S. A., & Funder, D. C. (2007). Acquaintance reports of personality and academic achievement: A case for conscientiousness. *Journal of Research in Personality, 41*, 221–229. doi: [10.1016/j.jrp.2006.03.001](https://doi.org/10.1016/j.jrp.2006.03.001)
- Zeidner, M. (1995). Personality trait correlates of intelligence. In D. H. Saklofske & M. Zeidner (Eds.), *International handbook of personality and intelligence* (pp. 299-320). New York: Plenum Press.

Elisa Camps is researcher in the Psychology Department at the Universitat Rovira i Virgili.

Fabia Morales-Vives is Professor in the Psychology Department, at the Universitat Rovira i Virgili, and researcher in the Research Center for Behavior Assessment (CRAMC).

Contact Address: Direct correspondence to the author at Universitat Rovira i Virgili, Departament de Psicologia, Campus Sescelades. Carretera de Valls s/n. 43007 Tarragona Spain. E-mail: fabia.morales@urv.cat



Instructions for authors, subscriptions and further details:

<http://ijep.hipatiapress.com>

Reductions in Negative Automatic Thoughts in Students Attending Mindfulness Tutorials Predicts Increased Life Satisfaction

Paul Ritvo^{1,2,3,4,5,6}, Khushboo Vora¹, Jane Irvine^{5,6,7}, Myriam Mongrain⁵, Saam Azargive¹, Muhammad Abid Azam¹, Meysam Pirbaglou¹, Crissa Guglietti¹, Noah Wayne¹, Daniel Felipe Perez¹ & Rob Cribbie⁵

- 1) School of Kinesiology and Health Science, York University, Canada
- 2) Research, Prevention and Cancer Control, Cancer Care Ontario, Canada
- 3) Dalla Lana School of Public Health and Departments of Family and Community Medicine, Psychiatry and Surgery, University of Toronto, Canada
- 4) Divisions of Epidemiology, Biostatistics and Behavioural Science, and Behavioural Health Sciences, University Health Network, Canada
- 5) Department of Psychology, York University, Canada
- 6) Department of Psychiatry, University of Toronto, Canada
- 7) Heart and Stroke/Richard Lewar Centre of Excellence, University of Toront, Canada

Date of publication: October 24th, 2013

Edition period: October 2013 - February 2014

To cite this article: Ritvo, P., et al. (2013). Reductions in Negative Automatic Thoughts in Students Attending Mindfulness Tutorials Predicts Increased Life Satisfaction. *International Journal of Educational Psychology*, 2(3), 272-296. doi: 10.4471/ijep.2013.28

To link this article: <http://dx.doi.org/10.4471/ijep.2013.28>

PLEASE SCROLL DOWN FOR ARTICLE

The terms and conditions of use are related to the Open Journal System and to [Creative Commons Attribution License \(CCAL\)](#).

Reductions in Negative Automatic Thoughts in Students Attending Mindfulness Tutorials Predicts Increased Life Satisfaction

Paul Ritvo, Khushboo Vora, Jane Irvine, Myriam Mongrain, Saam Azargive, Muhammad Abid Azam, Meysam Pirbaglou, Crissa Guglietti, Noah Wayne, Daniel Felipe Perez and Rob Cribbie
York University, Cancer Care Ontario, University of Toronto, University Health Network

Abstract

University education confronts students with stressful developmental challenges that can lead to mental health problems. Innovative programs must address an increasing prevalence of these problems but are impeded by the high costs involved. In this study, thirty-nine undergraduate students attended weekly one hour mindfulness meditation tutorials during a single (14 week) semester. Tutorials involved 40 minutes of guided meditation, followed by open-ended discussions on mindfulness and related scientific research. Multiple regression analysis tested associations between self-reported changes in mindfulness, in negative automatic thoughts and in satisfaction with life. Reductions in automatic thoughts accounted for a significant proportion of variance in life satisfaction and decreases in automatic thoughts were associated with an increased life satisfaction. This finding suggests guided meditation tutorials merit consideration in promoting student mental health on university campuses.

Keywords: Mindfulness, meditation, students, university education, well-being.

Las Reducciones en Pensamientos Automáticos Negativos en Estudiantes que Asisten a Tutorías de Meditación Plena Predice un Incremento en la Satisfacción de Vida

Paul Ritvo, Khushboo Vora, Jane Irvine, Myriam Mongrain, Saam Azargive, Muhammad Abid Azam, Meysam Pirbaglou, Crissa Guglietti, Noah Wayne, Daniel Felipe Perez and Rob Cribbie
York University, Cancer Care Ontario, University of Toronto, University Health Network

Resumen

La educación universitaria requiere que los estudiantes se enfrenten a desafíos significativos del desarrollo que pueden conducir estrés y problemas de salud mental. Los programas innovadores necesitan responder a la creciente prevalencia de estos problemas pero se bloquean por sus costes elevados. En este estudio, treinta y nueve estudiantes asistieron a una hora semanal de tutorías de meditación de conciencia plena durante un semestre (14 semanas). Las tutorías consistían en sesiones de 40 minutos seguidas de discusiones abiertas sobre la conciencia plena e investigaciones científicas relacionadas. El análisis a través de regresiones múltiples destacó asociaciones entre los cambios auto-identificados en relación a la conciencia plena, los pensamientos negativos automáticos, y la satisfacción con la vida. Este resultado sugiere que las tutorías de meditación guiada merecen una consideración en la promoción de la salud mental estudiantil en los campus universitarios.

Palabras clave: Conciencia plena, meditación, estudiantes, educación universitaria, bienestar

In recent years, increasing attention has focused on mental health promotion on university campuses due to an alarmingly elevated prevalence of mental health problems. According to current estimates, almost one third of university students experience symptoms of depressed and anxious mood (Eisenberg, Gollust, Golberstein, & Hefner, 2007) and nearly one quarter display maladaptive perfectionist tendencies (Radhu et al., 2012). As many students are engaging in developmental transitions to adulthood that include coping with new academic, interpersonal, and financial demands (Archer & Lamnin, 1985; Abouserie, 1994), mental health promotion can equip students with adaptive coping resources specific to the stressors confronted.

Although counseling services within universities are well established, the dilemma in higher education concerns the costs and inefficiencies of traditional counseling. According to a recent report on counseling services in Ontario colleges (Lees & Dietsche, 2012), the growth of student enrolment in Ontario universities increased 26 percent between 2007-2012, while budget allocations for counseling resources rose only 4.6 percent. As a result, student-to-counselor ratios range from 1300-1500 students per counselor. Given these proportions, the development of group-based and autonomously practiced mental health promotion practices are an important alternative.

In searching for such approaches, mindfulness meditation has shown significant potential in terms of cost-effectiveness. Mindfulness-Based Stress Reduction (MBSR) (Kabat-Zinn, 1982) has become a widely adopted therapeutic program in North America and Europe, introducing a secularized attention regulation practice that fosters moment-to-moment awareness (Kabat-Zinn, 2003; Kabat-Zinn, 2011). Ultimately, it promotes more objective perceptions less impeded by cognitive distortions and ruminations over past regrets and future uncertainties (Kabat-Zinn, 2003; Kabat-Zinn, 2011). During mindfulness sessions, participants are instructed to focus

attention on breathing sensations as they observe cognitions with an accepting and non-avoidant attitude (Bishop et al., 2004).

Mindfulness meditation has been used in clinical and non-clinical settings to help individuals manage adverse health conditions, counteract anxiety & depression, and prevent depressive relapses (Davidson et al., 2003; Fjorback, Arendt, Ørnbøl, Fink, & Walach, 2011; Kabat-Zinn, 1982; Kabat-Zinn et al., 1998; Ledesma & Kumano, 2009; Sipe & Eisendrath, 2012; Teasdale et al., 2000). Specific outcomes of participation include increased positive affect (Jain et al., 2007; Schroevers & Brandsma, 2010), increased self compassion (Chiesa & Serretti, 2009; Keng, Smoski, Robins, Ekblad, & Brantley, 2012), decreased rumination (Jain et al., 2007) and decreased perceived stress (Lane, Seskevich, & Pieper, 2007; Oman, Shapiro, Thoresen, Plante, & Flinders, 2008). In addition to psychometric outcome research, neuroscientific evidence has linked mindfulness practice to improved attentional stability (Lutz et al., 2009), cortical inhibition (Guglietti, Daskalakis, Radhu, Fitzgerald, & Ritvo, 2013), better working memory capacity, and reduced mind wandering, evidenced by associated improvements on academic tests like the Graduate Record Exam (GRE) (Mrazek, Franklin, Phillips, Baird, & Schooler, 2013). Given these favourable outcomes, mindfulness programs are beginning to be applied in educational environments (Broderick & Metz, 2009; Napoli, Krech, & Holley, 2005).

Taken together, these observations prompted the study aim of assessing the effectiveness of a university-based weekly mindfulness tutorial program. In assessing variables associated with program participation, we were guided by a Cognitive Behaviour Therapy-based model that identifies negative automatic thoughts as an important therapeutic target. Since mindfulness training entails non-judgmental awareness of cognitions, coupled with a reorientation to present-awareness, the negative impacts of automatic thoughts can be reduced, even if cognitive content is not directly modified.

We additionally assessed satisfaction with life as a global measure of mental health in this largely asymptomatic population given its importance as an outcome in university attendees. Overall, it was hypothesized that attendance in weekly mindfulness meditation sessions would improve student's mental health as indicated by reductions in negative automatic thinking and improvements in satisfaction with life.

Methods

Participants

N = 39 participants, [11] males and [28] females, 17 years of age or older, currently enrolled at a university as part-or full-time students were recruited through postings on campus and in-class announcements including informational hand-outs. Recruitment took place in September 2012 with baseline measures administered in September and October, 2012 (T1) and follow-up measures administered during the later part of the semester (November-December) (T2).

Intervention

The tutorials involved mindfulness meditation with instructions for 40 minutes of meditation combined with brief talks about the practice and related research, altogether extending for ~ 60 minutes. Participants could attend tutorial sessions convenient to class schedules and were encouraged to attend via related email correspondence. Meditation tutorials were offered at two campus locations for one hour on Mondays and Wednesdays, and at two separate hours on Tuesday (four hours in total) led by a faculty member and/or graduate students who were experienced practitioners of mindfulness. Tutorial attendance was recorded at each session.

Outcome Variables

The demographics questionnaire focused on undergraduate study major, age, year of schooling, ethnicity, prior meditation experience (hours and frequency of practice), psychological disorders (current or past), psychological counseling (current or past) and use of psychotropic prescription medication (current or past). The psychometric questionnaires assessed anxiety and depression-related cognitions and satisfaction with life.

Anxiety and depression - related cognitions

Automatic thoughts questionnaire (ATQ). The ATQ was developed to evaluate four dimensions of automatic or frequently occurring negative self-statements: a) personal maladjustment and desire for change; b) negative self-concepts and negative expectations; c) low self-esteem; d) helplessness (Hollon & Kendall, 1980).

Positive and negative affect scale (PNAS). The PNAS assesses two important mood dimensions with subscales consisting of 10 items each (Watson, Clark, & Tellegen, 1988). Respondents' rate how they feel in a temporally graduated manner, i.e. right now, today, during the past few days, during the past week, during the past few weeks, during the past year and generally. For this study we chose to ask respondents to indicate how they feel right now, at the present moment. Internal consistency alpha rating for the positive affect portion is .88 and .87 for the negative affect portion of the scale.

Mindfulness attention and awareness scale (MAAS). The MAAS is a 15-item scale designed to examine a core characteristic of mindfulness defined as an open or receptive awareness and attention to what is taking place in the present moment (Brown & Ryan, 2003). The MAAS was found to have

good internal consistency, with alphas ranging of .82 and .87 in student and adult samples respectively and demonstrates convergent and discriminant correlations in the expected direction (Brown & Ryan, 2003).

Satisfaction with Life

Satisfaction with life scale (SWLS). The SWLS assesses a respondents' satisfaction with life (Diener, Emmons, Larsen, & Griffin, 1985), employing five items where each one is rated on a 7-point scale from *strongly disagree* (1) to *strongly agree* (7). SWLS has a two-month test-retest correlation coefficient of .82, and a good internal consistency alpha coefficient of .87 (Diener et al., 1985).

Statistical Analyses

Multiple regression analysis was employed to test associations between changes in mindfulness and automatic thoughts, and the outcome of changes in satisfaction with life. The baseline variables were included as predictors rendering the interpretation of all posttest variables as the amount of change from pretest to posttest (Rausch, Maxwell & Kelley, 2003).

Results

Pre-Post Means for the Psychological Outcomes

Before conducting statistical analyses, all distributions were checked for normality and distributions were found to be normally distributed except for the Automatic Thoughts Questionnaire. The distribution for the latter was normalized with a logarithmic transformation. One participant did not complete the mindfulness measure at outcome, reducing the sample size for this variable to $N = 39$ (Table 1).

Table 1
Pre-Post Means for the Psychological Outcomes

Variable	Pre Mean (SD ^a)	Post Mean (SD)	Paired Sample t-Test
ATQ ^b	54.00 (22.62)	48.85 (21.15)	t(39) = 2.74, p = .009
SWL ^c	21.32 (6.43)	22.42 (7.05)	t(39) = -1.88, p = .067
Mindfulness	62.33 (13.79)	65.05 (10.84)	t(38) = -1.63, p = .110

Notes: ^aSD – Standard Deviation; ^bATQ – Automatic Thoughts Questionnaire; ^cSWL – Satisfaction with Life

Study results suggest attendance at a mindfulness meditation tutorial was associated with reductions in negative automatic thoughts (Automatic Thoughts Questionnaire), which, in turn, predicted increased Satisfaction with Life, as assessed during the latter part of the 3-month semester. In other words, there was observed a significant reduction in negative automatic thoughts (ATQ, Hollon and Kendall, 1980) that was associated with a trend for improvement in Satisfaction with Life (SWLS, Diener, Emmons, Larsen & Griffin, 1985). This observation addressed the principal study prediction, notably that reductions in negative automatic thoughts would be associated with increases in satisfaction with life (SWLS, Diener et al., 1985). A multiple regression analysis tested those associations and used changes in mindfulness and automatic thoughts as predictors of changes in satisfaction with life. Table 2 summarizes the regression analyses. The overall model was significant ($F(5, 38) = 23.997, p < .0001$) but the only predictor variable that accounted for a significant amount of the variance in satisfaction with life at outcome was automatic thoughts whereby a greater decrease (i.e., improvement) in negative automatic thoughts was associated with a greater increase (i.e., improvement) in satisfaction with life, $t(38) = -2.64, p = .013$. Mindfulness assessed as a separate variable was not predictive.

Table 2
Regression Analysis for Satisfaction with Life Outcomes

Predictor Variable	Unstandardized Beta	Std. ^a error	Standardized Beta	p value
Mindfulness	-.129	.077	-.200	.101
ATQ ^b	-17.62	6.68	-.364	.013

Notes: ^aStd. – Standard Error; ^bATQ – Automatic Thoughts Questionnaire; Outcome variable was Satisfaction with Life

Discussion

Study results suggest attendance at a mindfulness meditation tutorial was associated with reductions in negative automatic thoughts (Automatic Thoughts Questionnaire) that predicted increased Satisfaction with Life. This finding follows the hypothesis that the mindfulness tutorial, fundamentally consisting of meditation practice, would help reduce tendencies to engage in nonproductive, self-pejorative cognitions that reduce well-being.

We did not find specific associations between tutorial attendance (more vs. less attendance) and changes in automatic thoughts or satisfaction with life. This could be because the amounts of mindfulness practice likely varied from estimates based on tutorial attendance, as subjects indicated they independently engaged in varying practice levels. Nonetheless, tutorial provision demonstrated a cost-effective way of engaging students in a mental health promoting practice. The attendance of N = 39 students could have readily been scaled up to N = 80 students or N = 160 students without staffing changes. While results don't directly indicate the effectiveness of the mindfulness tutorial process, they indicate a positive adjustment process featuring the attenuation of negative automatic thoughts. While reductions in negative automatic thoughts might seem an intuitive intervention target, findings suggest systematic reductions were statistically associated with a

desirable outcome, i.e. satisfaction with life in the academic context. Future studies of longer duration and careful cost accounting will be useful in analyzing the effect sizes of benefits, their association with the intervention and costs expended per obtained benefits.

Interestingly, although the tutorials were a focus, the Mindfulness Attention and Awareness Scale scores were not correlated with identified benefits. One explanation is the first impact of mindfulness practice is a sensitization effect that can be self-critical in nature such that individuals do not necessarily identify themselves as more mindful. Rather than more directly experiencing the self acceptance that can lead to more positive mood-related self report, their experience of negative mental states occur without the spiraling phenomena whereby pejorative reactions to negative observations are more injurious than the observations themselves.

Mindfulness activates the prefrontal cortex with subsequently increased production/delivery of glutamate (Cheramy & Romo, 1987) stimulating the thalamus to increase secretions of gamma-aminobutyric acid (GABA) into the lateral posterior and geniculate nuclei (Armony & LeDoux, 2000; Cornwall & Phillipson, 1988). Increased GABA is hypothesized to selectively inhibit the visual cortex (Andrews, Halpern, & Purves, 1997) and posterior superior parietal area (Bucci, Conley, & Gallagher, 1999) permitting meditators to more selectively target stimuli, leading to enhanced focal attention (Newburg & Iversen, 2003). Evidence has demonstrated decreased GABA_B receptor activity in individuals with neuropsychiatric diagnoses compared to healthy controls (Barnow et al., 2009; Cryan & Kaupmann, 2005; Daskalakis et al., 2002; Daskalakis et al., 2008; Fatemi, Folsom, & Thuras, 2011; Ghose, Winter, McCarson, Tamminga, & Enna, 2011; Greenberg et al., 2000; Ishikawa, Mizukami, Iwakiri, & Asada, 2005; Klempan et al., 2009; Levinson et al., 2010; Levinson, Young, Fitzgerald, & Daskalakis, 2007; Liu, Fitzgerald, Daigle, Chen, & Daskalakis, 2009; Mizukami et al., 2002; Mizukami et al., 2000; Oblak, Gibbs, & Blatt, 2010; Sequeira et al., 2009; Zai, King, Wong, Barr, & Kennedy, 2005) and,

conversely, increased GABA_B-mediated inhibition associated with clinical improvements attributed to cognitive behavioral therapy (Rhadu et al, 2012), electroconvulsive therapy (Bajbouj et al., 2006), repetitive TMS (Daskalakis et al., 2006) and with clozapine treatment in schizophrenia (Liu et al., 2009; Wu et al., 2011).

Limitations of the current study are largely related to modest sample size, a brief (3 month) intervention and psychometric self-report. In future studies, more advanced designs will be implemented, including randomly allocated comparison groups, longer intervention and follow up periods and neurophysiological measures in combination with psychometric self-report.

References

- Abouserie, R. (1994). Sources and levels of stress in relation to locus of control and self esteem in university students. *Educational Psychology, 14*, 323-330. doi: [10.1080/0144341940140306](https://doi.org/10.1080/0144341940140306)
- Adlaf, E. M., Gliksman, L., Demers, A., & Newton-Taylor, B. (2001). The prevalence of elevated psychological distress among Canadian undergraduates: Findings from the 1998 Canadian Campus Survey. *Journal of American College Health, 50*(2), 67-72. doi: [10.1080/07448480109596009](https://doi.org/10.1080/07448480109596009)
- Andrews, T. J., Halpern, S. D., & Purves, D. (1997). Correlated size variations in human visual cortex, lateral geniculate nucleus, and optic tract. *Journal of Neuroscience, 17*(8), 2859-2868.
- Arch, J. J., & Craske, M. G. (2006). Mechanisms of mindfulness: emotion regulation following a focused breathing induction. *Behavior Research and Therapy, 44*(12), 1849-1858. doi: [10.1016/j.brat.2005.12.007](https://doi.org/10.1016/j.brat.2005.12.007)
- Archer, J., & Lamnin, A. (1985). An investigation of personal and academic stressors on college campuses. *Journal of College Student Development, 26*(3), 210-215.

- Armony, J. L., & LeDoux, J. E. (2000). *The New Cognitive Neurosciences*. Cambridge: MIT Press.
- Bajbouj, M., Lang, U. E., Niehaus, L., Hellen, F. E., Heuser, I., & Neu, P. (2006). Effects of right unilateral electroconvulsive therapy on motor cortical excitability in depressive patients. *Journal of Psychiatric Research*, 40(4), 322-327. doi: [10.1016/j.jpsychires.2005.07.002](https://doi.org/10.1016/j.jpsychires.2005.07.002)
- Barnow, S., Volker, K. A., Moller, B., Freyberger, H. J., Spitzer, C., Grabe, H. J., & Daskalakis, Z. J. (2009). Neurophysiological correlates of borderline personality disorder: a transcranial magnetic stimulation study. *Biological Psychiatry*, 65(4), 313-318. doi: [10.1016/j.biopsych.2008.08.016](https://doi.org/10.1016/j.biopsych.2008.08.016)
- Baron Short, E., Kose, S., Mu, Q., Borckardt, J., Newberg, A., George, M. S., & Kozel, F. A. (2010). Regional brain activation during meditation shows time and practice effects: an exploratory FMRI study. *Evidence-Based Complementary and Alternative Medicine*, 7(1), 121-127. doi: [10.1093/ecam/nem163](https://doi.org/10.1093/ecam/nem163)
- Berger, H. (1930). *Journal of Psychology and Neurology*, 40, 160-179.
- Bishop, S. R., Lau, M., Shapiro, S., Carlson, L., Anderson, N. D., Carmody, J., Devins, G. (2004). Mindfulness: A proposed operational definition. *Clinical Psychology-Science and Practice*, 11(3), 230-241. doi: [10.1093/clipsy.bph077](https://doi.org/10.1093/clipsy.bph077)
- Broderick, P. C., & Metz, S. (2009). Learning to BREATHE: a pilot trial of a mindfulness curriculum for adolescents. *Advances in School Mental Health Promotion*, 2, 35-46. doi: [10.1080/1754730X.2009.9715696](https://doi.org/10.1080/1754730X.2009.9715696)
- Brown, K. W., & Ryan, R. M. (2003). The benefits of being present: Mindfulness and its role in psychological well-being. *Journal of Personality and Social Psychology*, 84, 822-848.
- Bucci, D. J., Conley, M., & Gallagher, M. (1999). Thalamic and basal forebrain cholinergic connections of the rat posterior parietal cortex. *NeuroReport*, 10(5), 941-945.
- Cheramy, A., & Romo, R. (1987). Role of corticostriatal glutamatergic neurons in the presynaptic control of dopamine release. In M. Sandler,

- C. Feuerstein & Scatton (Eds.) *Neurotransmitter Interactions in the Basal Ganglia*. New York: Raven Press.
- Chiesa, A., & Serretti, A. (2009). Mindfulness-based stress reduction for stress management in healthy people: A review and meta-analysis. *Journal of Alternative and Complementary Medicine*, 15(5), 593-600.
- Cooper, N. R., Burgess, A. P., Croft, R. J., & Gruzelier, J. H. (2006). Investigating evoked and induced electroencephalogram activity in task-related alpha power increases during an internally directed attention task. *NeuroReport*, 17(2), 205-208.
- Cooper, N. R., Croft, R. J., Dominey, S. J., Burgess, A. P., & Gruzelier, J. H. (2003). Paradox lost? Exploring the role of alpha oscillations during externally vs. internally directed attention and the implications for idling and inhibition hypotheses. *International Journal of Psychophysiology*, 47(1), 65-74.
- Cornwall, J., & Phillipson, O. T. (1988). Mediodorsal and reticular thalamic nuclei receive collateral axons from prefrontal cortex and laterodorsal tegmental nucleus in the rat. *Neuroscience Letters*, 88(2), 121-126.
- Creswell, J. D., Way, B. M., Eisenberger, N. I., & Lieberman, M. D. (2007). Neural correlates of dispositional mindfulness during affect labeling. *Psychosomatic Medicine*, 69(6), 560-565. doi: [10.1097/PSY.0b013e3180f6171f](https://doi.org/10.1097/PSY.0b013e3180f6171f)
- Cryan, J. F., & Kaupmann, K. (2005). Don't worry 'B' happy!: a role for GABA(B) receptors in anxiety and depression. *Trends in Pharmacological Sciences*, 26(1), 36-43.
- Daskalakis, Z. J., Christensen, B. K., Chen, R., Fitzgerald, P. B., Zipursky, R. B., & Kapur, S. (2002). Evidence for impaired cortical inhibition in schizophrenia using transcranial magnetic stimulation. *Archives of General Psychiatry*, 59(4), 347-354.
- Daskalakis, Z. J., Farzan, F., Barr, M. S., Rusjan, P. M., Favalli, G., Levinson, A. J., & Fitzgerald, P. B. (2008). Evaluating the relationship between long interval cortical inhibition, working

memory and gamma band activity in the dorsolateral prefrontal cortex. *Clinical EEG & Neuroscience Journal*, 39(3), 150-155.

Daskalakis, Z. J., Fitzgerald, P. B., & Christensen, B. K. (2007). The role of cortical inhibition in the pathophysiology and treatment of schizophrenia. *Brain Research Reviews*, 56(2), 427-442.

Daskalakis, Z. J., Moller, B., Christensen, B. K., Fitzgerald, P. B., Gunraj, C., & Chen, R. (2006). The effects of repetitive transcranial magnetic stimulation on cortical inhibition in healthy human subjects. *Experimental Brain Research*, 174(3), 403-412.

Davidson, R. J., Kabat-Zinn, J., Schumacher, J., Rosenkranz, M., Muller, D., Santorelli, S. F., Sheridan, J. F. (2003). Alterations in brain and immune function produced by mindfulness meditation. *Psychosomatic Medicine*, 65(4), 564-570.

DeFelipe, J., Conley, M., & Jones, E. (1986). Long-range focal collateralization of axons arising from corticocortical cells in monkey sensory-motor cortex. *The Journal of Neuroscience*, 6(12), 3749-3766.

Diener, E., Emmons, R., Larsen, J., & Griffin, S. (1985). The Satisfaction With Life Scale. *J Personality Assessment*, 49(1), 71-75

Duclos, S., Laird, J., Schneider, E., Sexter, H., Stern, L., & Van Lighten, O. (1989). Emotion specific effects of facial expression and posture on emotional experience. *Journal of Personality and Social Psychology*, 57(1), 100-108.

Eisenberg, D., Gollust, S. E., Golberstein, E., & Hefner, J. L. (2007). Prevalence and correlates of depression, anxiety, and suicidality among university students. *American Journal of Orthopsychiatry*, 77(4), 534-542. doi: 10.1037/0002-9432.77.4.534

Ekman, P. (1992). Facial expressions of emotion: an old controversy and new findings. *Philosophical Transactions of the Royal Society of London. Series B, Biological Sciences*, 335(1273), 63-69. doi: 10.1098/rstb.1992.0008.

- Ekman, P. (1993). Facial expression and emotion. *American Psychologist*, 48(4), 384-392. doi: 10.1037/0003-066X.48.4.384
- Ekman, P., & Davidson, R. J. (1993). Voluntary smiling changes regional brain activity. *Psychological Science*, 4(5), 342-345. doi: 10.1111/j.1467-9280.1993.tb00576.x.
- Elias, A., & Wilson, A. (1995). Serum hormonal concentrations following transcendental meditation - potential role of gamma aminobutyric acid. *Medical Hypotheses*, 44(4), 287-291. doi: 10.1016/0306-9877(95)90181-7.
- Elias, A., Guich, S., & Wilson, A. (2000). Ketosis with enhanced GABAergic tone promotes physiological changes in transcendental meditation. *Medical Hypotheses*, 54(4), 660-662. doi: 10.1016/0306-9877(95)90181-7.
- Fatemi, S. H., Folsom, T. D., & Thuras, P. D. (2011). Deficits in GABA(B) receptor system in schizophrenia and mood disorders: a postmortem study. *Schizophrenia Research*, 128(1-3), 37-43. doi: S0920-9964(11)00019-3.
- Fjorback, L. O., Arendt, M., Ornbol, E., Fink, P., & Walach, H. (2011). Mindfulness-Based stress reduction and mindfulness-based cognitive therapy - a systematic review of randomized controlled trials. *Acta Psychiatrica Scandinavica*, 124(2), 102-119. doi: 10.1111/j.1600-0447.2011.01704.x.
- Franek, M., Vaculin, S., & Rokyta, R. (2004). GABA(B) receptor agonist baclofen has non-specific antinociceptive effect in the model of peripheral neuropathy in the rat. *Physiological Research*, 53(3), 351-355.
- Ghose, S., Winter, M. K., McC Carson, K. E., Tamminga, C. A., & Enna, S. J. (2011). The GABAB receptor as a target for antidepressant drug action. *British Journal of Pharmacology*, 162(1), 1-17. doi: BPH1004.
- Greenberg, B. D., Ziemann, U., Cora-Locatelli, G., Harmon, A., Murphy, D. L., Keel, J. C., & Wassermann, E. M. (2000). Altered cortical

excitability in obsessive-compulsive disorder. *Neurology*, 54(1), 142-147. doi: [10.1212/WNL.54.1.142](https://doi.org/10.1212/WNL.54.1.142).

Guglietti, C.L., Daskalakis, Z.J., Radhu, N., Fitzgerald, P.B., & Ritvo, P. (2012). Meditation-related Increases in GABA B modulated cortical inhibition. *Brain Stimulation*, 6(3), 397-402. doi: [10.1016/j.brs.2012.08.005](https://doi.org/10.1016/j.brs.2012.08.005).

Hajcak, G., Dunning, J. P., & Foti, D. (2007). Neural response to emotional pictures is unaffected by concurrent task difficulty: an event-related potential study. *Behavioral Neuroscience*, 121(6), 1156-1162. doi: [2007-18058-002](https://doi.org/2007-18058-002).

Hariri, A. R., Mattay, V. S., Tessitore, A., Fera, F., & Weinberger, D. R. (2003). Neocortical modulation of the amygdala response to fearful stimuli. *Biological Psychiatry*, 53(6), 494-501. doi: [S0006322302017869](https://doi.org/S0006322302017869).

Hebert, R., Lehmann, D., Tan, G., Travis, F., & Arenander, A. (2005). Enhanced EEG alpha time-domain phase synchrony during Transcendental meditation: Implications for cortical integration theory. *Signal Processing*, 85, 2213-2232. doi: [10.1016/j.sigpro.2005.07.009](https://doi.org/10.1016/j.sigpro.2005.07.009).

Hess, U., Banse, R, Kappas, A. (1995). The intensity of facial expression is determined by underlying affective state and social situation. *Journal of Personality and Social Psychology*, 69(2), 280-288. doi: [10.1037/0022-3514.69.2.280](https://doi.org/10.1037/0022-3514.69.2.280).

Hollon, S. D., & Kendall, P. C. (1980). Cognitive self-statements in depression: Development of an automatic thoughts questionnaire. *Cognitive Therapy and Research*, 4, 383-395.

Ishikawa, M., Mizukami, K., Iwakiri, M., & Asada, T. (2005). Immunohistochemical and immunoblot analysis of gamma-aminobutyric acid B receptor in the prefrontal cortex of subjects with schizophrenia and bipolar disorder. *Neuroscience Letters*, 383(3), 272-277. doi: [S0304-3940\(05\)00417-9](https://doi.org/S0304-3940(05)00417-9).

- Izard, C. E. (1990). Facial expressions and the regulation of emotions. *Journal of Personality and Social Psychology*, 58(3), 487-498. doi:10.1037/0022-3514.58.3.487.
- Jain, S., Shapiro, S. L., Swanick, S., Roesch, S. C., Mills, P.J., Bell, I., & Schwartz, G.E. (2007). A randomized controlled trial of mindfulness meditation versus relaxation training: Effects on distress, positive states of mind, Rumination, and distraction. *Annals of Behavioral Medicine*, 33(1), 11-21. doi: 10.1207/s15324796abm3301_2.
- Jha, A. P., Krompinger, J., & Baime, M. J. (2007). Mindfulness training modifies subsystems of attention. *Cognitive, Affective, & Behavioral Neuroscience*, 7(2), 109-119. doi: 10.3758/CABN.7.2.109.
- Kabat-Zinn, J. (1982). An outpatient program in behavioural medicine for chronic pain patients based practice of mindfulness meditation: Theoretical considerations and preliminary results. *General Hospital Psychiatry*, 4(1), 33-47.
- Kabat-Zinn, J. (2003). Mindfulness-based interventions in context: Past, present, and future. *Clinical Psychology-Science and Practice*, 10(2), 144-156. doi: 10.1093/clipsy.bpg016.
- Kabat-Zinn, J. (2011). *Mindfulness for beginners: Reclaiming the present moment and your life*. Boulder: Sounds True.
- Kabat-Zinn, J., Wheeler, E., Light, T., Skillings, A., Scharf, M. J., Cropley, T. G., Bernhard, J. D. (1998). Influence of a mindfulness meditation-based stress reduction intervention on rates of skin clearing in patients with moderate to severe psoriasis undergoing phototherapy (UVB) and photochemotherapy (PUVA). *Psychosomatic Medicine*, 60(5), 625-632.
- Keng, S.L., Smoski, M.J., Robins, C.J., Ekblad, A.J., & Brantley, J.G. (2012). Mechanisms of Change in Mindfulness-Based Stress Reduction: Self-Compassion and Mindfulness as Mediators of Intervention Outcomes. *Journal of Cognitive Psychotherapy*, 26(3), 270-280. doi: 10.1891/0889-8391.26.3.270.

- Klempman, T. A., Sequeira, A., Canetti, L., Lalovic, A., Ernst, C., French-Mullen, J., & Turecki, G. (2009). Altered expression of genes involved in ATP biosynthesis and GABAergic neurotransmission in the ventral prefrontal cortex of suicides with and without major depression. *Molecular Psychiatry*, 14(2), 175-189. doi: 4002110.
- Klimesch, W., Sauseng, P., & Hanslmayr, S. (2007). EEG alpha oscillations: the inhibition-timing hypothesis. *Brain Research Reviews*, 53(1), 63-88. doi: S0165-0173(06)00083-X.
- Knight, R. T., Staines, W. R., Swick, D., & Chao, L. L. (1999). Prefrontal cortex regulates inhibition and excitation in distributed neural networks. *Acta Psychologica*, 101(2-3), 159-178. doi: 10.1016/S0001-6918(99)00004-9.
- Lane, J.D., Seskevich, J.E., & Pieper, C.F. (2007). Brief meditation training can improve perceived stress and negative mood. *Alternative Therapies in Health And Medicine*, 13(1), 38-44
- Ledesma, D., & Kumano, H. (2009). Mindfulness-based stress reduction and cancer: a meta-analysis. *Psycho-Oncology*, 18(6), 571-579. doi: 10.1002/pon.1400.
- Lees, J., & Dietsche, P. (2012). *An analysis of counselling services in Ontario colleges: Initial report*. Retrieved from <http://www.occ-ccco.ca>
- Levinson, A. J., Fitzgerald, P. B., Favalli, G., Blumberger, D. M., Daigle, M., & Daskalakis, Z. J. (2010). Evidence of cortical inhibitory deficits in major depressive disorder. *Biological Psychiatry*, 67(5), 458-464.
- Levinson, A. J., Young, L. T., Fitzgerald, P. B., & Daskalakis, Z. J. (2007). Cortical inhibitory dysfunction in bipolar disorder: a study using transcranial magnetic stimulation. *Journal of Clinical Psychopharmacology*, 27(5), 493-497. doi: S0006-3223(09)01152-4.
- Liu, S. K., Fitzgerald, P. B., Daigle, M., Chen, R., & Daskalakis, Z. J. (2009). The relationship between cortical inhibition, antipsychotic

- treatment, and the symptoms of schizophrenia. *Biological Psychiatry*, 65(6), 503-509. doi: [S0006-3223\(08\)01104-9](https://doi.org/10.1016/j.biopsych.2008.08.011).
- Lutz, A., Brefczynski-Lewis, J., Johnstone, T., & Davidson, R. J. (2008). Regulation of the neural circuitry of emotion by compassion meditation: effects of meditative expertise. *PLoS One*, 3(3), e1897. doi: [10.1371/journal.pone.0001897](https://doi.org/10.1371/journal.pone.0001897).
- Lutz, A., Slagter, H. A., Dunne, J. D., & Davidson, R. J. (2008). Attention regulation and monitoring in meditation. *Trends in Cognitive Sciences*, 12(4), 163-169. doi: [S1364-6613\(08\)00052-1](https://doi.org/10.1016/j.tics.2008.08.005).
- Lutz, A., Slagter, H.A., Rawlings, N.B., Francis, A.D., Greischar, L.L., & Davidson R.J. (2009). Mental training enhances attentional stability: neural and behavioral evidence. *Journal of Neuroscience*, 29(42), 13418–13427. doi: [10.1523/JNEUROSCI.1614-09.2009](https://doi.org/10.1523/JNEUROSCI.1614-09.2009).
- Mann, E. O., Kohl, M. M., & Paulsen, O. (2009). Distinct roles of GABA(A) and GABA(B) receptors in balancing and terminating persistent cortical activity. *The Journal of Neuroscience*, 29(23), 7513-7518. doi: [29/23/7513](https://doi.org/10.1523/JNEUROSCI.2923-09.2009).
- Markram, H., Toledo-Rodriguez, M., Wang, Y., Gupta, A., Silberberg, G., & Wu, C. (2004). Interneurons of the neocortical inhibitory system. *Nature Reviews Neuroscience*, 5(10), 793-807. doi: [10.1038/nrn1519](https://doi.org/10.1038/nrn1519).
- Matousek, R. H., & Dobkin, P. L. (2010). Weathering storms: a cohort study of how participation in a mindfulness-based stress reduction program benefits women after breast cancer treatment. *Current Oncology*, 17(4), 62-70. doi: [10.3747/co.v17i4.572](https://doi.org/10.3747/co.v17i4.572).
- Mizukami, K., Ishikawa, M., Hidaka, S., Iwakiri, M., Sasaki, M., & Iritani, S. (2002). Immunohistochemical localization of GABAB receptor in the entorhinal cortex and inferior temporal cortex of schizophrenic brain. *Progress in Neuropsychopharmacology & Biological Psychiatry*, 26(2), 393-396. doi: [S0278-5846\(01\)00247-0](https://doi.org/10.1016/S0278-5846(01)00247-0).
- Mizukami, K., Sasaki, M., Ishikawa, M., Iwakiri, M., Hidaka, S., Shiraishi, H., & Iritani, S. (2000). Immunohistochemical localization of gamma-

aminobutyric acid (B) receptor in the hippocampus of subjects with schizophrenia. *Neuroscience Letters*, 283(2), 101-104. doi: [S0304-3940\(00\)00939-3](https://doi.org/10.1016/S0304-3940(00)00939-3).

Mrazek, M.D., Franklin, M.S., Phillips, D.T., Baird, B., & Schooler, J.W. (2013). Mindfulness Training Improves Working Memory Capacity and GRE Performance While Reducing Mind Wandering.

Psychological Science, 24(5), 776-781. doi: [10.1177/0956797612459659](https://doi.org/10.1177/0956797612459659).

Muellbacher, W., Facchini, S., Boroojerdi, B., & Hallett, M. (2000).

Changes in motor cortex excitability during ipsilateral hand muscle activation in humans. *Clinical Neurophysiology*, 111(2), 344-349. doi: [S1388-2457\(99\)00243-6](https://doi.org/10.1016/S1388-2457(99)00243-6).

Napoli, M., Krech, P. R., & Holley, L. C. (2005). Mindfulness training for elementary school students: The Attention Academy. *Journal of Applied School Psychology*, 21(1), 99-125. doi:

[10.1300/J370v21n01_05](https://doi.org/10.1300/J370v21n01_05).

Newberg, A., Alavi, A., Baime, M., Pourdehnad, M., Santanna, J., & d'Aquili, E. (2001). The measurement of regional cerebral blood flow during the complex cognitive task of meditation: a preliminary SPECT study. *Psychiatry Research*, 106(2), 113-122. doi: [S0925492701000749](https://doi.org/10.1016/S0925492701000749).

Newburg, A., & Iversen, J. (2003). The neural basis of the complex mental task of meditation: neurotransmitter and neurochemical considerations *Medical Hypotheses*, 61(2), 282-291. doi:[10.1016/S0306-9877\(03\)00175-0](https://doi.org/10.1016/S0306-9877(03)00175-0).

Niedermeyer, E. (1999). The normal EEG of the waking adult. In *Electroencephalography: Basic principles, clinical applications, and related fields* (pp. 149-173). E. Niedermeyer & F. Lopes da Silva (Eds.). Baltimore: Williams and Wilkins.

- Oblak, A. L., Gibbs, T. T., & Blatt, G. J. (2010). Decreased GABA(B) receptors in the cingulate cortex and fusiform gyrus in autism. *Journal of Neurochemistry*, 114(5), 1414-1423. doi: [JNC6858](https://doi.org/10.1111/j.1471-4141.2010.07188.x).
- Oman, D., Shapiro, S.L., Thoresen, C.E., Plante, T.G., & Flinders, T. (2008). Meditation lowers stress and supports forgiveness among college students: a randomized controlled trial. *Journal of American College Health*, 56(5), 569-578. doi: [10.3200/JACH.56.5.569-578](https://doi.org/10.3200/JACH.56.5.569-578).
- Papez, J. W. (1995). A proposed mechanism of emotion. 1937. *Journal of Neuropsychiatry & Clinical Neuroscience*, 7(1), 103-112.
- Pouille, F., & Scanziani, M. (2001). Enforcement of temporal fidelity in pyramidal cells by somatic feed-forward inhibition. *Science*, 293(5532), 1159-1163. doi: [10.1126/science.1060342](https://doi.org/10.1126/science.1060342)
- Quinn, N., Wilson, A., Mac Intyre, G., & Tinklin, T. (2009). People look at you differently: Students' experience of mental health support within Higher Education. *British Journal of Guidance & Counselling*, 37(4), 405-418. doi: [10.1080/03069880903161385](https://doi.org/10.1080/03069880903161385).
- Radhu, N., Daskalakis, Z. J., Guglietti, C. L., Farzan, F., Barr, M. S., Arpin-Cribbie, C. A., Ritvo, P. (2012). Cognitive behavioral therapy-related increases in cortical inhibition in problematic perfectionists. *Brain stimulation*, 5(1), 44-54. doi: [10.1016/j.brs.2011.01.006](https://doi.org/10.1016/j.brs.2011.01.006).
- Ray, W. J., & Cole, H. W. (1985). EEG alpha activity reflects attentional demands, and beta activity reflects emotional and cognitive processes. *Science*, 228(4700), 750-752. doi: [10.1126/science.3992243](https://doi.org/10.1126/science.3992243).
- Rausch, J. R., Maxwell, S. E., & Kelley, K. (2003). Analytic methods for questions pertaining to a pretest posttest follow-up design. *Journal of Clinical Child and Adolescent Psychology*, 32, 467-486.
- Rosenzweig, S., Greeson, J. M., Reibel, D. K., Green, J. S., Jasser, S. A., & Beasley, D. (2010). Mindfulness-based stress reduction for chronic pain conditions: variation in treatment outcomes and role of home meditation practice. *Journal of Psychosomatic Research*, 68(1), 29-36. doi: [10.1016/j.jpsychores.2009.03.010](https://doi.org/10.1016/j.jpsychores.2009.03.010).

- Rossignol, E. (2011). Genetics and function of neocortical GABAergic interneurons in neurodevelopmental disorders. *Neural Plasticity*, 649325. doi: [10.1155/2011/649325](https://doi.org/10.1155/2011/649325).
- Rothbart, M. K., Sheese, B. E., Rueda, M. R., & Posner, M. I. (2011). Developing Mechanisms of Self-Regulation in Early Life. *Emotion Review*, 3(2), 207-213. doi: [10.1177/1754073910387943](https://doi.org/10.1177/1754073910387943).
- Rudy, B., Fishell, G., Lee, S., & Hjerling-Leffler, J. (2010). Three groups of interneurons account for nearly 100% of neocortical GABAergic neurons. *Developmental Neurobiology*. doi: [10.1002/dneu.20853](https://doi.org/10.1002/dneu.20853).
- Schieber, M. H., & Hibbard, L. S. (1993). How somatotopic is the motor cortex hand area. *Science*, 261(5120), 489-492. doi: [10.1126/science.8332915](https://doi.org/10.1126/science.8332915).
- Schroevers, M.J. & Brandsma, R. (2010). Is learning mindfulness associated with improved affect after mindfulness-based cognitive therapy? *British Journal of Psychology*, 101, 95-107. doi: [10.1348/000712609X424195](https://doi.org/10.1348/000712609X424195).
- Sequeira, A., Mamdani, F., Ernst, C., Vawter, M. P., Bunney, W. E., Lebel, V., Turecki, G. (2009). Global brain gene expression analysis links glutamatergic and GABAergic alterations to suicide and major depression. *PLoS One*, 4(8), e6585.
- Siebner, H. R., Dressnandt, J., Auer, C., & Conrad, B. (1998). Continuous intrathecal baclofen infusions induced a marked increase of the transcranially evoked silent period in a patient with generalized dystonia. *Muscle Nerve*, 21(9), 1209-1212. doi: [10.1002/\(SICI\)1097-4598\(199809\)21:9<1209::AID-MUS15>3.0.CO;2-M](https://doi.org/10.1002/(SICI)1097-4598(199809)21:9<1209::AID-MUS15>3.0.CO;2-M).
- Sipe, W. E. B., & Eisendrath, S. J. (2012). Mindfulness-Based Cognitive Therapy: Theory and Practice. *Canadian Journal of Psychiatry-Revue Canadienne De Psychiatrie*, 57(2), 63-69.
- Tang, Y. Y., Lu, Q., Geng, X., Stein, E. A., Yang, Y., & Posner, M. I. (2010). Short-term meditation induces white matter changes in the

- anterior cingulate. *Proceedings of the National Academy of Sciences*, 107(35), 15649-15652. doi: [10.1073/pnas.1011043107](https://doi.org/10.1073/pnas.1011043107).
- Tang, Y., Ma, Y., Wang, J., Fan, Y., Feng, S., & Lu, Q. (2007). Short-term meditation training improves attention and self-regulation. *Proceedings of the National Academy of Sciences*, 104, 17152-17156.
- Teasdale, J. D., Segal, Z.V., Williams, J.G., Ridgeway, V.A., Soulsby, J. M., & Lau, M.A. (2000). Prevention of Relapse/Recurrence in Major Depression by Mindfulness-Based Cognitive Therapy. *Journal of Consulting and Clinical Psychology*, 68(4), 615-623.
- Travis, F., & Wallace, R. K. (1999). Autonomic and EEG patterns during eyes-closed rest and transcendental meditation (TM) practice: the basis for a neural model of TM practice. *Consciousness & Cognition*, 8(3), 302-318. doi: [10.1037/0022-006X.68.4.615](https://doi.org/10.1037/0022-006X.68.4.615).
- Travis, F., Arenander, A., & DuBois, D. (2004). Psychological and physiological characteristics of a proposed object-referral/self-referral continuum of self-awareness. *Consciousness & Cognition*, 13(2), 401-420. doi: [10.1016/j.concog.2004.03.001](https://doi.org/10.1016/j.concog.2004.03.001).
- Valentine, E., & Sweet, P. (1999). Meditation and attention: A comparison of the effects of concentrative and mindfulness meditation on sustained attention. *Mental Health, Religion, & Culture*, 2, 59-70. doi: [10.1080/13674679908406332](https://doi.org/10.1080/13674679908406332).
- von Stein, A., Chiang, C., & Konig, P. (2000). Top-down processing mediated by interareal synchronization. *Proceedings of the National Academy of Sciences*, 97(26), 14748-14753. doi: [10.1073/pnas.97.26.1474897/26/14748](https://doi.org/10.1073/pnas.97.26.1474897/26/14748)
- Wallace, R. K. (1970). Physiological effects of transcendental meditation. *Science*, 167(926), 1751-1754. doi: [10.1126/science.167.3926.1751](https://doi.org/10.1126/science.167.3926.1751).
- Wallace, R. K., Benson, H., & Wilson, A. F. (1971). A wakeful hypometabolic physiologic state. *American Journal of Physiology*, 221(3), 795-799.

- Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology*, 54(6), 1063-1070.
- Wehr, M., & Zador, A. M. (2003). Balanced inhibition underlies tuning and sharpens spike timing in auditory cortex. *Nature*, 426(6965), 442-446. doi: [10.1038/nature02116](https://doi.org/10.1038/nature02116).
- Wilkins, A. J., Shallice, T., & McCarthy, R. (1987). Frontal lesions and sustained attention. *Neuropsychologia*, 25(2), 359-365.
- Wu, Y., Blichowski, M., Daskalakis, Z. J., Wu, Z., Liu, C. C., Cortez, M. A., & Snead, O. C. (2011). Evidence that clozapine directly interacts on the GABAB receptor. *NeuroReport*, 22(13), 637-641. doi: [10.1097/WNR.0b013e328349739b](https://doi.org/10.1097/WNR.0b013e328349739b).
- Xue, S., Tang, Y. Y., & Posner, M. I. (2011). Short-term meditation increases network efficiency of the anterior cingulate cortex. *NeuroReport*, 22(12), 570-574. doi: [10.1097/WNR.0b013e328348c750](https://doi.org/10.1097/WNR.0b013e328348c750).
- Zai, G., King, N., Wong, G. W., Barr, C. L., & Kennedy, J. L. (2005). Possible association between the gamma-aminobutyric acid type B receptor 1 (GABBR1) gene and schizophrenia. *European Neuropsychopharmacology*, 15(3), 347-352. doi: [S0924-977X\(05\)00005-2](https://doi.org/S0924-977X(05)00005-2).

Paul Ritvo is Associate Professor in the School of Kinesiology and Health Science, Department of Psychology at York University, as well as Senior Scientist at Cancer Care Ontario.

Khushboo Vora is an M. Sc candidate and a researcher in the School of Kinesiology and Health Science, at York University.

Jane Irvine is an Associate Professor in the School of Kinesiology and Health Science & the Department of Psychology at York University.

Myriam Mongrain is an Associate Professor in the Department of Psychology at York University.

Saam Azargive is an M. Sc candidate and a researcher in the School of Kinesiology and Health Science, at York University.

Muhammad Abid Azam is an M. Sc candidate and a researcher in the School of Kinesiology and Health Science, at York University.

Meysam Pirbaglou is a PhD candidate and researcher in the School of Kinesiology and Health Science, at York University.

Crissa Guglietti is a PhD graduate, researcher and lecturer at York University.

Noah Wayne is a PhD candidate and a researcher in the School of Kinesiology and Health Science at York University.

Daniel Felipe Perez is a PhD candidate and researcher in the School of Kinesiology and Health Science at York University.

Rob Cribbie is a Professor in the Department of Psychology at York University.

Contact Address: Direct correspondence to Paul Ritvo at School of Kinesiology and Health Science, 357 Bethune College, 4700 Keele St., Toronto, Ontario, Canada, M3J 1P3 (Canada). E-mail address: pritvo@yorku.ca



Instructions for authors, subscriptions and further details:

<http://ijep.hipatiapress.com>

Effects of Peer Tutoring on Reading Self-Concept

Marta Flores & David Duran¹

1) Department of Basic, Developmental and Educational Psychology.
Universitat Autònoma de Barcelona, Spain.

Date of publication: October 24th, 2013

Edition period: October 2013 - February 2014

To cite this article: Flores, M., & Duran, D. (2013). Effects of Peer Tutoring on Reading Self-Concept. *International Journal of Educational Psychology*, 2(3), 297-324. doi: 10.4471/ijep.2013.29

To link this article: <http://dx.doi.org/10.4471/ijep.2013.29>

PLEASE SCROLL DOWN FOR ARTICLE

The terms and conditions of use are related to the Open Journal System and to [Creative Commons Attribution License](#) (CCAL).

Effects of Peer Tutoring on Reading Self-Concept

Marta Flores & David Duran
Universitat Autònoma de Barcelona

Abstract

This study investigates the development of the Reading Self-Concept and of the mechanisms underlying it, within a framework of a reading programme based on peer tutoring. The multiple methodological design adopted allowed for a quantitative approach which showed statistically significant changes in the Reading Self-Concept of those students who played the role of tutor in fixed peer tutoring. The qualitative approach of the analysis suggests that by performing the tutor's role, in an induced work atmosphere, by reading aloud and actively listening, by evaluating their effort, and engaging in meta-cognitive reflective processes, students become aware of their own capabilities and of their possibilities of improvement; thus promoting the development of the tutor's Reading Self-Concept.

Keywords: peer tutoring, reading competence, reading self-concept, metacognition

Incidencia de la Tutoría entre Iguales en el Autoconcepto Lector

Marta Flores & David Duran
Universitat Autònoma de Barcelona

Resumen

En este estudio se indaga sobre la evolución del autoconcepto lector y algunos de los mecanismos responsables de dicho desarrollo en el marco de un programa de lectura basado en la tutoría entre iguales. El diseño de multiplicidad metodológica adoptado permite una aproximación cuantitativa que evidencia cambios estadísticamente significativos en el autoconcepto lector del alumnado que ejerce el rol de tutor en la modalidad de tutoría fija. La aproximación cualitativa de análisis del proceso sugiere que el propio ejercicio del rol de tutor, el clima de trabajo creado, la lectura en voz alta con escucha activa, la valoración del esfuerzo realizado para la mejora, así como los procesos de reflexión metacognitiva en los que participan ambos miembros de la pareja, permiten tomar conciencia de las propias capacidades y posibilidades de mejora; hechos que pueden favorecer el desarrollo del autoconcepto lector de los tutores.

Palabras clave: tutoría entre iguales, competencia lectora, autoconcepto lector, metacognición

Within the framework of inclusive education, cooperative learning stands out as an advantageous methodology to cater for diversity: peers learn from one another in interactive environments structured by the teacher to promote cooperation (Villa, Thousand & Nevin, 2010). In this context, heterogeneity is perceived as a positive element and psychosocial and interactive abilities are developed by utilising peers' potentials as learning engines (Duran & Monereo, 2012).

Topping (1996) defines peer tutoring generically as a cooperative learning method in which people from similar social groups help others to learn, and in so doing they learn by teaching. In a school environment, Duran & Vidal (2004) contextualise peer tutoring as the creation of pairs of students in an asymmetrical relationship, derived from the performance of the tutor or tutee roles, with a common shared goal, which is achieved in the context of a relationship arranged by the teachers. In terms of role continuity, under fixed-role tutoring each student is assigned a permanent role, either as a tutor or tutee; whereas with reciprocal tutoring (Fantuzzo, King & Heller, 1992) both students are required to switch roles.

Peer tutoring has proved to be one of the most effective instructional practices in the achievement of quality education (Topping, 2000). Among this tool's most widely cited benefits are: improved learning of academic competences; promotion of positive attitudes towards learning, teachers and school; development of a more positive self-image; establishment of a relationship of trust and mutual enrichment between tutor and tutee, among others (Goodland & Hirst, 1990; Gordon, 2005).

Like cooperation, reading stands out as one of the key competences in modern society; reading grants people autonomy and it is an essential foundation of education. The reading competence encompasses a range of skills, knowledge and strategies that are attained through life in different contexts and communities in which an individual intervenes and takes part, and in which a reader plays a leading role by reflecting on and interpreting

the meaning of a text (Solé, 2011). A key component of the reading competence is the Reading Self-Concept.

Brookover & Lezotte (1979) have highlighted the great significance that schools attach to self-concept, given that it forms the basis for solid personal, social and professional performance. School experience plays a key role in the development of self-perception, as affirmed by Rath & Nanda (2012). Academic self-concept is regarded as essential (Wouters, Germeijs, Colpin & Verschueren, 2011) and it is indeed considered one the main objectives to achieve in several educational programmes. Self-concept develops from one's own perceptions, stemming from personal assessments and various external factors, which together help configure its form and internal structure. According to Marsh (1986), the development of academic self-concept is marked by simultaneous processes of interpersonal (with others) and intrapersonal (with self) comparisons. Academic motivation and self-concept foster positive attitudes to school in terms of greater participation and task completion, and also of improved attendance (Green, Liem, Martin, Colmar, Marsh & McInerney, 2012).

Similarly, Mandelman, Tan, Kornilov, Sternberg & Grigorenko (2010) state that in addition to external agents (the environment and other significant elements), there is also another key factor likely to have a bearing on the construction of the self-concept; namely, the individual's internally-generated own view, specifically their metacognitive evaluations which, according to these authors, have not been sufficiently researched. Thus, they focus on the impact of the individual's own metacognition on the development of their self-concept. Along these lines, the Reading Self-Concept is constructed depending on the student's response to certain reading challenges. Therefore, a key issue to consider is the Reading Self-Concept's relationship with reading performance. There appears to be a reciprocal influence (Fantuzzo, Tighe & Childs, 2000), by means of which these two constructs feedback into each other, whilst gaining strength from psychosocial and family factors, and also benefiting from specific learning

strategies (McInerney, Cheng, Mok & Lam, 2012).

Recent research (Dabbagh, 2011) confirms the multidimensional configuration of the self-concept and suggests that in their hierarchical organisation, the multiple dimensions tend to be less stable the lower they are placed in the hierarchy. As the Reading Self-Concept stands at a rather stable level, it takes longer to detect any changes taking place, a view which coincides with many reviews of cooperative learning studies that highlight the temporal factor as an important element to consider when detecting changes, thus calling for sufficiently long performances (Johnson & Johnson, 1990; Slavin, 1996; Duran & Monereo, 2008).

In specific contexts of peer tutoring and paired reading, some authors have produced evidence indicating that paired reading can have positive effects on the participants' self-esteem (Miller, Topping & Thurston, 2010; Topping, Miller, Thurston, McGavock & Conlin, 2011). In this context, they have carried out research on the development of self-esteem, observing two dimensions they consider to be interlinked: self-worth and self-competence, which to a certain extent are among those we took into consideration in this study. The results from these previous studies show improvements to self-esteem in all the peer-tutoring participants, according to both the different organisational modes (cross-age/same-age) and the role performed (tutor/tutee). Topping *et al.* (2011) attribute this improvement to the additional reading practice granted by peer tutoring and also to the work situation with a peer, particularly for the students taking on the tutor's role (although not exclusively). Moreover, Miller *et al.* (2010) suggest the need for qualitative research which includes the observation of interactions, in order to be able to assign them meaning and examine the influence they have on improving self-esteem in paired-reading contexts.

The present paper forms part of this context of various contributions to the understanding of self-concept construction, the Reading Self-Concept specifically.

Method

Objectives

Around 200 schools, 600 teachers and thousands of students and their respective families have been involved so far in the *Leemos en pareja* (*Reading in Pairs*) programme (Duran, Blanch, Corcelles, Flores, Oller, Utset & Valdebenito, 2011a) – and its partner programmes in the Basque language *Bikoteka Irakurtzen* (Duran, Blanch, Corcelles, Fernández, Flores, Kerejeta, Moliner & Valdebenito, 2011b) and in Catalan *Llegim en parella* (Duran, Blanch, Corcelles, Flores, Merino, Oller & Vidal, 2009). The programme was created with the aim of improving reading comprehension by means of peer tutoring. It is grounded on three conceptual bases: peer tutoring, reading competence and family involvement, and it also involves a teacher training process implementing peer tutoring. Furthermore, in order to ensure the initiative's success, prior to starting the programme, all students received basic training on its theoretical framework and functioning, with interactive guidelines aimed at creating appropriate scaffolding and tailored support, thus progressively promoting the pairs' autonomy in achieving their learning goals. The programme runs for 12 weeks, with two 30-minute sessions each week, revolving around an Activity Sheet, previously designed by the teachers, which is intended to guide the pairs' interaction and the reading process by means of pre-reading, while-reading and post-reading activities.

The programme's design allows for a sufficiently long intervention so as to consider its possible effect on the Reading Self-Concept of the students taking part in it.

The aims of this study are to examine the changes taking place in the Reading Self-Concept in the context of the *Leemos en pareja* programme and to identify the processes which may be responsible for producing the observed changes.

Design and procedures

Sample. The study involved 577 students (enrolled in years 3 to 6, Primary Education), in addition to 20 teachers, all belonging to 10 schools which took part in the programme during the academic years 08-09, 09-10 and 10-11. This was a representative sample of schools both in terms of funding source (public/state-assisted private) and setting (urban/rural).

The intervention team comprised 441 students, distributed as shown on **Table 1**. The comparison group included 136 students belonging to four of the institutions from the intervention group. Peer tutoring was not implemented in the comparison groups during the intervention period, although they did work on their reading comprehension by using the same Activity Sheets as the intervention group, but only with the usual teaching methodology used in their respective institutions.

Table 1
Distribution of the intervention group

Ac. Year	Institution	Year Group	Type of Tutoring	No. of students
08/09	A	3 and 5	Fixed	81
09/10	B	3 and 4	Fixed	39
	C	3 and 5	Fixed	29
	D	5	Fixed	39
10/11	E	5 and 6	Reciprocal	96
	F	5	Fixed	39
	G	6	Fixed	20

H	5 and 6	Fixed	46
I	3 and 5	Fixed	22
J	5 and 6	Fixed	30
Total			441

Instruments.

- *QALect Reading Self-Concept questionnaire (pre-test and post-test).*

Designed taking into account early research on reading self-image (Moliner, Flores & Duran, 2011), the questionnaire is aimed at students in years 3 to 6, primary education. It consists of 12 items comprising a statement and a Likert-type answer scale (five categories), except for number 2, which is assessed descriptively and consists of a statement and a list of topics offering several answer options (all valid). In addition, two other items collect supplementary information by requesting free writing about the students’ own reading preferences. The theoretical structure is grounded on two key dimensions in the construction of the self-concept: affective factors linked to reading (emotional and motivational), and factors related to metacognitive knowledge and regulation strategies which intervene in the reading process.

Once the questionnaire had been formulated, we then proceeded to validate the content and construct, and to determine its reliability. To validate the content, an expert judgement was employed with a Kappa index of agreement between judges (Cohen, 1960) of 95%, which enabled us to revise the questionnaire and incorporate the judges’ suggestions. To validate the construct, an exploratory factor analysis (EFA) was carried out with a sample of 95 students, the results of which were found adequate (KMO=.76) in relation to the sample (Norusis, 1990). The structure in two factors revealed good characterisation (Bartlett’s $\chi^2= 203.09; p <.01$) of the way in which these items were grouped. The factor analysis results thus validated

the questionnaire's construct. The reliability index for each of the factors was also calculated; Cronbach's α indicators $\geq .70$ show good internal consistency in relation to the questionnaire's factors.

- *Audiovisual register*: Analysis of the interaction of a sub-sample of 20 random pairs, over 3 sessions. In total, 60 work sessions were analysed.

- *Focus groups*: these were carried out at the end of the project with the students taking part in the audiovisual register and the teacher participants, where they evaluated the work done, the programme implementation, the degree of satisfaction, learning achieved, the progress made and the potential improvements to undertake in the programme's organisation and implementation.

- *Programme's final evaluation questionnaire* (Duran *et al.* 2011a). This questionnaire captures the students' and teachers' final evaluation of the different dimensions related to the programme: learning among peers, learning via the *Leemos en pareja* programme and evaluation of the programme implementation.

Procedure. As previously mentioned, the methodological design combines a quasi-experimental study with a comparison group and a qualitative study of the data of the process. For the former, the quantitative data analysis was performed with the SPSS Statistics 17 software, based on the *t-student* test for related samples.

The audiovisual registers were performed with the Atlas.ti v6.2 software, via a category system created for the analysis. For this category system, the following references were taken into account: Colomina, Onrubia & Rochera's (2005) interactivity analysis proposal; Colomina & Onrubia's (2005) interaction analysis, and De Backer, Van Keer & Valcke's (2012) proposal for the analysis of cognitive and metacognitive strategies which facilitate learning of reading comprehension in a peer-tutoring context. The latter was complemented and enhanced with the contributions made by Solé (2001) and Cassany, Luna & Sanz (1993). The category

system was in turn augmented with emerging categories observed in the pairs’ interaction, resulting in an *ad hoc* system whose reliability was validated by using Pearson’s coefficient (Ruiz & Sánchez, 2006) in an inter-judge test. The registered work sessions show the students performing the tasks associated with each role, according to the initial training received and following the reading Activity Sheet, which includes a text and activities to carry out both before and after reading.

The data gathered in the focus groups and the final evaluation questionnaires were analysed with the software Atlas.ti v6.2.

Results

Results from the quasi-experimental study. Following Levene’s test (Table 2), no variation is initially observed between the two groups, CG (comparison group) and IG (intervention group) and we can observe that the dispersion between them is similar. Although this study aims to study the pre-test and post-test changes of the two groups separately, the *t-student* test shows initial differences between them, with an initial higher level in the CG.

Table 2
Reading Self-Concept (RSC) pre-test results in CG and IG

Variable	Group	<i>N</i>	<i>M</i> pre-test	<i>SD</i>	<i>Levene</i>	<i>t</i>	<i>g^l</i>	<i>p</i>
RSC	CG	136	68.78	13.53	.23	2.97	575	.00
	IG	441	64.55	14.82				

Having shown the initial results, we will now present the results obtained by both groups in the pre-tests and post-tests (Table 3)

Table 3

Reading Self-Concept (RSC) pre-test and post-test results in CG and IG

Variable	Group	N	<i>M</i> pre-test	<i>SD</i>	<i>M</i> post-test	<i>SD</i>	<i>t</i>	<i>p</i>
RSC	CG	136	68.78	13.53	69.37	13.74	-.73	.47
	IG	441	64.55	14.82	66.91	14.33	-3.84	.00

As can be seen, the means between the pre-test and the post-test from the two groups increased between the initial and final post-test. But the comparison group improvement doesn't indicate statistically-significant differences between the pre-test and the post-test, whereas the intervention group does show statistically-significant differences. This leads us to consider that taking part in the *Leemos en pareja* programme offers students learning opportunities which can also benefit the development of their Reading Self-Concept.

By fine-tuning the results, it was possible to examine the development of the Reading Self-Concept in the intervention group, according to the type of tutoring undertaken (fixed or reciprocal), and in the fixed tutoring's case, according to the role performed (tutor or tutee).

In relation to the development of the Reading Self-Concept according to tutoring type (Table 4), significant differences are observed between the pre-test and the post-test in the group performing fixed tutoring, but not in the group performing reciprocal tutoring.

Table 4
Reading Self-Concept (RSC) pre-test and post-test results in IG according to tutoring type (fixed/reciprocal)

Variable	Tutoring Type	N	M pre-test	SD	M post-test	SD	t	p
RSC	Reciprocal	96	66.69	12.69	68.39	13.55	-1.73	.09
	Fixed	345	63.96	15.33	66.50	14.53	-3.45	.00

Table 5 below shows the development of the Reading Self-Concept according to the role performed by the students taking part in fixed tutoring. The students who acted as tutors show statistically-significant differences between their pre-test and post-test, whereas the tutees do not show any statistically-significant differences.

Table 5
Reading Self-Concept (RSC) pre-test and post-test results in IG according to role (tutor/tutee)

Variable	Tutoring type	N	M pre-test	SD	M post-test	SD	t	p
RSC	Tutor	172	65.04	13.78	68.37	13.98	-3.42	.00
	Tutee	173	62.89	16.70	64.63	14.86	-1.59	.11

The above results relating to the evolution of the Reading Self-Concept can perhaps be attributed to the fact that tutors are aware of their responsibility in performing their role, the expectations placed on them and the behaviour expected from a good tutor. They have also publicly

acknowledged their reading competence to be able to teach a peer, and all of this combined may mean that, during the programme's development, their self-concept is reinforced and improved with regards to the initial self-concept. On the other hand, despite receiving personalised help according to their reading and comprehension needs, the tutees may develop their Reading Self-Concept at a slower pace and may not improve at the same rate as the tutors; perhaps because they are in fact being tutored, having been identified as those needing help to progress. Furthermore, another influential factor previously mentioned is the perception of improvement in reading; although the tutees may show improvement in their reading comprehension, they are likely to attribute such improvement to the help received from their tutors instead of acknowledging their own dedication and efforts.

Analysing the results obtained according to tutoring type and role type, we need to understand that the students taking on a reciprocal role have half the time to perform each of their roles, due to the switch of roles in this modality. If the Reading Self-Concept progresses at a slower pace among the tutees than the tutors, it is then likely that the improvement may be smaller and this could explain why there are no statistically-significant results in the reciprocal tutoring mode.

After analysing the results from the quasi-experimental study, we then proceeded to analyse the process in order to identify some of the interaction factors of the pairs' inner workings, which may be influenced the development of the Reading Self-Concept.

Results of the analysis of the process. The category system was created following the sequential structure of the *Leemos en pareja* sessions, which were organised through the use of Activity Sheets (Duran *et al.* 2011a). The category system's reliability was assessed with the Pearson's coefficient (Ruiz & Sánchez, 2006), with values close to 1 and significant levels lower than .01 (Table 6), which indicates a high correlation between the judges, thus validating the system of analysis.

Table 6
Reliability of the category system according to Pearson’s correlation coefficient

Interjudge agreement	<i>r</i>	<i>p</i>
Judge 1* Judge 2	.987	.00
Judge 1* Judge 3	.990	.00
Judge 2* Judge 3	.989	.00

In the category system (Table 7), 3 segments were identified and ordered according to the session’s temporal sequence: before, while and after reading. The latter are taken as the units of analysis and are in turn divided into dimension, each of which is then subdivided into categories (shown in Tables 8, 9 and 10). These categories allowed for the analysis of the interaction between students in the programme’s sessions.

Table 7
Results of the interactivity analysis

Segment	Dimensions	<i>f</i>	%
1.Before reading		43	6.57
	1.1 Creation of work environment (CWE)	6	0.92
	1.2 Assessment of task quality (ATQ)	37	5.65
2.During reading		112	17.13
	2.1 Tutor’s model reading (TMR)	59	9.02
	2.2 Assessment of task quality (ATQ)	53	8.11
3.After reading		499	76.30

3.1 Assessment of task quality (ATQ)	130	19.88
3.2 Tutee's expressive reading (tER)	47	7.19
3.3 Pair's self-evaluation (PSE)	322	49.23
Total	654	100

The table above also shows the contrast between the performances registered in each of the segment and the frequency accumulated in each of the dimensions. The *after reading* segment stands out due to the number of observed performances, making up 76.30% of the total number.

For each segment we can also observe the registration of frequency in each of the categories across all dimensions. In Segment 1, *before reading* (Table 8), it can be observed that in the category “creation of work environment” (CWE), there is a low number of registered performances, which are distributed equally among the categories, thus confirming that not many performances are required and that the responsibility for creating a working environment falls equally on tutors and tutees. Although few performances were registered in relation to the creation of a kind and safe work environment to facilitate the task completion, teachers (*Tr*) affirm that in the focus groups this is a progressive and authentic development, as can be seen from their comments:

Tr (4) It was nice to see that in the first session the shyest students were at first uncomfortable but were fine later on. That is why it is so important to stick to the original pairing.

Tr (16) Working by sharing. This idea... Opening the door and seeing two kids from different classes working on their own (...) They were organising themselves very responsibly, managing themselves and the task very well, with great involvement and motivation. And to think that they are learning without your direct influence! It is amazing.

Table 8
Distribution of frequency according to dimensions and categories in segment 1. Before reading.

1. Before reading	f	%
1.1. CWE 1.1.1 The Tutor initiates the activity by creating a safe and trusted environment.	2	3.34
1.1.2 The Tutor and tutee start the activity creating a safe and trusted environment.	2	3.34
1.1.3 The tutee starts the activity creating a safe and trusted environment.	2	3.34
Total	6	100
1.2 ATQ 1.2.1 The Tutor dismisses the tutee’s attitude and/or response with some negative gesture or comment.	0	0
1.2.2 The Tutor praises the tutee and/or confirms the tutee’s response with some encouraging gesture or comment.	37	100
1.2.3 The tutee dismisses the Tutor’s attitude and/or response with some negative gesture or comment.	0	0
1.2.4 The tutee praises the tutor and/or confirms the Tutor’s response with some encouraging gesture or comment.	0	0
Total	37	100

With regards to the dimension of “assessment of the task quality” (ATQ), we can observe that all the registrations made are concentrated around the category in which the tutor renders a positive assessment of the task performed by the tutee. It is also worth drawing attention to the fact that there is no negative performance or any praise to tutors from the tutees. The

unilateral quality task assessment from the tutors may reinforce the notion of the tutor's role as a reading expert and may also foster their Reading Self-Concept.

For segment 2, *during reading* (Table 9), we present, on the one hand, the observed performances of the tutor's reading, considered to be the model reading (TMR). In this case, the performances centre around the tutor's correct reading accompanied by the tutee's attentive listening. Only 10.17% of tutors make some mistakes whilst reading, a fact which confirms the tutor's role as a correct reading model. In this regard, tutors (*T*) express their progress in reading and how they feel during their performance:

T (14) You also read and you have to do it well, so I prepare at home and I have improved a lot.

T (16) I never thought I read well enough to be a tutor, and I feel proud.

T (8) Different, confident, I had never taught anyone before and I feel important and bearing great responsibility.

The tutors' perception of self-confidence and improvement in reading, as well as their acknowledgement of their own limitations and their efforts to overcome them may have well contributed positively to the development of their Reading Self-Concept.

In the same segment, we can also observe some performances related to the assessment of the task quality (ATQ), which are distributed among 2 categories only, both referring to the tutor's assessment of the tutee. The highest frequency is achieved by the tutor when referring to the tutee's effort to correct their mistakes and perform their first reading with the greatest accuracy possible.

Table 9

Distribution of frequencies according to dimensions and categories segment 2. During reading

2. During reading		f	%
2.1. TMR	2.1.1 The Tutor reads correctly and the tutee listens attentively.	49	83.05
	2.1.2 The Tutor reads correctly and the tutee is distracted.	4	6.78
	2.1.3 The Tutor reads making some errors and the tutee listens attentively.	6	10.17
	2.1.4 The Tutor reads making some mistakes and the tutee corrects him/her.	0	0
	2.1.5 The Tutor reads making some mistakes and the tutee is distracted.	0	0
Total		59	100
2.2 ATQ	2.2.1 The Tutor dismisses the tutee’s reading quality with some negative gesture or comment.	0	0
	2.2.2 The Tutor assesses the tutee’s reading quality positively with some encouraging and approving gesture or comment.	12	22.64
	2.2.3 The tutee dismisses the Tutor’s reading quality with some negative gesture or comment.	0	0
	2.2.4 The tutee assesses the Tutor’s reading quality positively with some encouraging and approving gesture or comment.	0	0

2.2.5 The Tutor appreciates the tutee's efforts in correcting their mistakes and performing an accurate first reading of the text.	41	77.36
--	----	-------

Total	53	100
-------	----	-----

Finally, in the third segment, *after reading* (Table 10), we record the performances related to the assessment of the task quality by carrying out a final expressive reading by the tutee and the pair's self-evaluation (which is performed every four sessions). In the dimension of the assessment of the task quality (ATQ), we can see a repeat of the higher number of performances by the tutor in relation to the tutees' answers.

In the dimension related to the tutee's final and expressive readings, we can observe that around 20% of tutees read the text correctly, whereas just under 80% still make some mistakes (with or without tutors' correction). However, many tutees (*t*) declare they notice improvement in their reading: *t* (2) *I can now read faster*; *t* (39) *at first I couldn't read very well but now I can see I have improved*; and some even highlight the results of their efforts: *t* (45) *if you try hard, you become a better reader. Now I'm reading more and learning new things*. Conversely, some tutees don't notice any improvements: *t* (10) *I am reading the same way as before*; *t* (16) *I used to read slowly before and now I have improved, but I don't seem to enjoy reading more*; or simply attribute their progress to the tutors' effort and dedication, and not to their own effort: *t* (20) *I am reading better thanks to my tutor's help*; *t* (12) *my tutor has really helped me a lot*. In this regard, the development of the tutees' Reading Self-Concept may be hindered, since the tutees seem to either play down their improvement or attribute their achievement to external factors.

Table 10

Distribution of frequencies according to dimensions and categories segment 3. After reading.

3. After reading		f	%
3.1 ATQ	3.1.1 The Tutor dismisses the tutee’s attitude and/or response with some negative gesture or comment.	0	0
	3.1.2 The Tutor praises the tutee’s attitude and/or confirms their response with some encouraging gesture or comment.	130	100
	3.1.3 The tutee dismisses the Tutor’s attitude and/or response with some negative gesture or comment.	0	0
	3.1.4 The tutee praises the Tutor’s attitude and/or confirms their response with some encouraging gesture or comment.	0	0
Total		130	100
3.2 tER	3.2.1 The tutee reads, Tutor listens to it and intervenes when there errors or queries.	28	59.57
	3.2.2 The tutee reads (with some difficulty) and the Tutor listens to it without intervening.	9	19.15
	3.2.3 The tutee reads and corrects his/her mistakes autonomously.	0	0
	3.2.4 The tutee reads the text correctly (intonation, pronunciation, rhythm and fluency).	10	21.28
Total		47	100

3.3 PSE	3.3.1 Before reading: assessment of pair's performance	60	18.63
	3.3.2 During reading: assessment of the tutee's use and command of reading skills and strategies.	90	27.95
	3.3.3 After reading: assessment of tutee's comprehension	45	13.98
	3.3.4 Tutee's expressive reading	15	4.66
	3.3.5 Assessment of tutor's performance	90	27.95
	3.3.6 Objectives and improvement proposal: pair	14	4.35
	3.3.7 Teacher intervention	8	2.48
Total		322	100

The third dimension included in this segment is related to the pair's self-evaluation, which the two partners perform every four sessions and in which they assess the tutor's performance, the use of reading strategies, the tutee's reading and comprehension level, as well as other elements related to the pair's performance and any proposals for improvement. In this regard, it is worth noting that most of the interventions (around 46%) happen during the analysis of the tutees' reading progress, according to the categories previously described, corresponding to 3.3.2, 3.3.3 and 3.3.4. It is likely that an exhaustive analysis of the tutees' reading progress may highlight some of the limitations they haven't overcome yet and that these observations may obscure the achievements they have actually made. The tutors' attitudes regarding their role performance (not regarding tutee's progress on the reading elements) total almost 28% of the performances registered under 3.3.5. They are closely followed by the pairs' attitudes (approximately 23%), concentrated under categories 3.3.1 and 3.3.6. Finally, it is worth mentioning that teachers' interventions are also registered under this dimension (3.3.7), with few performances relating to the programme development and the

metacognitive reflection undertaken, with a total frequency of approximately 2.5%.

Discussion

The quantitative results obtained show that the Reading Self-Concept in all the *Leemos en pareja* participants evolves in a statistically significant manner. These results are in line with findings from other research focused on reviewing elements for the improvement of self-concept and self-esteem in peer learning contexts (Duran *et al.* 2011a; Ginsburg-Block, Rohrbeck & Fantuzzo, 2006) and others reviewed within the framework of peer tutoring and peer reading, (Miller *et al.*, 2010; Topping *et al.*, 2011).

In a more in-depth analysis, significant improvement was observed among the tutors participating in fixed-role tutoring. These improvements may be in tune with role theories (Robinson, Schofield, & Steers-Wentzell, 2005), which are grounded on the adopted attitude, dependant on the adjudicated role. In this regard, the tutors may well have increased their feelings of academic competence and effort because they are good reading models; and when they return to their natural student role, they may focus on learning with the same attitudes and behaviour expected of their tutees. Thus, any improvements in this group of students may be brought about by performing their role and because of the possibilities the roles offer them to perceive and evaluate themselves as good readers.

Similarly, from the qualitative results, four dimensions were identified, which may have influenced the positive construction of the Reading Self-Concept. The first one, a positive work environment, generated within a peer-tutoring framework, allows for maximum capacity development and fosters improvement, from recognising their own limitations to the work undertaken to improve them.

The second dimension relates to the evaluations made during the tasks. In this regard two regularities are observed, which may shed some

light in interpreting the observed performances: all the evaluations come from the tutor towards the tutees and all of them are positive. There is wide acknowledgment of the importance of peer reference for the formation of the Reading Self-Concept (Park, 2011), as well as for learning achievement in cooperative environments (Seligman, 2003; Murray, 1994). Therefore, the task assessment is regarded as a key element to consider in the improvement of the Reading Self-Concept.

The third dimension includes the readings made by both pair members, which seek to show the students' command of the task. In their initial reading, the tutors assert themselves as model readers. However, in their final expressive reading, the tutees seem unable to achieve recognition as expert readers, given that the majority of tutors were still seen to correct tutees' mistakes in this final task. This makes it difficult for the tutees to show progress in the quality of their reading and it may even hinder their self-concept's positive construction.

Lastly, and taking into account the possibilities accorded by self-evaluation in reflection on the progress and difficulties in the reading and comprehension process itself, self-evaluation may make students more aware of their reading level and their progress, and so they can implement strategies for improvement, which according to Esnaola, Goñi & Madariaga (2008) are crucial elements for the modification of the self-concept.

Conclusion

As a final conclusion, it is our belief that participation in the *Leemos en pareja* programme may have contributed to the positive development of the Reading Self-Concept in those students taking up the tutor role. Among the factors that may explain this positive development are: the act of taking on the role in itself, a favourable working climate, the positive assessment of the efforts made for improvement, reading-aloud tasks in combination with active listening from a peer, and inter-peer metacognitive reflections on the

progress made and the limitations in their reading and comprehension. Similarly, the challenge facing tutees and those performing reciprocal tutoring is that of taking responsibility for the observed reading improvement instead of ascribing it to the tutors. Metacognitive reflection is seen as a key factor which may boost development of the Reading Self-Concept by making students aware of their abilities and their likelihood of improvement according to the effort put in.

These results are an incentive to keep enquiring and delving into the processes or conditions which may be responsible for boosting the Reading Self-Concept in those students taking part in the programme, as well as in other peer-learning practices.

References

- Brookover, W.B., & Lezotte, L.W. (1979). *Changes in School Characteristics Coincident With Changes in Student Achievement*. Michigan: Institute for Research on Teaching.
- Cassany, D., Luna, M., & Sanz, G. (1993). *Ensenyar llengua*. Barcelona: Graó.
- Cohen, J. (1960). A coefficient of agreement for nominal scales. *Educational and Psychological Measurement*, XX (I), 37-46.
- Colomina, R., & Onrubia, J. (2005). Interacción educativa y aprendizaje escolar: la interacción entre alumnos. In C. Coll, J. Palacios, & A. Marchesi (comps), *Desarrollo Psicológico y Educación II. Psicología de la Educación* (pp. 415-436). Madrid: Alianza.
- Colomina, R., Onrubia, J., & Rochera, M. J. (2005). Interactividad, mecanismos de influencia educativa y construcción del conocimiento en el aula. In C. Coll, J. Palacios, & A. Marchesi (comps), *Desarrollo Psicológico y Educación II. Psicología de la Educación* (pp. 437-458). Madrid: Alianza.

- Dabbagh, S. (2011). Relationships between academic self-concept and academic performance in high school students. *Procedia Social and Behavioral Sciences* 15, 1034–1039. doi: [10.1016/j.sbspro.2011.03.235](https://doi.org/10.1016/j.sbspro.2011.03.235)
- De Backer, L., Van Keer, H., & Valcke, M. (2012). Exploring the potential impact of reciprocal peer tutoring on higher education student's metacognitive knowledge and regulation. *Instructional Science*, 40 (3), 559-588. doi: [10.1007/s11251-011-9190-5](https://doi.org/10.1007/s11251-011-9190-5)
- Duran, D. (Coord.), Blanch, S., Corcelles, M., Flores, M., Merino, E., Oller, M., & Vidal, A. (2009). *Llegim en parella. Tutoria entre iguals, a l'aula i a casa, per a la millora de la competència lectora*. Barcelona: ICE de la Universitat Autònoma de Barcelona.
- Duran, D., (Coord.), Blanch, S., Corcelles, M., Flores, M., Oller, M., Utset, M., & Valdebenito, V. (2011a). *Leemos en pareja. Un programa de tutoría entre iguales, con implicación familiar, para la mejora de la competencia lectora*. Barcelona: Horsori.
- Duran, D. (Coord.), Blanch, S., Corcelles, M., Fernández, M., Flores, M., Kerejeta, K., Moliner, L., & Valdebenito, V. (2011b). *Bikoteka Irakurtzen*. Vitoria: Gobierno Vasco.
- Duran, D., & Monereo, C. (2008). The Impact of Peer Tutoring on the Improvement of Linguistic Competence, Self-Concept as a Writer and Pedagogical Satisfaction. *School Psychology International*, 29 (4), 481-499. doi: [10.1177/0143034308096437](https://doi.org/10.1177/0143034308096437)
- Duran, D., & Monereo, C. (2012). *Entramado. Métodos de aprendizaje cooperativo y colaborativo*. Barcelona: Horsori
- Duran, D., & Vidal, V. (2004). *Tutoría entre iguales: de la teoría a la práctica. Un método de aprendizaje cooperativo para la diversidad en secundaria*. Barcelona: Graó.
- Esnaola, I., Goñi, A., & Madariaga, J.M. (2008). El autoconcepto: Perspectivas de Investigación. *Revista de Psicodidáctica*, 13 (1), 179-194.
- Fantuzzo, J., King, A., & Heller, R. (1992). Effects of reciprocal Peer Tutoring on Mathematics and School Children. A Component

Analysis. *Journal of Educational Psychology*, 84(3), 331-339.
doi: 10.1037/0022-0663.84.3.331

- Fantuzzo, J.W., Tighe, E., & Childs, S. (2000). Family involvement questionnaire: A multivariate assessment of family participation in early childhood education. *Journal of Educational Psychology*, 92(2), 367-376. doi:10.1037/0022-0663.92.2.367
- Ginsburg-Block, M.D., Rohrbeck, C.A., & Fantuzzo, J.W. (2006). A meta-analytic review of social, self-concept and behavioral outcomes of peer-assisted learning. *Journal of Educational Psychology*, 98 (4), 732-749. doi: 10.1037/0022-0663.98.4.732
- Goodland, S., & Hirst, B. (1990). *Exploring in peer tutoring*. Oxford: Basil Blackwell.
- Gordon, E. (2005). *Peer Tutoring. The teacher's resource guide*. Maryneland: Scarecrow Education.
- Green, J., Liem, G. A. D., Martin, A. J., Colmar, S., Marsh, H. W., & McInerney, D. (2012). Academic motivation, self-concept, engagement, and performance in high school: Key processes from a longitudinal perspective. *Journal of Adolescence*, 35 (5), 1111–1122.
- Johnson, D., & Johnson, R. (1990). *Cooperation and Competition: Theory and Research*. Hillsdale, NJ: Lawrence Erlbaum.
- Mandelman, S., Tan, M., Kornilov, S., Sternberg, R., & Grigorenko, E. (2010). The Metacognitive Component of Academic Self-Concept: The Development of a Triarchic Self-Scale. *Journal of Cognitive Education and Psychology*, 9 (1), 73-86. doi:10.1891/1945-8959.9.1.73
- Marsh, H.W. (1986). Verbal and math self-concepts: An internal/external frame of reference model. *American Educational Research Journal*, 23, 129-149. doi: 10.3102/00028312023001129
- McInerney, D. M., Cheng, R. W., Mok, M. M. C., & Lam, A. K. H. (2012). Academic Self-Concept and Learning Strategies: Direction of Effect on Student Academic Achievement. *Journal of Advanced Academics*, 23 (3), 249-269. doi: 10.1177/1932202X12451020

- Miller, D., Topping, K.J., & Thurston, A. (2010). Peer tutoring in reading: The effects of role and organization on two dimensions of self-esteem. *British Journal of Educational Psychology*, 80(3), 417-433. doi: 10.1348/000709909X481652
- Moliner, L. Flores, M., & Duran, D. (2011). Efectos sobre la mejora de las competencias lingüísticas y la autoimagen lectora a través de un programa de tutoría entre iguales. *Revista de Investigación en Educación* 9 (2) 209-222.
- Murray, F. (1994). Why understanding the theoretical basis of cooperative learning enhances teaching success. In J. Thousand, R. Villa, & A. Nevin (Eds.), *Creativity and collaborative learning. A practical guide to empowering students and teachers*. Baltimore: Paul H. Brookes Publishing Co.
- Norusis, M.J. (1990). *SPSS Base System User's Guide*. Chicago: SPSS.
- Park, Y. (2011). How motivational constructs interact to predict elementary students' reading performance: Examples from attitudes and self-concept in reading. *Learning and Individual Differences*, 21 (4), 347-358. doi:10.1016/j.lindif.2011.02.009
- Rath, S., & Nanda, S. (2012). Adolescent's self-concept: Understanding the role of gender and academic competence. *International Journal of Research Studies in Psychology*, 1 (2), 63-71. doi: 10.5861/ijrsp.2012.v1i2.82
- Robinson, D. R., Schofield, J., & Steers-Wentzell, K. L. (2005). Peer and Cross-Age Tutoring in Math: Outcomes and Their Design Implications. *Educational Psychology Review*, 17 (4), 327-362. doi: 10.1007/s10648-005-8137-2
- Ruiz, D., & Sánchez, A. (2006). *Apuntes de Estadística*. Edición electrónica. Retrieved August 7, 2013 from <http://www.eumed.net/libros-gratis/2006a/rmss/index.htm>
- Seligman, M. (2003). *La auténtica felicidad*. Barcelona: Vergara.
- Slavin, R. (1996). Research for the future. Research on cooperative learning and achievement: What we know, what we need to know. *Contemporary Educational Psychology*, 21 (1), 43-69.

- Solé, I. (2001). *Estrategias de lectura*. Barcelona: Graó.
- Solé, I. (2011). La comprensió lectora, una clau per a l'aprenentatge. *Debats d'Educació, 24*. Barcelona: Fundació Jaume Bofill.
- Topping, K. (1996). *Effective Peer Tutoring in Further and Higher Education*. Birmingham: SEDA Paper.
- Topping, K. (2000). *Tutoring*. Ginebra, Suïça: International Academy of Education.
- Topping, K., Miller, D., Thurston, A., McGavock, K., & Conlin, N. (2011). Peer tutoring in reading in Scotland: thinking big. *Literacy, 45* (1), 3-9. doi: [10.1111/j.1741-4369.2011.00577.x](https://doi.org/10.1111/j.1741-4369.2011.00577.x)
- Villa, R., Thousand, J., & Nevin, A. (2010). *Collaborating with Students in Instruction and Decision Making*. Thousand Oaks (CA): Corwin.
- Wouters, S., Germeijs, V., Colpin, H., & Verschueren, K. (2011). Academic Self-Concept in High School: Predictors and effects on adjustment in higher education. *Scandinavian Journal of Psychology, 52* (6), 586-594. doi: [10.1111/j.1467-9450.2011.00905.x](https://doi.org/10.1111/j.1467-9450.2011.00905.x)

Marta Flores is member of the Research Group on Peer Learning in the Department of Basic, Developmental and Educational Psychology. Universitat Autònoma de Barcelona, Spain

David Duran is the principal investigator of the Research Group on Peer Learning and professor in the Department of Basic, Developmental and Educational Psychology. Universitat Autònoma de Barcelona, Spain.

Contact Address: Direct correspondence to Marta Flores, Departament de Psicologia Bàsica, Evolutiva i de l'Educació. Universitat Autònoma de Barcelona. Facultat de Ciències de l'Educació. Desp. 254, Ed. G-6 08913 Bellaterra (Barcelona). E-mail: Marta.Flores@uab.cat



Instructions for authors, subscriptions and further details:

<http://ijep.hipatiapress.com>

Let's Share Perspectives! Mentalistic Skills Involved in Cooperation

Francesc Sidera, Elisabet Serrat, Jèssica Serrano, Carles Rostan, Agnès Caño, Anna Amadó¹

1) Department of Psychology, Universitat de Girona, Spain.

Date of publication: October 24th, 2013

Edition period: October 2013 - February 2014

To cite this article: Sidera, F., Serrat, E., Serrano, J., Rostan, C., Caño, A., Amadó, A. (2013). Let's Share Perspectives! Mentalistic Skills Involved in Cooperation. *International Journal of Educational Psychology*, 2(3), 325-352. doi: 10.4471/ijep.2013.30

To link this article: <http://dx.doi.org/10.4471/ijep.2013.30>

PLEASE SCROLL DOWN FOR ARTICLE

The terms and conditions of use are related to the Open Journal System and to [Creative Commons Attribution License \(CCAL\)](#).

Let's Share Perspectives! Mentalistic Skills Involved in Cooperation

Francesc Sidera, Elisabet Serrat, Jèssica Serrano, Carles Rostan, Agnès Caño, Anna Amadó¹

Universitat de Girona

Abstract

Previous research has found a link between theory of mind and cooperation. The aim of this study is to deepen into this relationship, to identify which theory of mind skills are more related to the cooperative ability on a referential communication task. A total of 50 children from first and fifth grade completed a battery of theory of mind tasks, and also a cooperative task where children worked in pairs to build block models. Each pair was composed by a builder and a guide, who gave instructions to his partner about how to build a replica of the model. The results show a significant relationship between the theory of mind skills and cooperation. Specifically, we found that the second-order false-belief task was the variable most related to cooperation after controlling the effect of age. In addition, we observed that the mentalistic skills were more important for cooperation in the builders than in the guides. Finally, we discuss the findings of this study and make suggestions for the future.

Keywords: Theory of mind, cooperation, referential communication.

¿A tu Izquierda o a la Mía? Habilidades Mentalistas Implicadas en la Cooperación

Francesc Sidera, Elisabet Serrat, Jèssica Serrano, Carles Rostan, Agnès Caño, Anna Amadó¹

Universitat de Girona

Resumen

Estudios previos han encontrado una relación entre la teoría de la mente y la cooperación. El objetivo del presente trabajo consiste en profundizar en esta relación, intentando delimitar qué habilidades de TM están más relacionadas con la capacidad cooperativa en una tarea de comunicación referencial. Un total de 50 niños y niñas de primero y quinto de primaria completaron una batería de tareas de teoría de la mente, y también una tarea de cooperación en la que por parejas debían reproducir modelos con piezas de construcción. En cada pareja había un constructor y un guía, quien daba las instrucciones a su compañero para construir una replica del modelo. Los resultados muestran una relación importante entre las habilidades de teoría de la mente y de cooperación. Más específicamente, se halló que la tarea de creencia falsa de segundo orden era la más vinculada con la cooperación, habiendo controlado el efecto de la edad. Además, se observó que las habilidades mentalistas fueron más importantes para la cooperación en los constructores que en los guías. Finalmente, se discuten los hallazgos de este estudio y se plantean futuras líneas de trabajo.

Palabras clave: Teoría de la mente, cooperación, comunicación referencial.

The ability to cooperate is an essential characteristic of human beings that is present in many of our daily routines. Authors like Tomasello (2009) argue that what makes human culture different is based on a set of specific skills and motivations to cooperate. In education, cooperation has been linked to a form of learning (Dillenbourg, 1999; Johnson & Johnson, 1979) and a teaching methodology which claims that learning is enhanced when students develop cooperative skills (Cabero, 2003). Research on cooperative learning has focused on testing its effectiveness compared to competitive or individualistic learning, showing its potential to boost students' social development and learning level (Arvaja, Salovaara, Häkkinen, & Järvelä, 2007). However, research also indicates that the positive effects of cooperative learning are not achieved spontaneously as a result of assembling the students in groups, but it is necessary to understand the complexity of the interaction process and to study the fundamental mechanisms supporting its effectiveness (Arvaja et al., 2007).

On the other hand, the ability to cooperate has been declared by European authorities as one of the core competencies that any citizen must acquire in order to face the challenges of a globalized world (OECD, 2002). From this viewpoint, cooperation becomes a personal competence and its development a priority, since it is considered an individual capacity that allows people to be successful in teamwork. In this sense, the cooperative competence may be defined as the set of individual knowledge, skills and attitudes necessary for working effectively in teams. In this line, the present study aims to deepen the knowledge about the influence of intraindividual factors related to cooperation. More specifically, about the relationship between cooperation and certain skills related to social cognition, namely, the mentalistic or theory of mind (ToM) skills.

By ToM we refer to the ability to attribute (represent, reason and conceptualize) mental states in oneself and others, as well as to understand that other people may have beliefs, desires and intentions different from their own. It is therefore a fundamental ability in humans that develops progressively from birth. In fact, children's understanding of mental states is a crucial cognitive development that has been studied intensively in the last years (Bryant, Coffey, Povinelli, & Pruetz, 2013). ToM skills may be understood as a system of concepts and inferences that allows people to attribute beliefs, desires, intentions and feelings to other beings and, in that

way, to understand their behaviour. It also enables the understanding of deception, lies and false beliefs about reality, in addition to the communication and cooperation with others. In fact, people with problems to develop mentalistic skills, as for instance people with autism spectrum disorders, show significant social and communication difficulties (Olivar & Belinchon, 1997; Rivière & Nuñez, 1996).

Although many of the studies on ToM have placed special emphasis on the study of deception or Machiavellian capacity, it is noteworthy the importance of ToM in the cooperative mind. Indeed, this research suggests that people with limited mentalistic abilities have difficulty to cooperate and perform altruistic behaviours (Sally & Hill, 2005; Liebal, Colombi, Rogers, Warneken, & Tomasello, 2008), in the same way that they struggle to understand deception or pretence.

While there is much research about ToM skills and their development (see Serrano (2012) for a revision), there are few studies about the role of ToM skills in cooperative contexts. Yet, some results, such as those obtained by Paal and Berezkei (2007), directly relate ToM with cooperation skills, rather than with Machiavellianism. Now it is important to note that in this study with adults they didn't use a cooperative situation, but a scale to assess the cooperation level and a test to assess the level of Machiavellianism. On the other side, Takagishi, Kameshima, Schug, Koizumi and Yamagishi (2010), in a study with preschoolers, found a significant relationship between the understanding of false belief and making a fair proposal of sweets distribution in the ultimatum game. According to the authors, children who had not developed the ability to infer how other children would react to their actions, behaved more selfishly, because they did not understand that other children could be angry at them and punish their unfair behaviour. From this view, understanding and anticipating other people's behaviour may encourage cooperative behaviour and adaptation to social rules.

A large part of the studies linking ToM with cooperation have focused on communication skills, using referential communication situations as cooperative tasks. One example is the study by Resches and Pérez-Pereira (2004), who found that ToM skills influence the type of communication resources children use in a referential communication task. This study showed the relationship between ToM skills and the ability to communicate effectively to cooperate on a task with a shared goal. Likewise, Maridaki-Kassotaki and Antonopoulou (2011) found that some referential communication skills were related to the understanding of first-order false beliefs. Using a similar task, Olivar, Flores and de la Iglesia (2004) found a

relationship between the capacity to understand second-order false beliefs and the quality of the sender's message.

In addition to the understanding of false belief, other mentalistic skills have been associated with referential communication abilities. For example, Happé (1993, 1994) found that children's performance in batteries of ToM tasks is a good predictor of figurative language understanding (irony, joke, metaphor...). Also Krych-Applebaum, Law, Jones, Barnacz, Johnson and Keenan (2007) found that ToM skills were related to communicative task. In this study they found that obtaining high scores on the Mind in the Eyes test (Baron-Cohen, 2003) was related to effective communication, but only in the case of the speaker and not the receiver. Finally, we must bear in mind that the ToM can be conceived not as a unit capacity, but as a capacity composed of various processes or dimensions (Tirapu-Ustarroz, Pérez-Sayes, Erekatxo-Bilbao, & Pelegrin-Valero, 2007) that despite being interdependent enough to form a general ability, they can also be manifested as separate skills. The same would occur in other human abilities, such as language, which is composed of different components or levels (phonological, semantic, syntactic...). In the case of the ToM this is controversial, and their fundamental components (if exist) have not yet been identified. Nevertheless, we believe that to further the study of the relationship between ToM and cooperation it is important to evaluate ToM with a battery of tasks assessing several of its processes, and not just one of them, as in some of the abovementioned studies.

In short, ToM skills are linked to the effectiveness of cooperative tasks. However, there is a shortage of studies on that subject, along with methodological differences in the measurement of the ToM, primarily in terms of the tasks used. Therefore, it seems reasonable to further study what ToM skills are related to cooperation. In this sense, the objective of this research focuses on investigating the influence of mentalistic skills of different types and complexity in a cooperative task of referential communication. Additionally, considering the study by Krych-Applebaum et al. (2007), we created two distinct roles, the guide (speaker) and the builder (receiver), to study which mentalistic skills are more linked to cooperation in each role.

We hypothesized that higher scores on ToM tasks will be associated to higher scores on a cooperative task. We also considered the possibility that some ToM

skills would be more strongly related to cooperative success than others, and that these relationships could depend on the role of the participants.

Methods

Participants

The sample consisted of a total of 50 children from first and fifth grade. The young group consisted of 24 participants aged 6 ($M = 6;6$, $SD = 0.03$; range: 6;0 to 6;11; 12 girls) while the older group consisted of 26 children aged 10 ($M = 10;08$, $SD = 0.03$; range: 10;0 to 10;11; 12 girls).

Procedure

Data collection

Data were collected in two sessions. In the first session ToM and intelligence were assessed. It lasted between 30 and 45 minutes, and was conducted during school hours in a quiet room of the child's school. The second session took place one week later, and participants conducted a cooperative task in pairs. This session was audio-visually recorded, so permissions from the school administration and families were obtained.

Materials and scores

The tasks administered and the scores used are described below (see also [Appendix A](#)). In all ToM tasks the raw score was transformed to a score of 0-3 points with the purpose to match their weight in the total score in ToM, which ranged from 0 to 18 points.

a. First-order false belief

The first task was a version of the original unexpected content task proposed by Perner, Leekman and Wimmer (1987). In the first part of this task the

participants were shown a closed tube of Lacasitos® sweets and were asked what they thought there was inside. Then they were showed the actual contents of the tube (pebbles). After children had seen the actual contents of the tube, they were asked about their previous false beliefs about these contents, and also were asked about the actual contents of the tube. In the second part of the task participants were asked about the false belief that a partner would have when shown the tube for the first time. They were also asked to justify their response. Finally, children were asked a control question to ensure that they really knew their partner had not seen the contents of the tube.

Participants' answers about their own previous false belief and that of a companion were scored with a 0 or 1 each, considering that responding all control questions was a prerequisite for obtaining the points. Thus, the maximum score in this task was 2 points (converted to 3).

b. Second-order false belief

The understanding of the second-order false belief was assessed using a version of the change of location task from the Developmental Neuropsychological Assessment II (NEPSY - II [Korkman, Kirk, & Kemp, 2007](#)). After introducing the main characters of the story (John and Mary), it was explained that John decided to go to one attraction (the wheel) and Mary to another (the carousel). Participants were then told that John finally decided to go to the haunted house, because there was a long queue at the wheel, and they were asked to predict where Mary would look for him, and why she would look for him there. Afterwards, participants were told that Mary had actually seen John going to the haunted house, though John didn't know. At this point, participants had to predict where John thought Mary would look for him, and justify their response. Finally, two control questions were asked. One point (transformed to 3 points) was given to the participants who correctly answered all questions, including control questions and justifications.

c. Deception

To assess the understanding of deception it was used a version of the task by Filippova and Astington (2008). Participants were told the story of two brothers: Marta, who never tells the truth, and his brother Peter, who knows that. In the story Peter can't find his soccer ball and knows that Marta has hidden it either in the closet or under the bed. Then participants were told that when Peter asks Marta where she has hid the ball, she answers under the bed. Next, participants were asked why Peter goes to get the ball in the closet (and not under the bed) and where Marta said she had hid the ball. One point was given to participants (transformed to 3 points) who answered correctly to both the test and the control questions.

d. Metaphor

The metaphor task of the NEPSY-II (Korkman et al., 2007) was administered, following the test procedure. First, participants were shown a picture of two twin sisters, and were explained that their mother says: "they are like two drops of water". Subsequently, participants were asked about the meaning of this expression. One point was given to participants who answered the test question correctly (converted to 3 points).

e. Faux-pas

Understanding of *faux-pas* situations was assessed with one of the stories designed by Baron-Cohen, O'Riordan, Stone, Jones and Plaisted (1999). In the story Cristina gives a plane as a birthday present to Manuel, and some months later, when the two children are playing with the plane, Cristina accidentally breaks it. Cristina apologizes to Manuel and he says: "Do not worry. I never liked this plane. Someone gave it to me for my birthday". Then three questions were asked: "In the story, did anyone say something they shouldn't have said or something awkward?" "Who said it?" and "What did he/she say?" If participants answered correctly to all three questions they

were given 1 point. A second point was given if they remembered that Manuel did not have a malicious intention and another point if they attributed the correct emotion to Cristina. Thus, the maximum score was 3 points.

f. Emotional attribution

The contextual task of the NEPSY-II (Korkman et al., 2007) was used to evaluate the ability to identify the emotions of characters in different contexts. The task shows different black and white pictures in which a girl is turned back, and participants have to indicate, from four possibilities, which face the girl would show in a given situation. Six different situations were administered after a trial. Participants obtained 1 point for each correct situation, so the maximum score was 6 points (converted to 3 points).

g. Intelligence quotient

Participants' IQ was assessed through the Kaufman Brief Intelligence Test (K-BIT) elaborated by (Kaufman & Kaufman, 1994) with Spanish scales. This test consists of two scales: one verbal and one nonverbal. From the verbal scale, 6-year-olds received the expressive vocabulary task, while 10-year-olds were administered both the expressive vocabulary and definitions tasks. Both groups were also administered the nonverbal matrices task. To analyse the results we used the percentile scores of the IQ composite score (which includes verbal and nonverbal scores).

Cooperation task

The procedure was based in the task used by Krych-Appelbaum et al. (2007) in which children work in pairs to make a copy of a model constructed by blocks of Lego Duplo® (see Appendix B). In each pair one of the participants takes the role of the guide and the other the builder. In the 6-year-old group a total of 12 pairs of children were formed: 6 of the same sex (3 boy-boy and 3 girl-girl) and 6 of the opposite sex. In the 10-year-old

group a total of 13 pairs were formed: 7 of the same sex (4 boy-boy and 3 girl-girl), and 6 of the opposite sex.

Participants sat facing each other with an opaque screen between them, so that they could not see the working area of their partner. The guide had a model, and the builder, following the instructions of the guide and provided with 45 construction blocks, was expected to build a replica of the model. After a pilot test, one 4-block trial model was designed, as well as three 6-block test models of increasing complexity. The blocks could vary in four dimensions: color, size, shape and position in the coordinate axis (see [Table 1](#)).

Table 1
Dimensions considered in each model

Model	Colour	Size	Shape	Axis
Trial	√	√		x, y, z
Model 1	√	√		x, y
Model 2	√	√	√	x, y, z
Model 3	√	√	√	x, y, z

The first model to be constructed was a trial model. When participants considered that they had constructed a replica of it, the opaque screen between them was removed, so they could see how they had built the model and discuss it. After that, they were asked to construct the 3 test models, but in these cases the opaque screen was not removed and they were not allowed to talk. They just could see the result of their work.

Each of the 3 test models was scored from 0 to 6 points. Therefore, the maximum score in the cooperation task was 18 points, which were awarded

as follows, considering both the correct choice of the blocks and their location: 0.5 points if all blocks had the correct color; 0.5 points if all blocks had the correct shape and size; 0.5 points if the first piece was located correctly; and 1 point for each of the remaining pieces located in the right place (or 0.5 points if they were placed incorrectly solely due to the incorrect location of the previous block).

In some parts of the results section participants are divided into two groups: (a) participants with a "high scores on cooperation" (those who had a score equal or above the median, which was of 6 points); and (b) participants with "low scores on cooperation" (median score lower than 6). In spite of the fact most children from the younger group had a low score on cooperation, two pairs of 6-year-olds obtained a high score. Plus, two pairs of 10-year-olds obtained a low score. Therefore, the division of the cooperation results in high and low does not entirely correspond to the groups of age.

Results

Cooperative abilities and theory of mind

As shown in the last row of [Table 2](#), participants obtained an average score of 7.24 points (SD = 4.43) in the cooperation task. In ToM, the average of the total score was 13.44 (SD = 3.81). If we consider the score on each of the ToM tasks, we observe that the best scores were obtained in the unexpected content task, followed by the tasks of deception, emotional attribution, metaphor, *faux-pas* and change of location.

When we look at the performance in ToM and cooperation as a function of the grade of the children, we observe that fifth-graders obtained higher scores than first-graders.

Table 2
 Mean (and standard deviation) in the cooperation and ToM tasks in the total sample and as a function of grade

Grade	COOP	First-order false belief	Second-order false belief	Deception	Metaphor	Faux-pas	Emotional Attribution	Total ToM score
<i>First</i>	4.42	2.75	.75	2.13	1.75	1.44	1.92	10.73
	(2.83)	(0.57)	(1.32)	(1.40)	(1.51)	(1.36)	(0.50)	(2.82)
<i>Fifth</i>	9.85	2.83	2.88	2.77	2.54	2.36	2.56	15.94
	(4.04)	(.49)	(.59)	(0.82)	(1.10)	(1.14)	(0.48)	(2.76)
<i>All the Sample</i>	7.24	2.79	1.86	2.46	2.16	1.92	2.25	13.44
	(4.43)	(0.53)	(1.47)	(1.16)	(1.36)	(1.32)	(0.58)	(3.81)

Note: range of the cooperation task = 0-18; range in each ToM task = 0-3; range of the total ToM score = 0-18

Correlations between cooperative abilities and theory of mind

In order to analyse the correlation between the ability to cooperate on a referential communication task and ToM skills, we performed partial correlations (controlling for age), both for the total sample, and as a function of the role in the cooperative activity.

For the total sample the correlation was only significant ($p < .05$) between cooperation and both ToM total score ($r = .34, p = .016$) and change

of location score ($r = 0.36$, $p = 0.011$), being both correlations of low intensity (see [Bisquerra, 2004](#)).

When we took into account the role of the participants in the cooperative activity we observed no significant correlations in the group of guides ($p > .05$), whereas in the group of builders we found a correlations of moderate intensity between cooperation and the following tasks: change of location ($r = .45$, $p = .027$), deception ($r = .41$, $p = .049$), and ToM total score ($r = .50$, $p = .013$).

Theory of mind skills, role of the participants and success in the cooperative activity

As the following analysis will compare the performance of the participants as a function of the role played in the cooperative activity (guides and builders) and depending on the success in this activity (high and low scores on cooperation), we first considered whether there were differences between these groups in relation to age and IQ.

We compared builders guide as to IQ (guides: $M = 57.48$, $SD = 26.10$; builders: $M = 45.32$, $SD = 27.50$) and the differences were not significant (Mann-Whitney: $p > .05$). In this case we did not analyse the effect of age because the pairs were formed by participants of the same grade and thus, in both groups of guides and builders half of the participants are from the first grade and half of the fifth grade.

If we compare the age of the participants with high and low cooperation scores (high score: $M = 119.58$, $SD = 18.13$; low score: $M = 86.79$, $SD = 19.99$) and their IQ (high score: $M = 47.46$, $SD = 26.82$; low score: $M = 55.67$, $SD = 27.60$), we found differences in terms of age (Mann -Whitney: $Z = -3.50$, $p = .000$) but not in terms of IQ ($p > .05$).

In [Table 3](#) we show the scores of the participants in the cooperation and ToM tasks in terms of the role of the participants and their high or low scores on cooperation. We observed that guides outperformed builders in the

tasks of deception, metaphor and *faux-pas*, as well as in the total ToM score. On the other side, builders showed better results on the unexpected content and change of location tasks. However, the contrasts were only significant ($p < .05$) in the *faux-pas* task.

Analysing the relation between high/low success in the cooperative task and ToM scores (see Table 3), we observed that participants with low scores on cooperation outperformed the group with high scores in unexpected content task, but the differences were not significant ($p > .05$). In the rest of ToM tasks, as well as in the total ToM score, participants with high scores on cooperation outperform their peers with low scores. These differences were statistically significant for the following tasks ($p < .05$): change of location, deception, metaphor, emotional attribution and total ToM score.

Table 3

Mean (and standard deviation) in the cooperation and ToM tasks as a function of the role of the participants and the level of success in the cooperative task

	COOP	First-order false belief	Second-order false belief	Deception	Metaphor	Faux-pas	Emotional Attribution	Total ToM score
<i>Guides</i>	7.24	2.76	1.80	2.64	2.28	2.34	2.24	14.06
N = 25	(4.47)	(0.56)	(1.50)	(.99)	(1.31)	(1.15)	(0.50)	(3.27)
<i>Builders</i>	7.24	2.82	1.92	2.28	2.04	1.50	2.26	12.8
N = 25	(4.47)	(0.50)	(1.47)	(1.31)	(1.43)	(1.37)	(0.66)	(4.26)
Contrasts	Z = .00 <i>p</i> = 1.000	Z = -.40 <i>p</i> = .687	Z = -.29 <i>p</i> = .773	Z = -1.09 <i>p</i> = .274	Z = -.62 <i>p</i> = .533	Z = -2.28 <i>p</i> = .023 *	Z = -.37 <i>p</i> = .710	Z = -.79 <i>p</i> = .431
<i>High scores on cooperation</i>	10.50	2.77	2.77	2.88	2.65	2.25	2.46	15.79
N = 26	(3.64)	(0.55)	(0.82)	(0.59)	(0.98)	(1.14)	(0.49)	(2.28)
<i>Low scores on cooperation</i>	3.71	2.81	0.87	2.00	1.62	1.56	2.02	10.90
N = 24	(1.52)	(0.51)	(1.39)	(1.44)	(1.53)	(1.43)	(0.60)	(3.51)
Contrasts	Z = -6.07 <i>p</i> = .000 *	Z = -.29 <i>p</i> = .771	Z = -4.55 <i>p</i> = .000 *	Z = -2.68 <i>P</i> = .007 *	Z = -2.67 <i>p</i> = .008 *	Z = -1.74 <i>p</i> = .082	Z = -2.62 <i>p</i> = .009 *	Z = -4.50 <i>p</i> = .000 *

Note: range of the cooperation task = 0-18; range in each ToM task = 0-3; range of the total ToM score = 0-18 (*) means $p < .05$

Discussion

In sum, the results of our study show that ToM skills are linked to effectiveness in the collaborative task. In addition, they provide more accurate data regarding some aspects of the relationship between ToM and cooperation.

First, the descriptive results from [Table 2](#) show that first-grade participants had higher difficulty in solving all the tasks, except for the unexpected content task, which is usually worked out from the age of 4 years ([Wellman and Liu, 2004](#)), and therefore this may be explained by a ceiling effect.

In the rest of the tasks fifth-grade participants scored higher than first-graders. It is especially remarkable the low score on the second-order false belief task (change of location), since results from other studies indicate a higher level of accomplishment at the age of 6, but this could be explained in terms of the task version (see, for example: [Perner & Howes, 1992](#); [Wimmer & Perner, 1985](#)). Now, we must take into account that fifth-graders do performance well on this task, so our version seems to discriminate participants adequately according to their abilities. On the other hand, in terms of cooperation abilities, we found that fifth-graders doubled the score of the first-graders.

Regarding our first hypothesis, correlations showed that there is a significant relationship between ToM scores and performance on the cooperative task, though the strength of this relationship is moderate and mainly reflected in the second-order false belief task (change of location). Now, if we take into account the role of the participants, the results were more specific. In the case of the builders, success in cooperation was significantly related to the tasks of deception and change of location (after

controlling age), as well as to the total ToM score. Furthermore, the intensity of the correlations was, in this case, high. On the contrary, in the case of the guides, no correlation between ToM and cooperation as found to be significant (controlling the effect of age). These results suggest that, in the cooperative task used in this research, ToM skills are important mainly in the case of the builders, where participants receive information and have to decide and request which information is necessary to resolve the task. Moreover, the results indicate which ToM skills are involved in the cooperation activity, mainly understanding second-order false beliefs and deception.

These two abilities have been related by some authors to executive functioning skills (fundamentally with working memory), and could be regarded as part of the more cognitive part of the ToM (Tirapu-Ustárrroz et al., 2007), as opposed to a more socioemotional component, which would include skills such as emotional attribution and *faux-pas* understanding.

Concerning the ToM scores as a function of the role of the participants, we observed a significant difference in favour of the guides. However, this difference occurs only in the *faux-pas* task and it is not reflected in the total ToM score. Therefore, overall, there are no differences in ToM scores between guides and builders, or at least not in the more cognitive component of ToM, as the *faux-pas* understanding may be considered as being part of the more emotional or moral component.

Attending to the success in the cooperative task (see Table 3), we observed that participants with high scores on cooperation obtained greater ToM scores than participants with low scores on cooperation. That is, the pairs with greater results in the cooperative activity also obtained significantly higher scores in the ToM tasks, except for the unexpected content task and the *faux-pas* task. In the former, most of the children pass the task, and therefore no differences between groups were observed. In relation to the *faux-pas* task, we had obtained different results for builders and guides, and now we observed differences as a function of cooperative

success. Despite we cannot explain that, these two results could be related. However, it is also possible that the type of skill underlying the *faux-pas* is not directly related to the success in the cooperative activity.

In conclusion, the ToM is strongly related to the ability to cooperate successfully, as already observed in other studies (Paal & Berezkei, 2007; Takagishi et al., 2010). What's more, in our study we found that to be so regardless of age. Besides, our results suggest that different skills may be involved in this relationship, mainly advanced cognitive ToM skills, as shown by the performance on the second-order false belief task (change of location). Unlike previous studies focused on a single task (Takagishi et al., 2010; Krych-Applebaum et al., 2007), our study highlights the relationship between ToM and cooperation through various ToM tasks (in ages not investigated before), and indicate that the ToM skills needed to cooperate effectively may vary as a function of role of the participants (speaker vs. receiver).

Finally, we suggest that the relationship between ToM skills and cooperation found in this work should be studied in the future through: (a) the design of various cooperative tasks, beyond those of referential communication, (b) the control of the ToM skills of the different participants, in a way that allowed to observe how the interaction of different mentalistic patterns affects the results of cooperative interactions; and (c) the consideration of other variables such as language, executive functions and motivation to cooperate. Then again, there is also a need to deepen the concept of ToM in order to clarify how and to what extent their various components are involved in the ability to cooperate.

Acknowledgements

This study was supported by the grant “Convocatòria 2012 d’ajuts a accions singulars d’R+D” from the University of Girona (SING12/20).

References

- Arvaja, M., Salovaara, H., Häkkinen, P. & Järvelä, S. (2007). Combining individual and group-level perspectives for studying collaborative knowledge construction in context. *Learning and Instruction*, 17, 448-459. doi: [10.1016/j.learninstruc.2007.04.003](https://doi.org/10.1016/j.learninstruc.2007.04.003)
- Baron-Cohen, S. (2003). *The Essential Difference: The Truth about the Male and Female Brain*. New York: Basic Books.
- Baron-Cohen, S., O’Riordan, M., Stone, V., Jones, R. & Plaisted, K. (1999). Recognition of faux-pas by normally developing children and children with Asperger syndrome or high functioning autism. *Journal of Autism and Developmental Disorders*, 29, 407-418. doi: [10.1023/A:1023035012436](https://doi.org/10.1023/A:1023035012436)
- Bisquerra R. (2004). *Metodología de la Investigación Educativa*. Madrid: La Muralla, S.A.
- Bryant, L., Coffey, A., Povinelli, D. J. & Pruetz, J. R. (2013). Theory of mind experience sampling in typical adults. *Consciousness and Cognition*, 22(3), 697-707. doi: [10.1016/j.concog.2013.04.005](https://doi.org/10.1016/j.concog.2013.04.005)
- Cabero, J. (2003). La galaxia digital y la educación: los nuevos entornos de aprendizaje. En J. Aguaded (Ed.), *Luces en el laberinto audiovisual* (pp.102-121). Huelva: Grupo Comunicar.
- Dillenbourg, P. (1999). *Collaborative-learning: Cognitive and Computational Approaches*. Oxford: Elsevier.
- Filippova, E. & Astington, J. (2008). Further development in social reasoning revealed in discourse irony understanding. *Child Development*, 79(1), 126-138. doi:[10.1111/j.1467-8624.2007.01115.x](https://doi.org/10.1111/j.1467-8624.2007.01115.x)
- Happé, F. (1993). Communicative competence and theory of mind in autism: A test of Relevance theory. *Cognition*, 48, 101-119. doi: [10.1016/0010-0277\(93\)90026-r](https://doi.org/10.1016/0010-0277(93)90026-r)

- Happé, F. (1994). An Advanced test of theory of mind: Understanding of story characters' thoughts and feelings by able autistic, mentally handicapped, and normal children and adults. *Journal of Autism and Developmental Disorders*, 24, 129-154. doi: [10.1007/bf02172093](https://doi.org/10.1007/bf02172093)
- Johnson, D. & Johnson, R. (1979). Conflict in the classroom: Controversy and Learning. *Review of Educational Research*, 49, 51-70. doi: [10.1111/teth.12007](https://doi.org/10.1111/teth.12007)
- Kaufman, A. S. & Kaufman, N. L. (1994). *Test Breve de Inteligencia de Kaufman*. Madrid: TEA Publicaciones de Psicología Aplicada.
- Korkman, M., Kirk, U. & Kemp S. (2007). *NEPSY II*. San Antonio: Psychological Corporation.
- Krych-Appelbaum, M., Law, J., Jones, D., Barnacz, A., Johnson, A. & Keenan, J. P. (2007). I think I know what you mean: The role of theory of mind in collaborative communication. *Interaction Studies*, 8, 267-280. doi: dx.doi.org/10.1075/is.8.2.05kry
- Liebal, K., Colombi, C., Rogers, S., Warneken, F. & Tomasello, M. (2008). Helping and Cooperation in Children with Autism. *Journal of Autism and Developmental Disorders*, 38, 224-238. doi: [10.1007/s10803-007-0381-5](https://doi.org/10.1007/s10803-007-0381-5)
- Maridaki-Kassotaki, K. & Antonopoulou, K. (2011). Examination of the relationship between false-belief understanding and referential communication skills. *European Journal of Psychology of Education*, 26(1), 75-84. doi: [10.1007/s10212-010-0037-2](https://doi.org/10.1007/s10212-010-0037-2)
- OECD (2002). Definition and Selection of Competencies (DeSeCo). *Theoretical and Conceptual Foundations: Strategy paper*. Paris: Organisation for Economic Co-Operation and Development.
- Olivar, J. S, Flores, V. & de la Iglesia, M. (2004). Relación entre Teoría de la Mente y Comunicación Referencial. Una explicación de los déficits pragmáticos en personas con autismo y síndrome de Down. *Acción Psicológica*, 3, 31-42.

- Olivar, J. S. & Belinchón, M. (1997). Ineficacia en la comunicación referencial de personas con autismo y otros trastornos relacionados: Un estudio empírico. *Anuario de psicología*, 75, 119-145.
- Paal, T. & Berezkei, T. (2007). Adult theory of mind, cooperation, Machiavellianism: The effect of mindreading on social relations. *Personality and Individual Differences*, 43, 541-551. doi: [10.1016/j.paid.2006.12.021](https://doi.org/10.1016/j.paid.2006.12.021)
- Perner, J. & Howes, D. (1992). "He thinks he knows" and more developmental evidence against the simulation (role-taking) theory. *Mind and Language*, 7, 72-86. doi: [10.1111/j.1468-0017.1992.tb00197.x](https://doi.org/10.1111/j.1468-0017.1992.tb00197.x)
- Perner, J., Leekman, S. R. & Wimmer, H. (1987). Three-year-olds' difficulty with false-belief: the case for a conceptual deficit. *British Journal of Developmental Psychology*, 5, 127-135. doi: [10.1111/j.2044-835X.1987.tb01048.x](https://doi.org/10.1111/j.2044-835X.1987.tb01048.x)
- Resches, M. & Pérez-Pereira, M. (2004). Comunicación referencial y conocimiento social: ¿Independientes o conectados? *Anuario de Psicología*, 35, 143-175.
- Rivière, A. & Nuñez, M. (1996). *La mirada mental*. Buenos Aires: Aique.
- Sally, D. & Hill, E. (2005). The development of interpersonal strategy: Autism, theory-of-mind, cooperation and fairness. *Journal of Economic Psychology*, 27, 73-97. doi: [10.1016/j.joep.2005.06.015](https://doi.org/10.1016/j.joep.2005.06.015)
- Serrano, J. (2012). *Desarrollo de la teoría de la mente, lenguaje y funciones ejecutivas en niños de 4 a 12 años*. Tesis doctoral no publicada, Universitat de Girona, Girona.
- Takagishi, H., Kameshima, S., Schug, J., Koizumi, M. & Yamagishi, T. (2010). Theory of mind enhances preference for fairness. *Journal of Experimental Child Psychology*, 105(1-2), 130-137. doi: [10.1016/j.jecp.2009.09.005](https://doi.org/10.1016/j.jecp.2009.09.005)

- Tirapu-Ustárrroz, J., Pérez-Sayes, G., Erekatxo-Bilbao, M. & Pelegrín-Valero, C. (2007). ¿Qué es teoría de la mente? *Revista de Neurología*, 44(88), 479-489.
- Tomasello, M. (2008). *Origins of Human Communication*. Cambridge: MIT Press.
- Tomasello, M. (2009). *Why We Cooperate*. Cambridge: MIT Press.
- Wellman, H. & Liu, D. (2004). Scaling of theory-of-mind tasks. *Child Development*, 75, 523-541. doi: [10.1111/j.1467-8624.2004.00691.x](https://doi.org/10.1111/j.1467-8624.2004.00691.x)
- Wimmer, H. & Perner, J. (1985). Beliefs about beliefs: representation and constraining function of wrong beliefs in young children's understanding of deception. *Cognition*, 21, 103-28. doi: [10.1016/0010-0277\(83\)90004-5](https://doi.org/10.1016/0010-0277(83)90004-5)

Francesc Sidera, Elisabet Serra, Jèssica Serrano, Carles Rostan, Agnès Caño and Anna Amadó are professors in the Department of Psychology at the Universitat de Girona, and research members of the Research Group on Language and Cognition.

Contact Address: Direct correspondence to Dr. Sidera at the Department of Psychology, Faculty of Education and Psychology, Universitat de Girona, Campus Girona Barri Vell, Plaça Sant Domènec, 9. 17071 Girona (Spain) E-mail address: francesc.sidera@udg.edu

Appendixes

Appendix A

Theory of mind tasks

a. First-order false belief (unexpected content)

The experimenter shows a closed tube of Lacasitos ® and says: "Look, here I have this tube". After showing the tube the experimenter asks: "What do you think there is inside the tube?"

Then the experimenter opens the tube and shows its real content: "Let's see... Look! There are actually pebbles in the tube!"

After that the experimenter closes the tube and asks: "What did you think there was inside the tube before opening it?" Then he also asks a control question: "And what's actually inside the tube?" The experimenter continues explaining: "Imagine that now comes X (a fellow of the participant). X has never seen what's inside the tube. If we show him/her the closed tube as we have it now, what will X think there is inside the tube? "

The child is also asked to justify his/her answer: "Why will X say that?" A final control question is made: "Has X seen what's inside the tube?"

b. Second-order false belief (change of location)

We show the photograph and start explaining: "John and Mary are in the fair. John wants to go on the wheel. Mary does not want to go on the wheel and goes to the carousel. When John sees that the cue for the wheel is very long, he decides to go to the haunted house. When Mary leaves the carousel she goes to look for John."

Then, the experimenter asks: "Where will Mary look for John?" And "Why will Mary go to that place?"

After that the experimenter says: "But really, when Mary was on the carousel she saw that John was going to the haunted house. John did not see that Mary was watching him".

Then the experimenter asks the second-order false belief question: "Where does John think Mary will look for him?" Why does John think that?"

Finally, three control questions are made: "Did Mary see John going to the haunted house?" "Did John see that Mary was watching?" And "at the beginning of the story, where did John want to go?"

c. Deception

The experimenter starts saying: "Now I will explain a story of two brothers, Marta and Peter. Marta is a liar and his brother Peter knows that Marta is a liar and never tells the truth. One day Martha took, without permission, Peter's ball. Peter was sure Marta had hidden his ball somewhere, but could not find it. Peter was very angry. Then Peter met Marta and asked her: 'Where's my ball? You have hidden my ball either in your closet or under your bed, because I have looked everywhere and I didn't find it. Where is it: in your closet or under your bed?' Then Marta said that the ball was hidden under her bed."

After explaining that story the experimenter asks: "Why will Peter go to get the ball in the closet?" And finally he asks the memory control question: "Where did Marta say she had hidden the ball?"

d. Metaphor

The experimenter shows a photo with two twin sisters and says: "Paula and Ruth are sisters. Her mother says that "they are like two drops of water". Then the experimenter asks: "What does the mother mean?"

e. Faux-pas

The experimenter explains the following story: "Cristina gave Manuel a plane for his birthday. Some months later, Cristina and Manuel were playing with the plane and Cristina accidentally broke the plane. 'Sorry' said Cristina. And Manuel said, "Don't worry. I never liked this plane. Someone gave it to me for my birthday. "

After explaining the story the experimenter asked three questions of *faux-pas* detection: "In the story, did anyone say something they shouldn't have said or something awkward?" "Who said it?" and "What did he/she say?"

The experimenter continued with the following question: "Did Manuel want Cristina to feel bad?"

The next question was: "And, what did Cristina feel like?"

Finally, two control questions were asked: "What did Cristina give Manuel for his birthday?" And "Did Manuel remember that Cristina had given him a plane?"

f. Emotional attribution

The experimenter starts saying: "The images I'll show are images of a girl named Julia. I'll show you some pictures about Julia turned back and about what happens to her. After looking at each of the images we will look at four photographs and you will have to tell me what photograph shows how Julia feels in the situation".

Before administering the six test images, there was a trial item (Julia fell off her bike and got hurt): "Let's make a trial. Look at this picture. This is Julia and here there are the 4 photos with different expressions of Julia. Point to the face that best shows us how Julia feels here".

If the child answers correctly the experimenter says: "Very good ! Now we will look at another picture".

If the child is wrong the experimenter says: "This is not correct. In the picture we see that Julia is hurt. This face shows us how Julia feels when she is hurt".

Afterwards the experimenter administers the 6 items. It is important to say that no feedback is given nor it is explained the situation to the participant, who is shown each of the situations and is asked to indicate the correct photograph. The experimenter only shows each of the test images to the child, and asks him/her about the correct photograph.

Appendix B

Cooperative task

After placing each pair of participants in front of each other, with the opaque screen in the middle, the experimenter said: "A (name of participant) is on this side of the screen and B (name of participant) on this other side. We put this screen in the middle of the table so that you cannot see what the other person is doing. So you cannot lift, or move the screen or show things above the screen. Only, you could see each other's eyes".

Then the experimenter explained the purpose of the task: "A has a model made with building blocks and B has a base and many pieces to build. Without looking at what the other is doing, the two of you will have to build the same model that now A has. You have to build the model as quick as possible. Both of you can talk, but you cannot look. When you finish the model you will have to say "we're done".

Finally, the role of the researcher was clarified: "I will not be able to speak or to help." When participants requested the assistance of the experimenter, she answered them: "you two have to build the same model that now A has. Both of you can talk, but you cannot look".

Instructions for authors, subscriptions and further details:

<http://ijep.hipatiapress.com>

The Anti-Education Era: Creating Smarter Students Through Digital Learning.

Todd Lilly¹

1) Edgewood College, United States of America.

Date of publication: October 24th, 2013

Edition period: October 2013 - February 2014

To cite this review: Lilly, T. (2013). The Anti-Education Era: Creating Smarter Students Through Digital Learning. [Review of the book *The Anti-Education Era: Creating Smarter Students Through Digital Learning*, by James Gee]. *International Journal of Educational Psychology*, 2(3), 353-355. doi: 10.4471/ijep.2013.31

To link this article: <http://dx.doi.org/10.4471/ijep.2013.31>

PLEASE SCROLL DOWN FOR ARTICLE

The terms and conditions of use are related to the Open Journal System and to [Creative Commons Attribution License \(CCAL\)](#).

Review

Gee, J.P. (2013). *The Anti-Education Era: Creating Smarter Students Through Digital Learning*. New York: Palgrave Macmillan
ISBN: 978-0-230-34209-5

James Paul Gee is a skilled scholar, rhetorician, and storyteller. Reading his work seems a bit like having a conversation with a neighbor, yet there is a method to his madness: “People need to get ‘situated meanings’ from actual images and experiences that render their words...” From this perspective, his latest collection of words, *The Anti-Education Era: Creating Smarter Students Through Digital Learning* is well-rendered.

“How can smart people- like you and me- be so dumb?” What kind of education is required to “save ourselves from our own stupidity?” What kind of education will make us agents rather than “victims in a world full of ideology, risk, fear, and uncertainty?” (p. XII).

The first two-thirds of Gee’s book, is a provocative rant about how we and James Paul Gee can be so stupid. How can we allow trillions of U.S. dollars to be spent on unwinnable wars while denying our poorest neighbors basic necessities? How can we allow ourselves to be victims of deregulated banking institutions and then allow the perpetrators huge monetary rewards rather than regulation? How can we ignore the empirical science behind global warming even as crops wither and oceans rise? (pp. VI, VII).

Gee offers a psychological explanation, which he calls *comfort stories*. These are Orwellian-like myths that simplify the uncomfortable, overwhelming complexities of the world. “In the act, we come to believe in connections and generalizations that are not true” (p. 33). These comfort stories offer irrational rationales for our shortcomings and transgressions. For example:

- *Our problems are President Obama’s fault because he is a Muslim who was born in Africa.*
- *Jesus said that he wants us to accumulate great riches, and poor people are poor because they are lazy.*
- *Standing in line all night to buy a new i-Phone will make us happy. Pure stupidity.*

Gee muses that the survival of our ancestral hunters and gatherers depended upon traveling light in mind and body, but now we weight ourselves down with splendid possessions that make us richly comfortable (p.138). However, we still prefer light, unburdened minds. We refrain from thinking about hefty problems, which Gee concludes is quite stupid in a world that increasingly requires complex, uncomfortable solutions.

Just when he has us convinced that we are hopelessly broken, Gee informs us in the final chapters that we have a whole toolkit full of tools at our disposal that if used correctly, can build smart Minds (with a capital ‘M’), and smart Minds yield sound bodies, healthy environments, and just societies (p. 155).

Previously, Gee has used the ‘toolkit’ metaphor to differentiate ordinary *discourse* from *Discourse* (with a capital ‘D’). In order to be recognized as a member of a particular Discourse, such as the Discourse of a particular profession or the Discourse of a working class tavern, one needs to use the correct “tools”. One such tool would be the correct way of talking, another would be ways to act and dress, another would be the correct way to think, and so on. Now, Gee offers a distinction between *minds* and *Minds*: “What if human minds are not meant to think for themselves, but, rather, to integrate

with tools and other people's minds to make a Mind of minds?" (p. 153). Communities of ideas, expertise and talents can rise in concert to create a Mind of minds, capable of solving highly complex dilemmas.

The creation of such Minds requires an educational paradigm shift (p. 205). The old days of admonishing students to do their own work and keep their eyes on their own papers must shift to teaching students how to identify and solve problems by tapping into the minds of those who exhibit critical knowledge and skills. This is achievable through face-to-face, real-time interactions as well as through engagement in digitalized simulations and Internet *affinity sites*, which Gee defines as virtual spaces where "multiple tools, different types of people, and diverse skill sets are networked in ways that make everyone smarter and make a space itself a form of emergent intelligence" (p. 174). Gee envisions that this process of *distributed cognition* (p. 122) is absolutely necessary if we are to avert an otherwise catastrophic fate.

He makes a compelling argument, with little room for comfort.

Todd Lilly
Edgewood College
TLilly@edgewood.edu