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# The link between emotion identification skills and socio-emotional functioning in early adolescence: A 1-year longitudinal study

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## Abstract

Amongst adults, low emotion identification skill (EIS) relates to poor emotion regulation strategies, higher rates of anxiety and depression, and higher rates of somatic illness and disease [Taylor, G. J., & Bagby, R. M. (2004). New trends in alexithymia research. *Psychotherapy and Psychosomatics*, 73, 68–77]. Little research has examined EIS in adolescence and, in particular, the longitudinal impact of EIS on social support and affective experience. Six hundred and sixty-seven high school students completed measures of EIS, social support and positive and negative affects in Grade 8, and again in Grade 9. Repeated measure ANOVAS revealed that negative affect increased and positive affect decreased from Grades 8 to 9. Structural equation modelling revealed that low EIS predicted increases in fear, decreases in positive affect, and decreases in the quality and quantity of social support. Amongst boys, low EIS also predicted increases in sadness. We discuss the implications of these findings for early prevention programmes.

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*Keywords:* Alexithymia; Difficulty identifying feelings; Adolescents; Well-being; Emotions; Longitudinal; Social support; Emotion identification skill; Affective experience

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## Introduction

People differ in how hard they find it to identify and describe emotions. Sifneos (1973) termed this problem “alexithymia”, which literally means having no words for feelings. Other researchers have used terms such as “emotion perception” (Ciarrochi, Chan, & Bajgar, 2001), “emotional clarity” (Salovey, Stroud, Woolery, & Epel, 2002), and “mood labelling” (Swinkels & Giuliano, 1995). These terms have emerged from different literatures, yet they all appear to reflect a similar construct (Gohm & Clore, 2000). We will label this construct “Emotion Identification Skill”, or EIS.

Adults who are low in EIS often have trouble regulating their negative affect (NA) (Taylor, Bagby, & Parker, 1997) and experience difficulty in establishing and maintaining intimate social relationships (Ciarrochi, Scott, Deane, & Heaven, 2003; Kauhanen, Kaplan, Julkunen, Wilson, & Salonen, 1993). Relatively little research has examined EIS in adolescents. What research has been conducted has been cross-sectional, and therefore does not allow one to establish whether EIS is a precursor to social support and affective experience, or a mere concomitant. If EIS is a precursor, then it could be used to identify adolescents low in EIS before major problems occur. These adolescents could be targeted for an intervention that seeks to improve emotion identification. More generally, if EIS is a precursor, then universal prevention programmes should seek to teach emotion identification skills to all students. The present study examined whether EIS in Grade 8 predicted changes in fear, hostility, sadness, positive affect, and social support in Grade 9.

### *EIS and social and emotional experience in adults*

Emotion identification is seen by many to be a fundamental building block of emotional competence (Ciarrochi, Forgas, & Mayer, 2006; Mayer, Salovey, & Caruso, 2004; Saarni, 1999). Emotions and moods provide information about our relationship to the environment, such as when fear signals that there is a prospect of something undesirable happening in the future and sadness signals that something undesirable has happened in the past (Ortony, Clore, & Collins, 1988). Global positive mood often signals that the present environment is safe, and cues people to explore, socialize, and utilize pre-existing knowledge (Fredrickson, 2001). In contrast, negative mood signals that “something is wrong” and often cues people to be careful and pay attention to the details of the current environment, rather than relying on pre-existing knowledge (Bless, 2001).

Larsen’s (2000) two-stage model suggests that emotion often signals a person to engage in emotion regulation. The first stage involves identifying an undesirable affective stage. Successful identification is thought to trigger a second affect management stage in which cognitive and behavioural processes are used to down-regulate affective states viewed as problematic (Larsen, 2000). People who do not accurately detect and monitor their affective states are proposed to have problems managing their affect. Based on this model, we hypothesize that adolescents who are low in EIS, and who are entering a particularly challenging time in their life will tend to manage their affective states poorly, and will experience increased levels of NA and decreased levels of positive affect.

We also hypothesize a link between EIS and social support, defined here as amount and quality of social support. Identifying and sharing emotion may be essential to the development of friendships, support, and intimacy (Fitness, 2006; Spitzer, Siebel-Jurges, Barnow, Grabe, &

Freyberger, 2005). Adults low in EIS engage in less social sharing of emotions, especially for negative events (Pennebaker, Zech, & Rime, 2001; Taylor et al., 1997). We therefore expect that low EIS will predict low quantity and quality of social support.

There are three self-report measures of EIS used with adults: the difficulty identifying and describing subscales of alexithymia (Bagby, Parker, & Taylor, 1994; Bagby, Taylor, & Parker, 1994), the emotional clarity scale (Salovey, Mayer, Goldman, Turvey, & Palfai, 1995), and the emotional labelling scale (Swinkels & Giuliano, 1995). Research amongst adults generally supports our hypotheses that people low in EIS experience greater social and emotional problems. Both emotional clarity and emotional labelling have been associated with the experience of more positive (and less negative) mood states (Rude & McCarthy, 2003; Salovey et al., 1995, 2002; Swinkels & Giuliano, 1995). Research also suggests that higher levels of alexithymia (of which EIS forms a core part) are associated with higher levels of general psychological distress, particularly anxiety, stress, and depression (Kerr, Johnson, Gans, & Krumrine, 2004; Zeitlin & McNally, 1993), higher rates of somatic illness and disease (Taylor, 2000), eating disorders (Wheeler, Greiner, & Boulton, 2005), and social and interpersonal problems (Spitzer et al., 2005). Many of the problems associated with alexithymia (e.g., drug abuse) may reflect ineffective attempts to regulate emotions (Taylor, 2000).

### *Theories of how emotion identification develops*

Saarni and colleagues have provided a theory of how emotional competence develops from infancy to adulthood (Bukley & Saarni, 2006; Saarni, 2000). The present paper is most relevant to two of Saarni's emotional competence dimensions: (1) awareness of one's emotional states and (2) skill in using the vocabulary of emotion and expression in terms commonly available in one's subculture.

According to Saarni, children first develop an awareness of their own emotional responses between 12 and 28 months of age. Then, during the preschool years (aged 2.5–5 years), children communicate about emotions and emotion eliciting events with others. Such communication normally helps them to develop awareness and understanding. Children also develop the ability to evaluate themselves and their emotions as being “good” or “bad”, and this sets the stage for self-conscious emotions (e.g., embarrassment). In middle school, children become aware of having multiple, sometimes conflicting, emotions towards the same person, and finally, by adolescence, they become aware of their own emotional cycles (e.g., embarrassment about feeling afraid).

Lane et al. (1990) have proposed a cognitive model of emotional awareness development that compliments Saarni's model. Emotional experience is said to become more differentiated and integrated with development, such that the representations of emotional states move from implicit to explicit forms. Lane et al. (1990) posited five levels of emotional awareness, each level representing a hierarchical increase in differentiation and integration from the previous level. People are said to move from a lack of awareness, to awareness of relatively undifferentiated emotional states (“I feel bad”), to awareness of individual feelings (“I am angry”), to awareness of emotional blends (“I feel both happy and sad”), and finally, to awareness of blends in both self and others, and an ability to clearly differentiate feelings in the self from those in another. Both Lane and Saarni's developmental framework suggests that individual differences in emotion identification may occur both across and within age groups.

There are at least three interrelated theories that explain why emotion identification skills may differ between individuals. First, it may be that low EIS is the consequence of psychological trauma occurring early in life that influences the developing brain and produces neuroanatomical problems (Krystal, 1988; Taylor & Bagby, 2004). Second, it may be that low EIS is due, in part at least, to environments that teach children that some emotions are “bad” and should be avoided (Gottman, Katz, & Hooven, 1996). Avoidance may lead children to become disconnected from their feelings and unable to produce labels for them. Consistent with this view, there is an empirical link between having an avoidant coping style and having low EIS (Parker, Taylor, & Bagby, 1998). Finally, low EIS may arise in children whose caregivers fail to accurately and sensitively articulate their affective states (Reckling & Buirski, 1996). At the extreme, the abusive caregiver may deliberately invalidate the child’s feelings (“You shouldn’t feel sad”), leaving the child distrusting their own affective states and confused.

### *Research on EIS in children and adolescence*

Cross-sectional research in self-reported EIS with adolescents has been conducted using the alexithymia scale (AL; Bagby & Parker et al., 1994; Bagby & Taylor et al., 1994), the awareness scale (AW) of the emotion expression scale for children (Penza-Clyve & Zeman, 2002), and the emotion clarity scale (EC; Salovey et al., 1995). The three scales have quite similar items, such as “I often do not know how I am feeling (AW)”, “I am often confused about the way I am feeling inside (AL), and “I am rarely confused about how I feel” (EC; Salovey et al., 1995). This overlap is perhaps unsurprising in the case of the alexithymia and the AWs, in that the latter scale was derived from the former, but validated on a different age group (Penza-Clyve & Zeman, 2002).

Rieffe, Oosterveld, and Terwogt (2006) examined alexithymia in children aged approximately 12 years. They found that both difficulty identifying and difficulty describing feelings could be reliably measured in this population. These scales also correlated with lower levels of happiness, and higher anger, fear, and sadness. Extremera, Duran, and Rey (2007) examined the link between emotional clarity and a variety of adjustment variables amongst a group of adolescents (mean age 15.7 years). They found that clarity was related to higher optimism and satisfaction with life, and lower pessimism and perceived stress. Importantly, clarity was correlated with lower stress and higher life satisfaction, even after controlling for optimism and pessimism, suggesting that the variable was distinctive. In a related study, Fernandez-Berrocal and colleagues found that emotional clarity was associated with lower rates of depression and anxiety, even after controlling for self-esteem (Fernandez-Berrocal, Alcaide, Extremera, & Pizarro, 2006).

Finally, research has examined the link between adjustment and the emotional awareness subscale of the Emotion Expression Scale for Children (Penza-Clyve & Zeman, 2002; Sim & Zeman, 2004; Zeman, Shipman, & Suveg, 2002). Penza-Clyve and Zeman (2002) conducted a cross-sectional study involving children ranging between 9 and 12 years of age. They found that low awareness was associated with higher inhibition of emotional expressivity, and higher likelihood of coping in maladaptive ways when experiencing sadness and anger. In a related study, Zeman et al. (2002) found that low emotional awareness was associated with internalizing symptoms.

Past research has found important gender differences in EIS and emotional expression. Generally, low EIS is higher amongst males than females in adults (Ciarrochi, Hynes, &

Crittenden, 2005; Mattila, Salminen, Nummi, & Joukamaa, 2006). In addition, girls (in Grades 1, 3, and 5) are more likely than boys of the same age to report expressing sadness and pain (Zeman & Garber, 1996). We therefore explored gender differences in the present study.

### The present study

We utilized a 1-year longitudinal panel design. EIS was assessed using the subscales of the Toronto Alexithymia Scale (TAS) that focus on difficulty identifying and verbally describing emotions (Bagby, Parker et al., 1994; Bagby, Taylor et al., 1994). We also measured two aspects of a person's social support network, namely, the quantity and quality of that social support (Sarason, Levine, Basham, & Sarason, 1983). Finally, we assessed four aspects of affective experience, namely, hostility, fear, sadness, and positive affect. We could not sample every affective state, but this sampling captures a broad range of important states. Fear and sadness are related to two of the most common affective disorders (i.e., anxiety and depression; Kessler et al., 1994; Watson & Clark, 1994). Anger is also central to many disorders and has important implications for social functioning and physical health (American Psychological Association, 1994; Benotsch, Christensen, & McKelvey, 1997). There tend to be fewer dimensions of positive states (Watson & Clark, 1994), and the positive affect (PA) scale we used in the present study appears to capture a broad range of positive emotion labels (e.g., delight, excitement, enthusiasm, and happiness). Although the different positive and negative states do correlate, they appear to have distinctive appraisal patterns, distinctive causes (Ortony et al., 1988), and distinct factor loadings (Watson & Clark, 1994).

We assessed the extent that EIS predicted future levels of social support and emotional experience. We focused on Grades 8–9 because this is a time of social-emotional change and challenge. Adolescents often increase their interactions with peers, decrease their interactions with family, experience difficult challenges concerning social acceptance, and begin to develop romantic relationships (Klimes-Dougan & Zeman, 2007; Larson, Richards, Moneta, Holmbeck, & Duckett, 1996; Vieno, Santinello, Pastore, & Perkins, 2007). In addition, adolescents show decreasing well-being (Csikszentmihalyi & Hunter, 2003). This leads to our first hypothesis: Emotional well-being is expected to become increasingly negative from Grades 8 to 9.

As described in our introduction, research and theory suggests that EIS may be essential for effective socio-emotional functioning (Larsen, 2000; Taylor, 2000; Spitzer et al., 2005). We therefore hypothesized that EIS will be a precursor to changes in social support and emotional experience. More specifically, on average, we expected people low in EIS to show greater decreases in social support and worsening (more negative) emotional experience compared with those high in EIS with the same baseline levels of social support and emotional experience. This hypothesis assumes that the effect of EIS is not fully realized in baseline levels of social support and emotional experience (at Grade 8). To test this hypothesis, we utilized SEM and examined the impact of Grade 8 EIS on Grade 9 social support and emotional experience, when controlling for baseline (Grade 8) measures of the variables (Wainer, 1991).

There has been some question as to whether EIS is more of a stable trait or a state that is itself influenced by emotional states. Given our panel design, we were able to evaluate the extent that EIS was influenced by state emotions. The adult literature suggests that EIS may be trait-like (Mikolajczak & Luminet, 2006; Salminen, Saarijarvi, Toikka, Kauhanen, & Aarela, 2006), so we

explored whether it would be trait-like in adolescents, that is, would be stable and relatively uninfluenced by affective states. To explore this possibility, we tested the impact of Grade 8 social support and emotional experience on Grade 9 EIS, when controlling for Grade 8 EIS.

## Method

### *Participants and procedure*

Participants were students who attended five high schools in a Catholic Diocese of New South Wales, Australia. The Diocese is located in the city of Wollongong and includes south-western Sydney ensuring a diverse socio-economic sample. For example, the spread of occupations of the fathers of our participants closely resembles national distributions (Australian Bureau of Statistics, 2004): e.g., professionals 20.4% (16.5% nationally), associated professionals 15.1% (12.7%), intermediate production and transport 11.2% (13.4%), tradespersons 34.3% (21%), managers 4.8% (9.7%), labourers 3.3% (10.8%), advanced clerical 1.2% (.9%), intermediate clerical 5.5% (8.8%), and elementary clerical 4.3% (6.1%). Additionally, 22% live in non-intact families, whereas national divorce rates are currently 29% (Australian Bureau of Statistics, 2005); 19.77% are exposed to a language other than English in the home, whereas nationally the figure is 15.8% (Australian Bureau of Statistics, 2006).

Students were surveyed in the middle of their second year in high school and again at the same time a year later. A total of 803 (mean age = 13.68 years, SD = 1.47; males = 412, females = 389; 2 did not indicate gender) and 786 (mean age = 14.68 years, SD = 1.47; males = 400, females = 379; 7 did not indicate gender) students completed the questionnaire at Time 1 and Time 2, respectively. For the purpose of conducting statistical analyses, we were able to match the data of 667 students for Time 1 and Time 2. We obtained an 83.1% follow-up rate after taking into account absences on the testing day and normal student transfers into and out of schools. We used ANOVAs to compare people who completed the survey on their Year 8 variables with those who did not complete, and found no differences on any of the variables,  $p$ 's > .1.

Consent from schools, parents, and students were obtained each year and students were then invited to participate in the study on “Youth Issues”. Administration of the questionnaires at both times took place during regular class times under the supervision of the research team and teachers. Students completed the questionnaires anonymously and without any discussion. At the conclusion of the sessions, students were thanked for their participation and debriefed.

### *Materials*

*Emotion identification skills* (Bagby, Parker et al., 1994; Bagby, Taylor et al., 1994): EIS was based on the 12 items of the TAS-12 that assesses difficulty identifying and describing emotions (Bagby, Parker et al., 1994; Bagby, Taylor et al., 1994). The difficulty identifying and describing subscales combined to form a single scale because of the high intercorrelation between them (uncorrected for measurement error:  $r_{t1} = .68$ ;  $r_{t2} = .69$ ; corrected for measurement error:  $r_{t1} = .89$ ;  $r_{t2} = .86$ ) and because past research suggests that they fall into the same psychometric space (Gohm & Clore, 2000). The EIS scale yielded alpha coefficients of .87 at Time 1 and .88 at

Time 2, which is consistent with the items forming a highly coherent scale. Items from the difficulty identifying feelings subscale include, “I am often confused about what emotion I am feeling” and “I am often puzzled by the sensations in my body.” Items from the difficulty describing feelings subscale include: “It is difficult for me to find the right words for my feelings” and “I find it hard to describe how I feel about people.” The scale was reversed so that higher numbers were indicative of high emotion identification skills.

The TAS has substantial validity evidence using all three scales in the adult literature (Bagby, Parker et al., 1994; Bagby, Taylor et al., 1994; Taylor, 2000). Recently, research suggests that amongst adolescents, the difficulty identifying and describing scales are distinctive from other constructs such as self-esteem, and relate to theoretically relevant criteria such as NA and somatic complaints (Hurrell, Ciarrochi, & Heaven, 2006; Rieffe et al., 2006).

*Positive and Negative Affect Schedule—Expanded Form (PANAS-X; Watson & Clark, 1994):* The PANAS-X is a 60-item self-report measure of two broad general factors, PA and NA, assessing 11 specific affects: fear, sadness, guilt, hostility, shyness, fatigue, surprise, joviality, self-assurance, attentiveness, and serenity. Time constraints did not allow us to administer the full 60-item scale, but we did assess fear (e.g., “afraid,” “scared”; six items,  $\alpha = .85$  for present sample), sadness (e.g. “sad,” “blue;” five items,  $\alpha = .91$ ), hostility (e.g. “scornful,” “disgusted;” seven items,  $\alpha = .82$ ), and joviality (8 items,  $\alpha = .94$ ). We refer to “joviality” as “positive affect”, as we believe this better captures the breadth of the scale, which includes items such as, “joyful” “delighted”, “excited,” “enthusiastic,” and “happy”. Respondents rated the extent to which they had experienced each particular emotion over the past month. Ratings were made on a five-point scale (very slightly or not at all (1) to extremely (5)). Research has shown the subscales to have adequate internal consistency, discriminant validity, and criterion related validity (Watson & Clark, 1994).

*Social Support Questionnaire (SSQ; Sarason et al., 1983):* The short four-item version of the SSQ was used to quantify each participant’s perception of the availability of, and satisfaction with, social support (Ciarrochi, et al., 2003; Sarason et al., 1983). Items include (1) “Who do you feel really appreciates you as a person?”, (2) “Who can you count on to help you out in a crisis situation, even though they would have to go out of their way to do so?”, (3) “Whose lives do you feel you are an important part of?”, and (4) “Who can you really count on when you need help?” For each item, respondents listed the persons perceived to be available for support and then rated how satisfied they were with these supports using a 6-point scale (very dissatisfied (1) to very satisfied (6)). Means were calculated for social support quantity and quality. The alpha reliabilities in the present sample were .89 for quantity and .88 for quality (or average satisfaction). Quantity and quality tended to be only modestly correlated (Grade 8  $r = .36$ ; Grade 9  $r = .38$ ), suggesting that they are overlapping yet distinguishable constructs (Sarason et al., 1983).

## Results

### *Preliminary analyses*

The mean scores at both times are presented in Table 1. Consistent with hypothesis 1, negative states significantly increased and positive states significantly decreased from Grades 8 to 9. There was no change in mean level of EIS and quality of social support, although there was an increase in quantity of support.

Table 1  
Mean levels of emotion identification skill (EIS) and social and emotional experience in Grades 8 and 9

Variables	Grade 8		Grade 9		<i>t</i> value
	Means	SD	Means	SD	
EIS	3.70	.80	3.67	.83	1.18
Fear	1.67	.67	1.84	.82	−5.28*
Hostility	1.75	.69	1.94	.82	−5.62*
Sadness	1.70	.87	1.99	1.05	−7.29*
Positive affect	4.15	.85	4.02	.88	3.88*
Social support quality	5.36	.74	5.33	.69	.91
Social support quantity	5.5	2.3	5.94	2.25	−4.78*

\* $p < .001$ .

As expected, the emotional well-being variables were significantly intercorrelated, with sadness correlating with PA ( $r_8 = -.31$ ;  $r_9 = -.35$ ), hostility ( $r_8 = .50$ ;  $r_9 = .58$ ), and fear ( $r_8 = .55$ ;  $r_9 = .57$ ); PA correlating with hostility ( $r_8 = -.15$ ;  $r_9 = -.24$ ) and fear ( $r_8 = -.10$ ;  $r_9 = -.10$ ), and hostility correlating with fear ( $r_8 = .50$ ;  $r_9 = .49$ ). Social support quality was correlated with quantity ( $r_8 = .36$ ;  $r_9 = .38$ ), sadness ( $r_8 = -.23$ ;  $r_9 = -.27$ ), PA ( $r_8 = .37$ ;  $r_9 = .37$ ), hostility ( $r_8 = -.22$ ;  $r_9 = -.19$ ) and fear ( $r_8 = -.13$ ;  $r_9 = -.13$ ). Finally, social support quantity was correlated with sadness ( $r_8 = -.13$ ;  $r_9 = .16$ ), PA ( $r_8 = .29$ ;  $r_9 = .30$ ), hostility ( $r_8 = -.09$ ;  $r_9 = -.08$ ), but not with fear ( $r_8 = -.06$ ;  $r_9 = -.01$ ).

Table 2 presents the correlations between Grades 8 and 9 EIS and social and emotional experience. As expected, EIS was related to lower fear, hostility, and sadness, and to higher positive affect, social support quantity, and quality.

Repeated measure ANOVAs were used to evaluate the effect of gender on Time 1 and Time 2 measures of EIS and on the social and emotional experience variables. There were no gender effects on EIS ratings,  $p > .2$ . There was evidence that girls reported greater levels of sadness ( $M_{\text{boys}} = 1.64$ ;  $M_{\text{girls}} = 2.1$ ,  $F = 46.98$ ,  $p < .01$ ) and fear ( $M_{\text{boys}} = 1.61$ ;  $M_{\text{girls}} = 1.92$ ,  $F = 44.38$ ,  $p < .01$ ), and greater levels of PA ( $M_{\text{boys}} = 4.00$ ;  $M_{\text{girls}} = 4.18$ ,  $F = 10.05$ ,  $p < .01$ ). Girls also had higher levels of social support quality ( $M_{\text{boys}} = 5.29$ ;  $M_{\text{girls}} = 5.4$ ,  $F = 5.94$ ,  $p < .01$ ) and quantity ( $M_{\text{boys}} = 5.12$ ;  $M_{\text{girls}} = 6.3$ ,  $F = 56.5$ ,  $p < .01$ ). There were no significant interactions between gender and time,  $p > .05$ , indicating that the gender differences held across Grades 8 and 9.

### Main analyses

We first assessed whether the factor structure of EIS was invariant across Grades 8 and 9. The invariant model assumed that the EIS factor loadings for Grades 8 and 9 were the same; the baseline model did not make this assumption. A comparison of the models revealed that the invariant model ( $\chi^2 = 1416$ ,  $df = 262$ ) was not a significantly worse fit than the baseline model ( $\chi^2 = 1400$ ,  $df = 251$ ),  $\chi^2_{\text{diff}} = 16$ ,  $p > .05$ , consistent with the factor structure being invariant.

We next conducted the main analysis of the panel data. We used structural equation modelling to assess the impact of Grade 8 EIS on social support and emotional experience at Grades 9 and 8 social support and emotional experience on Grade 9 EIS, whilst controlling for baseline (Year 8)

Table 2

Correlation between emotion identification skill (EIS) and emotional experience and social support (SS) for Grades 8 and 9

	Grade 8 EIS	Grade 9 EIS
Grade 8		
Fear	-.35*	-.26*
Hostility	-.43*	-.29*
Sadness	-.46*	-.32*
Positive affect	.26*	.17*
SS quantity	.23*	.15*
SS quality	.23*	.19*
Grade 9		
Fear	-.30*	-.44*
Hostility	-.23*	-.45*
Sadness	-.35*	-.52*
Positive affect	.23*	.30*
SS quantity	.19*	.18*
SS quality	.24*	.27*

\* $p < .01$ .

levels of the variables. Separate SEM analyses were conducted for each dependent variable. We also represented measurement error by using three item parcels as indicators of each latent variable at each time point. As long as at least three parcels are used, there appears to be little disadvantage to using parcels (Hau & Marsh, 2004). The main benefit, in the present study, is to reduce the parameters estimated and thereby ensure sufficient power in the modelling and especially in estimating correlated errors of repeated measures.

Two models were tested in each analysis, for each of our dependent variables. Model 2 assumed correlated measurement error between repeated variables and correlated disturbances. Model 1 did not make these assumptions. In every case, Model 2 fitted the data significantly better than Model 1, with differences in  $\chi^2 > 30$ , all  $p$ 's  $< .001$ . Table 3 presents the fit indices for the two models for each aspect of emotional experience and social support. As suggested by Kline (1998), several goodness of fit measures were used to assess the models. The measures of fit suggest that Model 2 provides adequate fit, in that, for each model, the  $\chi^2/df$  is less than 2.5, NFI is well above .90, and the RMSEA is below .05 (Bentler & Bonett, 1980; Browne & Cudeck, 1989; Kline, 1998).

We next evaluated whether any of our cross-lagged effects were moderated by sex. The SEM model (similar to Fig. 1) was tested for boys and girls separately. We compared a model where the link between EIS and future social support and emotional experience was the same for boys and girls, versus a model where this link was allowed to be different. This involved six analyses (for sadness, fear, hostility, positive affect, social support quality, and social support quantity). Given that we had no a-priori predictions, we used a Bonferoni correction. The model that assumed boys and girls differed ( $\chi^2 = 152.5$ ,  $df = 84$ ) fitted the data significantly better for the sadness analyses, compared to the model that assumed boys and girls where the same ( $\chi^2 = 163.4$ ,  $df = 85$ ),  $\chi^2 = 10.9$ ,  $p < .001$ . Examination of the cross-lagged effects revealed that EIS did not influence girl's level of sadness ( $\beta = .01$ ,  $p > .10$ ) but did influence boy's level. Fig. 1 presents the

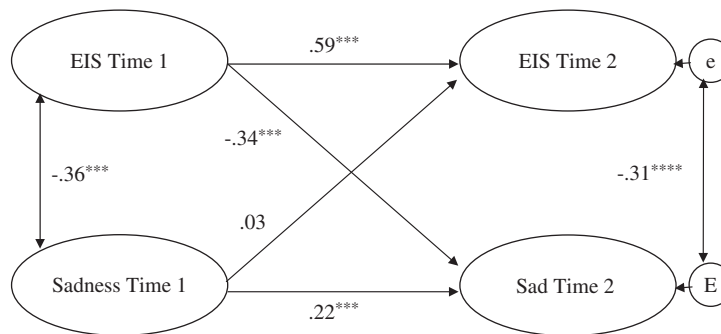
Table 3

Model fit indices for structural equation models with Grade 8 EIS and social and emotional experience (SEE) predicting Grade 9 EIS and SEE

	Model	$\chi^2$	df	$\chi^2/df$	NFI	NNFI	RMSEA
Fear	No Cov err	274.17	49	5.595	.986	.981	.083
	Cov error <sup>a</sup>	110.43	42	2.629	.994	.993	.049
Hostile	No Cov err	228.38	49	4.661	.988	.985	.074
	Cov error <sup>a</sup>	59.59	42	1.42	.997	.998	.025
Sad	No Cov err	321.02	49	6.551	.983	.977	.091
	Cov error <sup>a</sup>	87.47	42	2.083	.995	.996	.040
Positive affect	No Cov err	249.97	49	5.101	.990	.987	.078
	Cov error <sup>a</sup>	97.54	42	2.322	.996	.996	.045
SS quantity	No Cov err	108.47	49	2.214	.994	.994	.043
	Cov error <sup>a</sup>	49.10	42	1.169	.997	.999	.016
SS quality	No Cov err	132.20	49	2.698	.994	.994	.043
	Cov error <sup>a</sup>	70.97	42	1.690	.997	.999	.016

Note: NFI, Bentler-Bonett normed fit index; NNFI, Bentler-Bonett non-normed fit index (Tucker Lewis); RMSEA, root mean square error of approximation.

<sup>a</sup>Assumes covariance between measurement errors of repeated measures variables and covariance between disturbances. The other model does not make these assumptions.



\*\*\* $p < .001$ , \*\* $p < .01$ , \* $p < .05$

Fig. 1. Structural equation model of Year 8 emotion identification skill (EIS) and sadness predicting Grade 9 EIS and sadness amongst boys.

significant cross-lagged model for boys and sadness. This model illustrates that EIS at Time 1 predicted sadness at Time 2 but sadness at Time 1 did not predict EIS at Time 2.

There were no other gender effects, so the remaining models were based on data across the entire sample. Figs. 2–5 present the models with significant cross-lagged effects. Fig. 2 illustrates that low EIS predicts increasing fear, and Fig. 3 suggests that low EIS predicts decreasing positive affect. Finally, Figs. 4 and 5 indicate that low EIS predicts decreasing quality and quantity of social support. There were no significant cross-lagged effects involving hostility. The only evidence that emotional experience affected EIS levels was found in the analysis of PA (Fig. 3), with lower levels of PA at Grade 8 predicting lower levels of EIS at Grade 9.

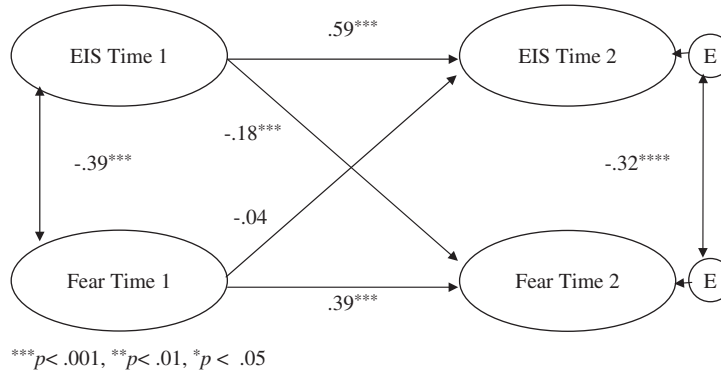


Fig. 2. Structural equation model of Grade 8 emotion identification skill (EIS) and fear predicting Grade 9 EIS and fear.

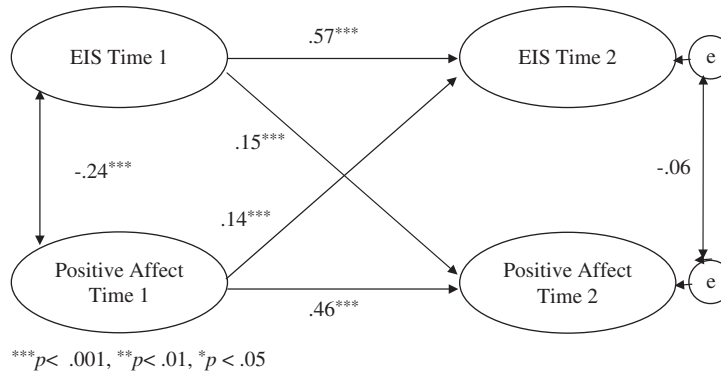


Fig. 3. Structural equation model of Grade 8 emotion identification skill (EIS) and positive affect predicting Grade 9 EIS and positive affect.

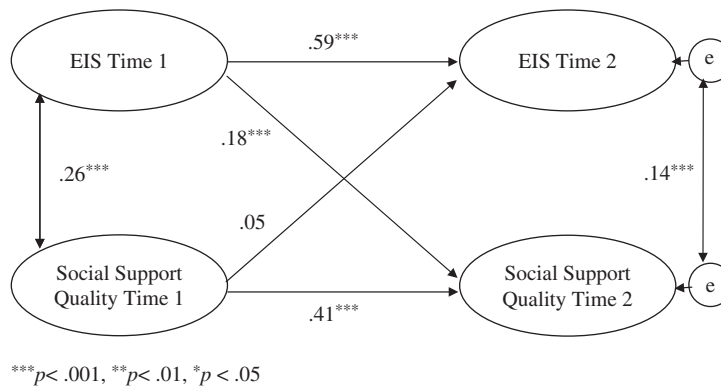


Fig. 4. Structural equation model of Grade 8 emotion identification skill (EIS) and social support (SS) quality predicting Grade 9 EIS and social support quality.

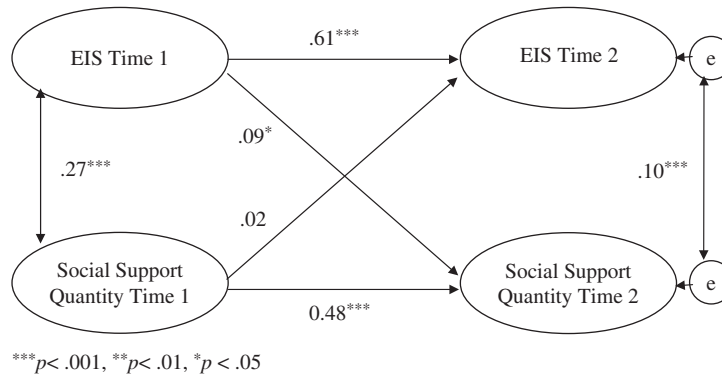


Fig. 5. Structural equation model of Grade 8 emotion identification skill (EIS) and social support (SS) quantity predicting Grade 9 EIS and social support quality.

*The combined model:* We next examined the effects described in Figs. 1–5 within a single model. This allowed us to control for covariances between concurrent measures of affect and social support. The results were essentially the same as that reported in the figures. EIS predicted future sadness ( $\beta = -.17$ ,  $p < .01$ ), PA ( $\beta = .14$ ,  $p < .01$ ), fear ( $\beta = -.18$ ,  $p < .01$ ), quality of social support ( $\beta = .20$ ,  $p < .01$ ) and quantity of social support ( $\beta = .10$ ,  $p < .05$ ). The one difference between the combined and individual analyses was that PA did not significantly predict EIS in the combined analysis ( $\beta = .01$ ). None of the measures of affect or social support predicted future EIS.

*Reliability of emotion measures amongst those high and low in EIS:* It is possible that those low in EIS would not be able to reliably report their affective states over the past month. They may report either a truncated range of responses, or they may answer relatively randomly. If either of these possibilities were true, then we would expect that the affect measures would be less reliable amongst those low in EIS compared to those high in EIS.

We performed a median split of EIS and examined the range of responses and the internal (alpha) reliabilities of the scale. We found that individuals within the low EIS group obtained scores that fell along the full-scale range (1–5) for positive affect, fear, and sadness scales. The reliabilities between those low and high in EIS were nearly identical across Grades 8 and 9: Grade 8: Fear  $\alpha_{\text{high\_EIS}} = .83$   $\alpha_{\text{low\_EIS}} = .85$ ; sadness  $\alpha_{\text{high\_EIS}} = .84$   $\alpha_{\text{low\_EIS}} = .91$ ; PA  $\alpha_{\text{high\_EIS}} = .94$   $\alpha_{\text{low\_EIS}} = .94$ ; Grade 9: Fear  $\alpha_{\text{high\_EIS}} = .85$   $\alpha_{\text{low\_EIS}} = .88$ ; Sadness  $\alpha_{\text{high\_EIS}} = .88$   $\alpha_{\text{low\_EIS}} = .91$ ; PA  $\alpha_{\text{high\_EIS}} = .93$   $\alpha_{\text{low\_EIS}} = .94$ .

## Discussion

Little research has utilized a longitudinal design to examine the links between EIS and socio-emotional functioning. The present research utilized a 1-year, cross-lagged panel design to test whether EIS was likely to be a precursor of social support and emotional experience, or a consequence of these variables. The results indicated that adolescents low in EIS experienced greater decreases in social support and greater increases in the negativity of their emotional experience, compared to those high in EIS with the same baseline levels of social support and

emotional experience. There was little evidence of emotional experience or social support leading to increases in EIS

### *Increasing negativity of emotional experience*

EIS at Grade 8 predicted significant increases in fear, and significant decreases in PA at Grade 9. There was one gender effect, namely, EIS led to increases in sadness amongst boys but not girls. The effect sizes involving affective experience were modest, varying in size between 1.8% and 9.5% of variance explained. Still, these effects are potentially important. Our data represent only a snapshot of one brief period in adolescence. It captures the effects of EIS between Grades 8 and 9, and does not represent any effects of EIS that were already present before Grade 8. The cross-sectional analysis indicates that adolescents low in EIS in Year 8 were already more fearful and sad, and experienced less PA than individuals higher in EIS. Thus, much of the effect of EIS was already in place when we began following these students. The correlations at Grade 8 suggest that EIS shares approximately 5.7% of the variance with positive affect, 24% with sadness, and 15% of the variance with fear.

We based our predictions of a link between EIS and emotional experience on Larsen's two-stage model of affect regulation. This model suggests that if someone fails to correctly identify an affective state, they may be unable to cope with their emotions effectively. Our results are consistent with this possibility. However, research is needed to understand what aspects of coping, if any, are impaired in people low in EIS.

The developmental coping model of Skinner and Zimmer-Gembeck (2007) provides a framework to guide the search for which aspects of coping might be impaired. Adolescents low in EIS may have difficulty with three types of coping: (1) coping designed to coordinate actions and contingencies in the environment (e.g., poor problem solving and information seeking); (2) coping designed to coordinate reliance and social resources available (e.g., poor support seeking), and (3) coping designed to coordinate preferences and available options (e.g., inability to engage in effective cognitive restructuring or to engage in effective social negotiation). Future research is needed to evaluate the link between EIS and the different families of coping.

Our research focused on self-reported emotional experience. One interesting possibility is that adolescents low in EIS may not actually have more negative emotional experiences, but merely *believe* they have more negativity. Much work within the cognitive behavioural therapy domain suggests that inaccurate beliefs can have a powerful impact on "actual" well-being and behaviour (Beck, 1995; Ciarrochi & West, 2004). Unfortunately, it might be difficult to disentangle "true" well-being from beliefs about well-being. Future research might obtain acquaintance or parental ratings of adolescent well-being, and examine the extent that EIS predicts these ratings. The difficulty with external reports is that because those high in EIS are less likely to describe their feelings, raters may be less likely to have an accurate understanding of what the individual is feeling.

Penza-Clyve and Zeman (2002) suggested that adolescents low in EIS may not know precisely what they are feeling, but do know that they are experiencing general emotional distress. Our study asked adolescents to report on how positive, sad, angry, or afraid they generally felt during the past month. Identifying these affective states in such a non-specific way may require only a modest level of emotional identification skill (Lane, Quinlan, Schwartz, Walker et al., 1990).

Research in our lab suggests that most 10-year-old children (3 years younger than the present sample) are aware of basic affective states and can label them (Bajgar, Ciarrochi, Lane, & Deane, 2005). Lane and Schwartz (1987) and Saarni's (2000) theories suggest that there are more advanced levels of emotion identification that include identification of multiple, conflicting emotions, identification of emotional blends, identification of emotions about emotions, and identification of conflicting emotions in the self and other. Like Penza-Clyve and Zeman (2002), we would hypothesize that adolescents low in EIS are generally able to identify their affective states in simple terms, but are not able to perform the more sophisticated emotion identification tasks. Future research is needed to assess this interesting possibility.

There was no evidence in the present study of fear and sadness affecting future levels of EIS. We did find that lower PA in Grade 8 was associated with reductions in EIS at Grade 9 (relative to the baseline measures). However, this finding was not replicated in the overall model (where all Time 1 measures were covariates). Thus, the dominant pattern was of EIS influencing affect, rather than vice versa.

#### *Decreasing quality and quantity of social support*

Our study suggests that EIS is associated with reductions in quality and quantity of social supports amongst adolescents. Identifying and sharing emotion may be essential to the development of relationships (Fitness, 2006; Spitzer et al., 2005). Adult alexithymics engage in less social sharing of emotions, especially for negative events (Pennebaker et al., 2001; Taylor et al., 1997). Perhaps as a consequence, alexithymic adults have fewer social contacts and are more likely to be unmarried (Kauhanen et al., 1993). Our findings suggest that adverse social effects are occurring prior to adulthood, in early to middle adolescence.

Cross-sectional studies cannot provide evidence about whether social support leads to EIS, or vice versa. It is possible that people who engage in fewer intimate social interactions (i.e., are low in social support) become lower in EIS. However, our longitudinal research suggests that low levels of social support do not lead to reductions in EIS, at least for the period between Year 8 and Grade 9. Thus, our data support the view that it is EIS that leads to reductions in social support.

#### *Conclusions and future directions*

We have already mentioned a number of limitations and future directions, but there are still others. The present research presents a 1-year snapshot of adolescent development. Future research is needed to examine the links between EIS and social and emotional experience over longer periods of time.

One potential limitation of our study involves our focus on self-reports and the danger that relationships are inflated by shared method variance. However, two aspects of our design and findings make the shared method variance explanation unlikely. First, both baseline social and emotional experience and baseline EIS were used as covariates in the analyses. This type of analysis will tend to covary out shared method variance (Lindell & Whitney, 2001). Second, most of our findings suggest that EIS predicts future social support and emotional experience, but social support and emotional experience generally do not predict future EIS. It would be difficult

(but not impossible) for a shared method variance explanation to account for why one cross-lagged effect is significant but the other is not.

Finally, although longitudinal data has its strengths, it also has limitations. It is always possible for an omitted variable to influence the SEM model estimates. To some extent, this possibility was mitigated in our analyses, because we utilized structural equation modelling to control for measurement error and correlated errors and disturbances (Finkel, 1995). Ultimately, the best way to determine whether EIS *causes* social and emotional well-being is to directly teach emotion identification skills and observe the effects of this teaching on future social and emotional well-being. Some adolescent intervention programmes already teach emotion identification, and have been shown to be effective (Ciarrochi & Mayer, 2007). However, these programmes may have many active components, and it is difficult to tell whether emotion identification per se is important to future well-being. Thus, we would recommend a focused intervention, targeting emotion identification exclusively. The present results suggest that such a programme may have a beneficial impact on the social and emotional lives of adolescents.

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