Secure attachment and high IQ: Are gifted children better adjusted?

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Abstract

Research indicates that securely attached children have advanced language skills and are well adjusted, whereas insecurely attached children often have ongoing problems that include learning disabilities, and psychological and behavioural problems. Interestingly, some researchers have claimed that gifted children are also well adjusted. Others have found that gifted children have socio-emotional problems, for example during the teenage years, and these problems are assigned to the uneven development of gifted children. This study investigated the connection between attachment, IQ, socio-emotional adjustment and learning disabilities in both non-gifted children (with FSIQ>80) and gifted children (children who have at least one subtest score of IQ>120). Eighty 7-10 year old children and their parents were recruited from Australia and New Zealand. Findings indicate that attachment may have an important influence on IQ. The study also found that children of mothers who had maternal depression were more likely to have internalising problems and writing disability.

Introduction

The literature on gifted children often paints a picture of socio-emotional problems and uneven development as a natural by-product of giftedness (Silverman, 1997; Winner, 2000), although good adjustment and socio-emotional problems may be equally common amongst the gifted (Csikszentmihalyi & Csikszentmihalyi, 1993). These extremes may be moderated by others factor, such as maternal depression and attachment (Wellisch, 2010).

Attachment problems can be framed in the context of developmental neglect due to minimal interactions or poorly timed and inappropriate care-giving behaviours, also connected with maternal depression. At the same time, intelligence may be a protective factor, as suggested by experts from a variety of backgrounds (Fergusson & Lunskey, 1996; Gunnar, 1998; Johnson & Flake, 2007; Perry, & Szalavitz, 2006), and if this were the case, we could expect to see more securely attached children in a gifted population than in a general sample.

Further, large discrepancies in IQ subtests have been observed in gifted children, often with relatively lower verbal scores compared to higher performance scores (Silverman, 2002; VanTassel-Baska, 2005; Winner, 2000). Interestingly, a similar finding has been made with children who have experienced early trauma, neglect, and abuse (Perry, 2002; Perry & Szalavitz, 2006).

To sum up, large discrepancies, often with lower verbal and full scale IQs have been found in children who are insecurely attached, who have been abused and neglected, and whose mothers have suffered from maternal depression. Similar discrepant IQ scores have been noted in relation to gifted children. High intelligence, however, may be a protective factor against attachment related causes, and a higher incidence of secure attachment can therefore be expected in gifted children.

This research project was undertaken to clarify the connection between IQ and attachment, an uneven IQ profile, and problems such as poor socio-emotional adjustment and learning disabilities, and these will first be discussed briefly, followed by a description and findings of the research. The clarification of these issues is expected to help educators in the identification of children's needs, and psychologists in interpreting IQ scores and providing therapy and advice. It should also enable parents of gifted insecurely-attached children to find appropriate information, and locate services that can address such problems.

Giftedness and socio-emotional adjustment

There is little agreement on the adjustment of gifted children, with some indicating that gifted children are well adjusted (Freeman, 1995;

Neihart, 1999; Terman, 1925; Terman & Oden, 1947), while others have found the opposite to be true (Hollingsworth, 1942; Silverman, 1993; Plucker & Stocking, 2001). Csikszentmihalyi and Csikszentmihalyi (1993) found two types of gifted individuals that may explain such divergent findings. They identified one type as highly intelligent, effective and successful, coming from warm, supportive and stimulating families. The other type identified was highly creative (e.g. scientists, artists, musicians), who had in many cases triumphed over early disruptions and traumatic circumstances, indicating that these two types may have secure and insecure attachment styles.

Attachment

Ainsworth, Blehar, Walters, and Wall (1978) distinguished three patterns of attachment. One pattern was termed secure, and the other two, ambivalent and avoidant, were defined as insecure. The mother's sensitive responses and her ability to correctly interpret her baby's needs have been found to be pivotal to babies' attachment style. The quality of the mother's caretaking is affected by a number of factors including socio-economic status, support, economic security, her own unresolved attachment experiences and mental health (Prior & Glaser, 2006).

Insecure attachment has been associated with maternal depression, inconsistent or dismissive care-giving, misinterpretations and miscommunications, as well as with neglect and abuse. Additionally, the mother's attachment style is highly transferable to her child (Fonagy, Steele, & Steele, 1991), for example if the mother is insecurely attached, the child is also likely to be insecurely attached. Insecurely attached children can have learning difficulties, and emotional and behaviour problems, the types of problems that are claimed to mask giftedness in some children (Lovett & Lewandowski, 2006). One reason for this is that learning and socio-emotional problems are likely to be the focus of intervention in the school setting, and giftedness in such cases may not be expected or identified.

In summarising a review of attachment research, Prior and Glaser (2006) reported that approximately 65% of the population is securely attached, and that secure attachment is a precursor to healthy emotional development and relationships. Interestingly, many secure attachment characteristics, such as advanced language and cognitive competence, are similar to gifted characteristics that are also observed in gifted children with problems (Rogers & Silverman, 1997).

Maternal Depression

Maternal depression has been linked to disorders in attachment, leading to less than optimal cognitive development at a key time in the baby's development (Cicchetti, Rogosch, & Toth, 1998). Predictors of child vocabulary, for example, have been associated with particular environmental factors such as the mother's vocabulary (Snow, 1998), however, as withdrawal is a characteristic of depression, mother-child conversation and the child's vocabulary may well be affected. Additionally, post-natal depression has a negative effect on caregiving, which can then affect children's language (Stein, Malmberg, Sylva, Barnes, & Leach, 2008).

Studies have found that maternal depression is related to intergenerational family problems (Lyons-Ruth, Lyubchik, Wolfe, & Bronfman, 2002), the mother's childhood experiences (Bowlby 1973), maternal state of mind (Adam, Gunnar, & Tanaka, 2004), cumulative disadvantage (Arditti, Burton, & Neeves-Botelho, 2010), children's behaviour problems (Gartstein & Sheeber, 2004), and relationship problems (Nagata, Nagai, Sobajirna, Ando, Nishide, & Honjo, 2000). According to Johnson and Flake (2007), depression affects one in five women. In Australia, this figure is estimated to be between 9 to 16% of women (Buist & Bliszta, 2006), especially during the child-bearing years, with one study finding that 74% of chronically depressed mothers had insecurely attached babies (McMahon, Barnett, Kowalenko, & Tennant, 2006). Maternal depression can therefore have a significant effect on a child's development and quality of adjustment.

Although the language of gifted children is generally advanced, (Winner, 2000), it is possible that the impact of maternal depression in gifted children may result in a lower verbal IQ in comparison to other subtests, such as performance IQ. Speech or language pathology has been associated with lower socio-economic groups and psychiatric problems, such as behaviour and anxiety disorder (Toppelberg & Shapiro, 2000). Although these studies have shown effects in lower socio-economic groups, it would be reasonable to expect some effects of maternal depression on language in middle class children. Findings also indicate that maternal depression is associated with school performance and underachievement (Leschied, Chiodo, Whitehead, & Hurley, 2005), and underachievement is often associated with gifted

children (Commonwealth Government Publishing Service, 2001). It is therefore possible that there may be some negative developmental effects of maternal depression on gifted children, even if they are securely attached.

To sum up, maternal depression has been shown to affect attachment, IQ, especially verbal IQ, child adjustment, and school achievement, and it is argued that some or all of these effects may also be observed in gifted children.

IQ and attachment

Research on the connection between attachment and IQ is scarce, although the detrimental effects of adverse early childhood experiences on brain and development are well established (Gunnar & Quevedo, 2007; Joseph, 1999; Rutter, Kreppner, & O'Connor, 2001). Speculations have included that intelligence could be a resilience factor in abused children, as they may learn more quickly to link pleasure with their mothers' responses even when pleasurable interaction may be in short supply (Perry & Szalavitz, 2006). Johnsons and Flake (2007) have also suggested that intelligence may be protective for babies whose mothers suffer from maternal depression. Intelligent babies may communicate more positively, for example they may smile more frequently, thereby establishing a positive feedback loop that increases the mothers' confidence and sensitive responses (Greenberg, 1999). Intelligence is therefore thought to be a protective factor for children who have had adverse early experiences.

Perry and Szalavitz (2006) noted that the verbal IQ of severely traumatised children is often in the low to normal range, whereas their performance IQ may be quite high. Modestly lower verbal scores were also found in children whose mothers were diagnosed with maternal depression (McMahon, Trapolini, Cornish, & Ungerer, 2008), and an association has also been found between language disorders and parenting dysfunctions (Coster, Gersten, Beeghly, & Cicchetti, 1989), as well as with ADHD (Perry, Pollard, Blakley, Baker, & Vigilante, 1995). A lower verbal score compared to a child's performance score may therefore be indicative of early dysfunctional maternal interaction. Silverman's (2002) observation of IQ disparities in relation to gifted children were seen particularly in gifted and learning disabled children (Silverman, 1997), who frequently become underachievers (Commonwealth Government Publishing Service, 2001). Such disparities and uneven development observed in gifted children, especially where verbal IQ is lower than performance scores, may well be connected to attachment problems and maternal depression.

Although the association between general competence and secure attachment has been established (Prior & Glaser, 2006), the findings in relation to attachment and high IQ are not settled, and rarely explored, as mentioned. One study of 65 Dutch middle-class children found that the highest IQ was attained by the securely attached (Van Ijzendoorn & Van Vliet-Visser, 1988). However, a study of 63 children in mid-western United States found that insecurely attached babies, who had reacted with higher distress to novelty than others, had higher IQs at three years of age than those who were securely attached (Karrass & Braungart-Rieker, 2004). Although different instruments were used to measure IQ, it is difficult to explain why these two studies had opposing outcomes, and further research is required on whether, and how, attachment and IQ are associated.

The Current Research

No mention was made of studies on high IQ and attachment in a review of gifted research (Ziegler & Raul, 2000), and the review found that control groups were only employed in 22% of studies on giftedness. There is therefore a research gap, which this study attempts to address. The current study has included a comparison group of children without a 'gifted' score, with participating children's full scale IQ (FSIQ) ranging from 84 to 149. Additionally, we aimed to investigate whether the previously observed Verbal versus Performance disparity could be identified in the updated WISC-IV test's Verbal Comprehension (VC) and Perceptual Reasoning (PR) subtests, and whether there was a difference between those with and without gifted scores in relation to this disparity.

Method

The sample was culled down to 80 parents and their 7-10 year old children (30 girls and 50 boys). The criterion for participation was that the children would already have had a WISC-IV IQ assessment within the past 18 months, with a full scale IQ (FSIQ) of >80. Of the original participants, six children who were recruited were not retained in the study as they had FSIQ scores below 80 and did not therefore meet the criterion for participation. Another four children had had an IQ assessment, however, not with a WISC-IV.

Participants included clients from a New Zealand psychology clinic specialising in gifted children

(n=58), clients from three Australian psychology clinics (n=11), and from the NSW Association for Gifted and Talented Children (n=11), where an advertisement on the website and in the quarterly journal invited participants to join the research.

All 80 mothers participated in the study, however, only 54 of the fathers filled in the questionnaires. The majority of the parents (87%) reported their family income at or above $75,000, and most had either undertaken tertiary studies (mothers 75%, n=60, fathers 75%, n=41), or held professional diplomas (mothers 15%, n=12, fathers 14%, n=8).

Procedure

The project was approved by the Human Research Ethics Committee at Macquarie University, and by the relevant persons within the organisations who sourced the participants. New Zealand parent participants were provided with the questionnaires to take home, while a psychologist at the clinic administered a child attachment questionnaire during the child's general assessment. Parents posted the questionnaires to the researchers, and the clinic separately posted the child questionnaires and the WISC-IV results.

In Sydney the procedure was somewhat different, in that those parents indicating an interest in participating were sent the questionnaires by post, and the completed forms were collected personally by the researcher, who administered the child attachment questionnaire to the child during the visit.

Data collection and survey instruments

Demographic and background information

Information was requested about children's learning disabilities in five categories: speech, spelling, reading, mathematics, and handwriting. Data collection also included parents' highest level of qualification, job title, job tasks, health, family income, and mothers' questionnaires asked about any diagnosed maternal depression. Although both mothers and fathers were surveyed, it was decided to use only mothers' data for analysis as all 80 mothers filled out forms, whereas only 54 fathers participated in the research.

Income, SES and qualification

Six categories of family income were determined by dividing 2007-2008 income levels into five approximately equal amounts and adding CPI of 6.4%. These categories were collapsed into three categories for the purposes of analysis: less than $73 k per year (n=10), $73-151k per year (n=33) and greater than $151 k per year (n=33).The socio-economic status of the sample (M=5.3) was measured by an occupational index ranging between no job (0) and high-level professional (7). Qualifications included six categories, ranging from 1 (less than HSC) to 6 (higher than Master degree). For mothers, these were collapsed into three categories for the purposes of analysis: up to HSC and technical college (n=20), first degree (n=34) and postgraduate degree (n=26).

Sources

It was found that the IQ measures varied considerably over the five different sources from which the participants were drawn. Although source was not in itself of interest, it was important to include it in analyses in order to remove between-source variation. As there were very few subjects from some of the sources, the original five sources were collapsed into a binary variable. We combined the 11 gifted children from the NSWAGATC with the three gifted children from the Lizette Campbell and Associates clinic into one category (coded 1) , and the other three sources into the other category (coded 0). This grouping was chosen because it explained almost as much variation in IQ scores as the original grouping.

Child cognitive development

As mentioned, the Wechsler Intelligence Scale for Children (4th ed.) (WISC-IV) (Wechsler, 2003) was used for this study, and was administered by a variety of psychologists. Five IQ scores were obtained (Verbal Comprehension (VC), Perceptual Reasoning (PR), Working Memory (WM), Processing Speed (PS), and Full Scale IQ (FSIQ). Subtests and full-scale scores for each child were collected with parental permission from either the clinics or requested directly from the psychologist.

IQ scores

Binary variables (>120 or not >120) were created from continuous IQ scores. The decision to assign any scores >120, including full-scale score, to 'gifted' scores was based on a number of considerations. Gagné, for example, suggested that mild giftedness starts at a full-scale score of 120 IQ (Gagné, 2007). However, changes to the revised WISC-IV as well as downward adjustments made due to the Flynn effect — a substantial international increase in average scores on intelligence tests — appear to have reduced WISC-IV's Full Scale IQ in gifted children from a mean of 128.7 for the WISC-III validity study to IQ123.5 for the WISC-IV gifted sample (Flanagan & Kaufman, 2004). Additionally, calculation of a full-scale score is not recommended when large discrepancies are obtained between subtests, as the full-scale score would not adequately represent the children's abilities. These children are often

identified as twice exceptional, or as gifted and disabled. As we wanted to ensure that children with some high scores and large discrepancies between subtest scores were included amongst the gifted children, we set the gifted score at >IQ120 of any sub-scale or full-scale score, although giftedness and inclusion in a gifted program is generally set at two standard deviations from the norm (=FSIQ130) (Lohman, Gambrell, & Lakin, 2008; Winner, 2000).

Child attachment

The Attachment Style Classification Questionnaire for Latency Age Children (ASCQ) (Finzi, Cohen, Sapir, & Weizman, 2000) aims to access children's working model of attachment, and was adapted to an Australian version from an English translation of the original Hebrew questionnaire. A sample item was "It is easy for me to depend on others, if they're good friends of mine". This was changed to "It's easy for me to depend on my good friends". In all, four items were adjusted (items 3, 6, 9, and 14). In the Australian adaptation, the Likert-type choices were 'Never true of me' 'Sometimes true of me' 'Often true of me' 'Mostly true of me' and 'Always true of me'.

As in previous research by Al-Yagon and Mikulincer (2004a, 2004b), children were classified as 'securely attached' if the secure score surpassed both their avoidant and anxious scores. Children were classified 'insecurely attached' if either their avoidant or anxious score surpassed their secure score. As the present sample was relatively small it was decided to distinguish only between secure and insecure, and not to differentiate between the two types of insecurity. Six children who could not be confidently assigned to either the secure or insecure groups because they had the same scores on the secure and one of the insecure scales were omitted from analyses involving attachment. Because the predictions based on attachment were directional (i.e., it was expected that children with secure attachment would have higher IQ scores than those with insecure attachment), one-tailed tests were used in testing this variable.

Child Adjustment

Adaptive functioning and problems were assessed with the Child Behavior Checklist for Ages 6-18 (pages 3-4) (Achenbach, 2001), filled in by participating mothers and fathers. A license agreement was obtained from the University of Vermont to reproduce these pages for the study. This is a 113-item Likert-style questionnaire ranging from 'not true' (0) to 'very true or often true' (2).

Results

Attachment and IQ

The primary aim of the study was to investigate the relationship between attachment and high IQ, and the first analysis compared children's gifted scores with secure attachment. In total 53 children out of 74, or 71.6%, were securely attached, which is slightly higher than the percentage found in previous research. No significant gender difference in attachment was found. The percentage of children with secure attachment was higher for children with scores >IQ120 on any index or FSIQ (n=33, 76.7% versus n=20, 64.5%), but this difference was not significant ($c2$ (1, N = 74) = 1.33, p = .25). Girls were found to have significantly higher processing speed scores than boys (107.4 versus 99.3, t(78) = 2.38, p = .02). There were no other significant differences, although the difference in PR scores (118.3 for boys versus 111.9 for girls) approached significance (t(78) = 1.91, p = .059) (see Table 1). Although children classified as secure had higher mean scores on all the IQ measures than children classified as insecure, these differences were small, and none was significant. The difference in VC (M=114.6 and 107.4 for secure and insecure children respectively) came closest to being significant (t(72) = 1.94, p = .056)

Table 1
Mean IQ scores and gender (N=80)

		VC	PR	WM	PS	FSIQ
Boys	M	112.60	118.28	102.18	99.34	112.08
n=50	SD	16.02	15.66	15.40	15.05	16.49
Girls	M	113.07	111.90	99.30	107.37	111.63
n=30	SD	13.25	12.09	13.67	13.76	12.81
TOTAL	M	112.78	115.89	101.10	102.35	111.91
	SD	14.96	14.67	14.72	15.01	15.13

Note: Verbal Comprehension (VC), Perceptual Reasoning (PR), Working Memory (WM), Processing Speed (PS), and Full Scale IQ (FSIQ)

IQ scores with at least 10 points higher PR than VC, attachment, learning disabilities, and adjustment

The second aim of the study was to investigate the relationship between attachment status (secure versus insecure) and IQ profile, learning disabilities, and internalising and externalising problems. These relationships were investigated with crosstabs, t-tests and ANOVAS.

In total 23 children (28.75%) scored at least 10 points higher on PR than on VC (known hereafter as the PR discrepancy). Boys were more likely than girls to have a PR discrepancy (36% versus 16.7%), although this difference was not significant (c2 (1, N = 80) = 3.4, p = .064).

Attachment

There was no significant difference between secure and insecure children in terms of PR discrepancy (30.2% versus 33.3% respectively had such a discrepancy). Further, there were no significant differences between children classified as secure or insecure in terms of internalising, externalising and the number of learning disabilities.

PR discrepancy

There was no relationship between PR discrepancy and likelihood of borderline or clinical internalising or externalising problems — 48% of those with the PR discrepancy had such problems, compared with 44% who did not have the PR discrepancy. Similarly, approximately equal percentages of children with and without a PR discrepancy had at least one gifted score (>120 IQ) 56.5% (13/23) and 54.4% (31/57) respectively. It may be worth noting that only four of the thirteen children with a PR discrepancy who had at least one gifted IQ score (>120) had a gifted FSIQ (30.8%). This can be compared to the result for the 31 children who did not have a PR discrepancy who had at least one gifted score, 24 of whom (77.4%) had a gifted FSIQ. This difference was significant (c2 (1, N = 44) = 8.2, p = .003).

To sum up, boys were more likely than girls to have a PR discrepancy; children with a PR discrepancy were as likely to have at least one gifted score as those without such a discrepancy; and children who had a gifted score as well as a PR discrepancy were significantly less likely to have a gifted FSIQ than gifted children who did not have a PR discrepancy.

Learning disability

Thirty one children (38.8%) had at least one reported learning disability, with more than two thirds in reading and spelling. Twelve of these children (38.7%) had a PR discrepancy compared with 11 (22.4%) children who did not have a learning disability. This difference was not significant (c2 (1, N = 80) = 2.4, p = .117). The number of LDs decreased as number of 'gifted' scores increased (Spearman r = -.41, p < .0005), so that those children who had a total of 4 or 5 gifted scores were not reported to have any LDs. To sum up, children with more gifted scores were less likely to have LDs.

Additionally, no child with a gifted score in the WM or PS subtest was reported to have any learning disorders, whereas four children with gifted scores in their VC subtest had a learning disability, and 10 children with gifted PR scores had a learning disability. Children with learning disabilities had significantly lower scores on VC (t(78)=2.83, p=0.006), WM (t(77)=3.18, p=0.0024), PS (t(77)=2.74, p=0.008), and FSIQ (t(76)=3.27, p=0.002).

Child adjustment

Of the 80 participants, 14 children, or 17.5%, had both internalising and externalising problems in the borderline or clinical range. An independent t-test found no significant difference in internalising or externalising scores between children with gifted scores and those who did not have a gifted score (t(78)=1.19, p=.24 and t(78)=0.13, p=.90 respectively). Independent t-tests also found no significant difference between children who had a FSIQ>120 and those who did not have a FSIQ>120, in internalising, (t(78)=.025, p =.81) or externalising, (t(78)=.13, p=.90). There were likewise no significant differences between boys and girls in terms of internalising problems (t(78)=1.44, p=.14) or externalising (t(78)=.85, p=.40).

Maternal Depression

The mothers of eight children (three girls and five boys) reported that they (the mothers) had been diagnosed with post-natal depression during the child's early years. There was no significant relationship between depression and attachment. It was found that the presence of maternal depression was significantly associated with the child being reported to have a learning disability with respect to hand writing (χ2 (1) = 4.39, p = .036, 4/8 of children whose mothers had suffered depression versus 13/72 whose mothers who did not report being depressed). It was also found that children whose mothers reported being depressed had higher internalising and total problem scores: M = 13.6 versus 8.2, t(78) = 2.32, p =.023 for internalising and M = 25.3 versus 17.5, t(78) = 2.1, p =.039 for externalising.

Relationship between attachment and IQ

Analyses based on the general linear model (GLM) were used to test the association between attachment and the five IQ measures (FSIQ, VC,

PR, WM and PS). The following variables were included in the analyses along with attachment (secure and insecure) in order to reduce the possibility of obtaining spurious correlations between attachment and the dependent variables: gender, source (coded as a binary variable, as described earlier), family income and maternal education (each with three categories), and maternal depression (yes or no).

As four families had not reported any income and the attachment style of six children was undecided, only 70 participants were included in these analyses. The effect of source was significant for all the IQ variables except PR (partial η2 varied from .13 to .23 for the four significant effects). The association of attachment with the IQ scores was significant for only one variable, VC ($F(1,61) = 4.17$, $p = .045$, partial η2 =.06, Cohen's d = .52[1]). The relationship with FSIQ was marginal ($p = .068$, partial η2 =.05, d = .57). In both cases, the mean IQ scores, adjusted for the other variables in the model, were higher for children with secure attachment (117.9 versus 111.2 for FSIQ and 120.2 versus 112.5 for VC). Although none of the other IQ measures was significantly related to attachment, it is worth mentioning that the effect size, Cohen's d, was .38 for PR and .46 for PS (the d for WM was low, at .07). The only other significant effect occurred for gender, with boys obtaining higher scores than girls (121.5 versus 113.9) for PR (($F(1,61) = 4.3$, $p = .043$, partial η2 =.07).

It was found that neither mother's qualification nor family income was significantly associated with the IQ scores. For some IQ measures, there was a tendency for the relationship to be in the expected direction (higher educational qualification and family income associated with higher IQ scores), but even this trend was not consistent across measures. Further analysis showed that source was not significantly related to mother's education or family income, so its presence in the model was not accounting for their lack of association with IQ.

Although the association between FSIQ was not significant ($p = .068$), it perhaps cannot be dismissed. A power analysis was carried out and it was found that the power to detect an effect of the size obtained (partial η2 =.05) at $p = .05$ would be .80 with a sample size of 150 participants.

[1] Cohen's *d* was calculated as the difference between the adjusted means of the IQ score for the secure and insecure groups over the square root of the residual for the GLM.

Discussion

The effect for secure attachment and IQ was only significant for one of the IQ measures (VC). The fact that the effect size was between .38 and .57 for four of the measures (not WM) indicates that attachment may have an important influence on IQ. These effects were obtained with family income and mothers' qualifications held constant. Family income and mothers' qualifications were used as proxies for parental IQ, as parent IQs were not collected, and as income and qualifications are known to be related to IQ (Neisser et al., 1997). They have also been shown to be strongly related to child cognitive performance (Hay & Kumar, 1995). The finding of the influence of attachment on IQ supports Van Ijzendoorn and Van Vliet-Visser's (1988) earlier finding of a connection between secure attachment and higher IQ.

As mentioned, the participants were a clinical population, and this showed itself in a number of ways, although the notion that gifted children's problems stem primarily from being gifted has not been supported by this study. For example, almost 39% of the children were reported to have learning problems, and 41% had either borderline or clinical internalising/externalising problems. The mean FSIQ (M=112) of child participants was also higher than in the general population (M=100). The relatively high mean FSIQ score may be explained by the middle-class sample, and the recruitment of some participants from organisations with a focus on gifted children.

The gender imbalance of 30 girls to 50 boys in this study is likely to reflect the relative severity and frequency of behaviour or educational problems faced by parents of boys, who are often more vulnerable (Milgrom, Westley, & Gemmill, 2004). The findings in this study also shows that children with a PR discrepancy were more likely to be boys, and if they had a gifted score they were significantly less likely to have a gifted FSIQ score, supporting the frequent assertions that these gifted children may not be identified due to lower FSIQ (Silverman, 2002; Winner, 2000).

Although not significant, children with a PR discrepancy were also more likely to have a learning disability, and those with learning disabilities were significantly more likely to have a lower score on all five IQ measures. However, there was no difference between gifted and non-gifted children in their likelihood of having a PR discrepancy, and no relationship between PR discrepancy, borderline or clinical internalising, externalising problems, or attachment style. The lack of significant difference between children with or without gifted scores and internalising

and externalising problems adds to a growing evidence base indicating that gifted children are no more likely to be maladjusted than children who are not gifted, at least in the 7-10 year age group in the current study.

As child attachment was not a significant indicator of PR discrepancy, maternal depression or LD, maternal depression appeared to be a better indicator of problems than attachment, although findings should be interpreted with caution due to low numbers of those diagnosed with maternal depression within the participant population and the use of only one attachment measure. Additionally, data on undiagnosed maternal depression was not collected, and it is therefore possible that undiagnosed mother participants may have affected the findings. Nevertheless, the finding that VC was significantly lower for children whose mothers had reported depression was expected, and supports the association of children's language development with maternal depression found in other research. Children whose mothers reported depression were also more likely to have internalising and total problems, and more likely to have at least one learning disability, especially in handwriting. Interestingly, an earlier study of 128 primary school children found that handwriting, and interaction between handwriting and concentration, can be a significant indicator of underachievement (Stoeger, Ziegler, & Martzog, 2008). The connection between underachievement and maternal depression has already been mentioned (Leschied et al., 2005).

Limitations

A major limitation was the difficulty in measuring child attachment. First, the most reliable and well-researched assessment of attachment has been of babies in what is known as the Strange Situation (Ainsworth & Wittig, 1969). This procedure is time consuming and complex. Second, there is a dearth of attachment measures available for 7 to 10 year olds (Prior & Glaser, 2006), and behaviour is less relevant for this age group than their representations of their working model of attachment. The measure used in this research, the Attachment Style Classification Questionnaire for Latency Age Children (ASCQ) (Finzi, Cohen, Sapir, & Weizman, 2000), which was designed with this in mind, adapted from a Hebrew translation of the much-researched Hazan and Shaver's adult attachment style scale (Mikulincer, Florian, & Tolmacz, 1990). However, concepts about relationships are difficult to grasp, and although a self-report measure is relatively easy to use and requires less time than observations or interviews, validity may be a problem, as there is no certainty that children will report their working model of attachment through an accurate assessment of their feelings or behaviours. Therefore, at least two different attachment measures would have been preferable to compare the consistency of children's responses.

Another limitation was that IQ assessments were not carried out with parents. It is therefore not possible to ascertain with certainty whether attachment style and children's IQ were in fact a function of one another. Finally, it was difficult to recruit children with completed IQ assessments, resulting in a relatively low number of participants with an unequal gender distribution, which was a by-product of the clinical nature of the research population.

Conclusion

The findings indicate that secure attachment may increase IQ. A larger study is therefore indicated, and more than one attachment measure should be used in future research. Additionally, the association between children's hand writing problems and maternal depression should be investigated further.

The research has confirmed that gifted children with a discrepancy score may be less likely to be identified and more likely to need educational intervention, particularly if they have a gifted PR score, associated with a higher likelihood of having a learning disability. These children can be supported through a variety of appropriate remedial means, such as counselling and social skills training in addition to provisions in gifted programming and remedial educative programs that are aimed at addressing learning problems (Wellisch & Brown, 2011).

However, unless IQ tests are carried out, other indicators for support may need to be used, for example information about maternal depression, and observations of children's difficulties with handwriting. There is a need, therefore, to change the way gifted children are identified. The current gifted model in use in Australian education departments is the Differentiated Model of Giftedness and Talent (DMGT) (Gagné, 2009). Gagné (2011) has outlined a model for talent development (ATM) for the provision of appropriate talent development programs, although he acknowledges that it would not be helpful to gifted underachievers, who "need a special alternative pathway, distinct from the highly challenging course offered in ATD programs" (p. 145). A new gifted model with an intervention component as proposed by Wellisch

and Brown (2011) may well provide such a pathway, and the consequent enabling support needed by gifted underachievers to stay the path, and achieve to their true potential.

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