

RUNNING HEAD: Assessment of preschoolers' attachment security

Assessment of preschoolers' attachment security using the Attachment Q-set and the Attachment Story Completion Task

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Abstract

Among the methods developed for assessing attachment security, the *Attachment Q-Sort* (AQS) and the *Attachment Story Completion Task* (ASCT) are the only ones designed for preschoolers, other than the *Strange Situation Procedure* and its coding systems. This study employed the French versions (Fr-) of these instruments with 121 preschoolers displaying externalising behaviour. The main objective was to analyse the correspondence between the two instruments, since both were designed to assess attachment security. Correspondence was appraised by completions obtained for the same sample, and from relations with variables known to have (or not have) significant relations with attachment (i.e. age, gender, cognitive abilities and parenting). The results suggest that the Fr-AQS and the Fr-ASCT are not interchangeable measures of attachment. They have to be employed according to their methodological properties and constraints. These results are discussed in terms of validity concerns and recommendations for the administration of the two procedures.

Keywords: attachment, externalising behaviour, parenting, cognitive abilities, personality

In previous research, attachment in young children – defined as the particular relationship that is established between the child and his/her caregiver, usually the parent, and promoting the child's safety and comfort, especially in case of distress – has mainly been assessed using the famous *Strange Situation Procedure* (SSP) (Ainsworth, Blehar, Waters, & Wall, 1978). This is based on observations of the child's behaviour during separation and reunion with the caregiver (principally the mother), and the child's attachment patterns are inferred from this according to the balance between exploration of the environment and attachment behaviour. Secure children balanced their attachment and exploratory behaviours, while insecure children did not. Avoidant children tended to minimise their attachment behaviours in favour of exploration, while ambivalent children tended to maximise their attachment behaviour and avoid exploration. The SSP has been widely used because the recognition of attachment patterns has enabled researchers both to describe and to explain individual differences in early attachment relationships. Its cross-cultural validity has been demonstrated (Solomon & George, 2008). Nevertheless the SSP has been criticized for several shortcomings (van Ijzendoorn, Vereijken, Bakermans-Kranenburg, & Riksen-Walraven, 2004). It is a non-natural and stressful laboratory procedure, which means that it lacks ecological validity and raises ethical concerns. Moreover it was initially designed for very young children (from 12 to 24 months), although a later version was devised for older children, with a longer time of separation (Solomon & George, 2008). Finally, the SSP only allocates the children to one of the four classical patterns of attachment. It does not use continuous scores to describe the extent of the attachment among the securely attached children. All 'secure' children are lumped together.

In the last couple of decades, several alternative methods of assessing children's attachment security have been developed. These include the *Attachment Q-Set* (AQS) focusing on attachment behaviour (Waters & Deane, 1985) and the *Attachment Story Completion Task* (ASCT) focusing on attachment representations (Bretherton, Ridgeway, & Cassidy, 1990). Up to now, these two instruments are the only ones (other than with the SSP and its coding systems) designed to assess attachment security with preschoolers. Both of them address the main shortcomings of the SSP. First, they can be used for a broader age range: the ASCT is suitable for three- to seven-year olds, while the AQS has been designed for children from ten months to five years old. Second, their ecological validity is greater, since the AQS is based on home observations, and the ASCT on various attachment-relevant themes of daily life. Third, these scales do not require stressful separations. Fourth, the Q approach enables social desirability to be controlled for (van Ijzendoorn, et al., 2004). Finally, the two instruments provide continuous scores that allow attachment security to be treated as a continuum (Cummings, Greenberg, & Cicchetti, 1990).

The *Attachment Q-set* (AQS) consists of a large number of cards describing the child's behaviour in the natural home setting (Waters & Deane, 1985). The psychometric properties of the original version of AQS are good, especially when it is completed by a trained observer. It has reasonable convergent validity with the SSP ($r = .31, p < .001$) and good predictive validity

with maternal sensitivity measures ($r = .37, p < .001$) (van Ijzendoorn, et al., 2004). In the light of these results, most studies have used the AQS coded by a trained observer rather than by the parent. Nevertheless this procedure is time-consuming, as the observer has to spend two or more one-hour sessions at the child's home (van Ijzendoorn, et al., 2004).

The *Attachment Story Completion Task* (ASCT) is an assessment tool which consists of a series of story stems with themes which are designed to activate children's attachment representations (Bretherton, et al., 1990), namely internal working models (IWM). Bowlby defined IWM as "the internal mental representations that individuals develop of the world and of significant people within it, including the self" (Delius, Bovenschen, & Spangler, 2008, p. 396). IWM are especially important for interpreting and predicting the behaviour of attachment figures in order to plan immediate and further reactions. The ASCT is designed to assess the child's IWM by means of play and narrative. Different coding systems of the ASCT are available.

In previous studies, both the AQS and the ASCT have been related to the SSP to demonstrate convergent validity (Gloger-Tippelt, Gomille, Koenig, & Vetter, 2002; Posada, 2006; Solomon & George, 1999; van Ijzendoorn, et al., 2004). However only Bretherton (2008; 1990) has compared these two methods among young children. She found positive and significant correlations ($r = .61, p < .01$) between the mother-reported AQS security score at 25 months and the ASCT security score (using the initial coding systems) at 37 months. Surprisingly, this relation was weaker ($r = .46, p < .01$) when both measures were made concurrently, at 37 months.

The main aim of the present study is to analyse the correspondence between the French versions of the AQS (Fr-AQS) and of the ASCT (Fr-ASCT) using the Q-set coding system (Miljkovitch, Pierrehumbert, Karmaniola, & Halfon, 2003). The correspondence will be studied by exploring the two instruments in the same sample of children. First, a reasonable correspondence is expected between the Fr-AQS and the Fr-ASCT, in line with Bretherton's (2008) results, even if another coding system is used. Both measures were designed to assess preschoolers' attachment security: the Fr-AQS for attachment behaviour, and the Fr-ASCT for attachment representations. To test the correspondence in the current study, the continuous scores of the Fr-AQS and Fr-ASCT will be correlated. The consistency of children's secure or insecure attachment patterns across the two instruments will also be appraised, using the categorical scores.

Second, the influence of several variables (age, gender, cognitive abilities and parenting) whose relations with children's attachment patterns are well-known will be explored using the Fr-AQS and the Fr-ASCT. If the relation between these criterion variables and children's attachment is evident with these two instruments, the correspondence between them will be established. On the other hand, if the relation between these variables and children's attachment is only evident with one instrument, this will suggest that they are measuring different factors (i.e. that attachment behaviour and attachment representations assess different, unrelated, sub-factors of attachment).

The results will be discussed in terms of validity concerns and recommendations for the administration of the two procedures. This research also has clinical implications, since it was conducted with children who had been referred to clinicians for externalising behaviour problems. A deeper understanding of the characteristics of the two instruments will be useful for both the diagnostic accuracy and the treatment of such problems.

Age-related effect

Numerous studies have investigated age-related differences in children's attachment behaviours. None of them found a significant effect when using either the SSP (Lyons-Ruth, Repacholi, McLeod, & Silva, 1991; Moss, Bureau, Cyr, Mongeau, & St-Laurent, 2004; Moss, Cyr, & Dubois-Comtois, 2004; van Ijzendoorn & Van Vliet-Visser, 1988) or the AQS coded by an observer (Brown, McBride, Shin, & Bost, 2007; Clark & Symons, 2000; Szewczyk-Sokolwski & Bost, 2005). The same was true for children's attachment representations assessed with the Fr-ASCT (Miljkovitch & Pierrehumbert, 2008; Miljkovitch, Pierrehumbert, Bretherton, & Halfon, 2004; Pierrehumbert et al., 2009). No relation between age and attachment was therefore expected in the present study, either with the Fr-AQS or with the Fr-ASCT.

Gender-related effect

No significant relations has previously been found between children's gender and their attachment patterns, either with the SSP (e.g. Lyons-Ruth, et al., 1991; Madigan, Moran, Schuengel, Otten, & Pederson, 2007; Moss, Cyr, et al., 2004) or with the AQS coded by either an observer (Brown, et al., 2007; Clark & Symons, 2000; De Mulder, Denham, Schmidt, & Mitchell, 2000) or the mother (McCabe, Peterson, & Connors, 2006). The results obtained using the ASCT are less clear. Several authors have suggested that boys are more disorganised (Miljkovitch & Pierrehumbert, 2008; Miljkovitch, et al., 2004; Miljkovitch, et al., 2003; Pierrehumbert, et al., 2009) and less secure (Green, Stanley, & Peters, 2007; Pierrehumbert, et al., 2009) than girls. This gender-related effect could be due to the sort of task used in the ASCT (i.e. narrative production). Maccoby and Jacklin (1974), for example, reported that girls usually performed better than boys on verbal tasks, and a meta-analysis of 165 studies of gender differences in verbal ability found a mean effect size (favouring girls) of .11 for students aged five to 18 (Hyde & Linn, 1988). Importantly, gender-related differences were not uniform across tasks. The effect size for vocabulary was low ($d = .02$) but significantly higher for speech production ($d = .33$), an important component of the ASCT. In line with these results, no significant relation was expected between children's gender and the Fr-AQS, but an effect of gender on the Fr-ASCT was anticipated.

Attachment and cognitive abilities

The relations between attachment security and children's cognitive development have been documented in previous studies of both typically developing and atypical populations (e.g. Jacobsen & Hofmann, 1997; Moss, Bureau, et al., 2004; van Ijzendoorn et al., 2007). The conclusions have highlighted the predictive role of both attachment behaviour and representations for cognitive abilities, the hypothesis being that more securely-attached children

develop higher levels of cognitive abilities. The reverse relation, from cognitive abilities to attachment security, has been considered far less often. However Atkinson et al. (1999) demonstrated that the cognitive abilities of children with Down's syndrome has an impact on their attachment patterns: children with better cognitive abilities are more likely to be categorised as secure (with the SSP as well as with the AQS coded by an observer) than children with lower cognitive abilities. A recent study also found bidirectional influences between children's attachment representations assessed with the Fr-ASCT and their cognitive abilities (Stievenart, Roskam, Meunier, & Van de Moortele, 2011). In the light of these results, we expected significant interrelations between cognitive abilities and attachment.

Attachment and parenting

Interrelations between parenting behaviour and children's attachment behaviour are well documented (Barnett, Kidwell, & Leung, 1998; Lounds, Borkowski, Whitman, Maxwell, & Weed, 2005; Roskam, Stievenart, Van de Moortele, & Meunier, 2011; van Ijzendoorn, Schuengel, & Bakermans-Kranenburg, 1999). Most studies have involved attachment behaviour (using either the SSP or the AQS). Similar results were reported for adolescents completing self-report questionnaires about the perceived quality of their relationships with their mother and father (Bosmans, Braet, Van Leeuwen, & Beyers, 2006). Parents adopting high supportive but low controlling parenting methods tend to promote secure attachment in their children. Parents appear to facilitate their children's IWM of themselves as lovable, and of the parent as available, by using support, responsiveness and the promotion of the child's individuality (De Wolff & van Ijzendoorn, 1997; Karavasilis, Doyle, & Markiewicz, 2003). These are all characteristics of a secure child. Significant interrelations between parenting and attachment were therefore expected in the current study.

In summary, the main aim of the present study is, first, to analyse the correspondence between the Fr-AQS and the Fr-ASCT. The correspondence will be studied by exploring the two instruments in the same sample of children. Second, the influence of several variables (age, gender, cognitive abilities and parenting) whose relations with children's attachment patterns are well-known will be explored using the Fr-AQS and the Fr-ASCT.

Method

Sample

This study was part of the 'H2M children' (hard-to-manage children) research programme attempting to identify early predictors of externalising behaviour problems in children. The research was conducted by the Psychological Sciences Research Institute at the Université catholique de Louvain (UCL), with the collaboration of the Cliniques universitaires Saint-Luc in Brussels in Belgium. It covered preschoolers displaying externalising behaviour who had been referred to clinicians, and non-referred preschoolers (see <http://www.uclouvain.be/h2m-children.html> for more details).

The current study used data collected from a moderately large group of 121 preschoolers (95 boys and 26 girls) displaying externalising behaviour and their parents. 51 (42.1%) children were three years old, 38 (31.4%) were four years old and 32 (26.4%) were five years old. All the children were recruited from paediatric units in Belgian hospitals where they had been referred for externalising behaviour problems (arousal, opposition, agitation, aggressiveness, non-compliance etc.). The referral had to have been made by a physician after a diagnosis of externalising behaviour which was the immediate and principal reason for the referral. Children displaying substantial language delays or developmental disorders were excluded from the group. At the time of recruitment, all the children involved were attending mainstream schools. 29 (36%) mothers had completed less than full secondary education; 65 (52%) had up to 3 years of post-secondary education; and 21 (17%) had a university degree. Amongst fathers the corresponding figures were 39 (31%) less than full secondary school; 48 (38%) some post-secondary; and 22 (17%) with a degree.

Some data are missing, due, for example, to incomplete completion, to the absence of one parent or interruptions in participation in the research programme. Analysis of the attrition revealed no significant differences in demographic variables, behavioural assessment, parental childrearing behaviours, quality of attachment or cognitive abilities between the children and parents who left the programme and those who remained. At the time of recruitment, the mean age of the children was 54.69 months ($SD = 11.35$).

Procedure

Three clinical research assistants were involved in the data collection. Each parent was interviewed separately by a research assistant in a quiet room and then asked to complete a set of questionnaires. The parents were then systematically instructed by the clinical research assistants about the content of Fr-AQS and how to code it; they were asked to complete it together. At the same time, the children were examined individually by a research assistant and a speech therapist in a quiet room. At the time of recruitment, all of the 118 children were visited at school, where they completed the Fr-ASCT during school-time and in the absence of their parents.

Measures

Fr-Attachment Q-set. The French version of the AQS (Fr-AQS) that was used in this research was adapted from the original AQS (Waters & Deane, 1985) by Pierrehumbert and his colleagues (Pierrehumbert, Mühlemann, Antonietti, Sieye, & Halfon, 1995; Pierrehumbert, Sieye, Zaltzman, & Halfon, 1995). It describes preschoolers' attachment behaviour and covers a broad range of secure base and exploratory behaviours as well as affective responses. The *secure base*, a core concept in attachment theory, is defined as the caregiver's ability to provide a source of security to the child, which enables him or her to feel safe to explore the environment (Cassidy, 1999). For instance, some items of the Fr-AQS characterising a secure child are 'the child is friendly with strangers' or 'the child is independent of his/her mother; he/she can play on his/her own'.

The 79 items of the Fr-AQS have to be sorted into a forced nine-category distribution according to the applicability of each item to a particular child, from

'more characteristic' to 'less characteristic' of the child's behaviour. This has to be done by trained observers or parents. Due to methodological constraints, the sorting could not be undertaken by an observer in the present study. So, after systematic instruction by the clinical research assistants, the parents completed this task together. The distribution of the items then had to be normalised, with a pre-defined number of cards in each pile. The results for a particular child were then correlated to those of a prototypical secure child as described by experts in the field of attachment. The correlation coefficient is a continuous score varying from +1.00 to -1.00, with a higher positive score indicating greater security. The validation study of the Fr-AQS (Pierrehumbert, Mühlemann, et al., 1995) demonstrated its convergent validity with the SSP, in line with the original version of the AQS (Waters & Deane, 1985).

The children's continuous scores also permitted them to be categorised as secure or insecure. These scores had first to be standardised, as described by Symons, Clark, Isaksen, & Marshall (1998, p. 787): "Fisher r to z transformations were conducted on each score. This is appropriate when a dependent variable is a correlation statistic, and in addition, this provides correction to the negative skew of the Q-sort distribution that is typically found" (p. 787). Then, the cut-off point was chosen so that about 66% of normally-developing children in the Pierrehumbert validation sample ($n=103$) (1995) were categorised as secure. The referred children in the present study were considered to be secure if they scored above this cut-off point (60.2%, $n = 68$) and as insecure if they scored below it (39.8%, $n = 45$).

Fr-Attachment Story Completion Task. The Attachment Story Completion Task (ASCT) was translated into French under the title *Histoires à compléter* (Fr-ASCT), and used to assess the children's attachment IWM (Bretherton, 1990; Bretherton, et al., 1990). The administration of the task was video-recorded: it lasted 20–25 minutes, on average. Story stems were presented to the child with a set of small human figures and a few appropriate simple props. The child was then asked to show and tell what happened next. The procedure included six story stems: the child figure (a) causes an accidental mishap (spills juice at the dinner table), (b) is hurt (falls off a rock in a park), (c) is afraid (of a monster in the bedroom), and experiences (d) separation from and (e) reunion with his or her parents (the parents leave for a trip while the grandmother looks after the children). In addition a birthday party story stem serves as a warm-up procedure to introduce the child to what is expected.

Several studies have cross-validated the ASCT using different coding systems (Ongari, 2008) with children's responses to current or previous separation/reunion episodes as in the SSP (e.g. Gloger-Tippelt, et al., 2002; Solomon, George, & De Jong, 1995) or with the mothers' *Adult Attachment Interview* (AAI), evaluating adults' attachment representations (Gloger-Tippelt, et al., 2002; Miljkovitch, et al., 2004). The results support the assumption that story completions reflect the child's IWM of self with parents.

In the current study, the narratives were coded by the clinical research assistants using the Q-set procedure, *Cartes pour le Codage des Histoires à compléter* (CCH), which was developed by Pierrehumbert (Miljkovitch, et al.,

2003) and referring to the AAI as a model. This procedure takes both the content and the intrinsic qualities of the narrative production into account. As with the AAI, the ability to construct a narrative around attachment issues depends on how the person is able to regulate their emotions about the issues raised (Main & Goldwyn, 1985/1994). If the informant is insecure, his/her narratives tend to be incoherent, and he/she is often uncooperative during the interview.

After viewing the video recording of the whole set of six stories, the coder scores 65 items describing potential characteristics of the narrative (Pierrehumbert, et al., 2009). Items focus either on the content (e.g., “the child portrays the parents as available”) or on the formal characteristics of the narrative (e.g., “the child enacts emotions within the story”). The items are presented on cards. The first step of the CCH coding procedure is to sort the cards into seven piles (free distribution) from the most to the least characteristic of the child’s narrative. Then a forced distribution is imposed by allowing only a specific number of cards in each pile. Each item receives a score (range 1-7). Four Q-correlations are computed from the scores of the forced distribution, by comparing the children’s individual Q-set description with the criterion sort provided by experts for a prototypical child using Main and Cassidy’s four patterns (secure, avoidant, ambivalent and disorganised) (Miljkovitch, et al., 2003). These Q-correlations are continuous scores ranging from +1.00 to –1.00, with a higher positive score indicating greater security, avoidance, ambivalence or disorganisation. For comparability with the Fr-AQS, only the secure score was considered here.

As with the Fr-AQS, the initial Q scores also allowed the children to be categorised. All the Q-correlation scores were standardised, allowing for comparisons. First, the distribution of the secure standardised Q-correlations scores among the non-referred children of the H2M research programme was analysed. A cut-off point was chosen according to which 66% of normally developing children were categorised as secure, in accordance with the frequency reported in the literature (Ainsworth, et al., 1978). Second, each child in the referred group was categorised as secure (67.9%, $n = 76$) or insecure (32.1%, $n = 36$) using the same cut-off point.

To maximise the coding validity, 20% of the video-recorded ASCT were coded separately by two independent coders, both in the referred and the non-referred groups. The agreement between the two coders was computed using intraclass correlations. These coefficients have the advantage of taking into account differences in scoring means between coders (Howell, 1998, pp. 550-553). The reliability of the security Q-scores was .80. This value is quite good, although higher intraclass correlations between coders of the ASCT have previously been reported (.94 for security) (Miljkovitch, et al., 2004; Miljkovitch, Pierrehumbert, & Halfon, 2007). Our values were similar to those reported recently from a Spanish sample of 30 randomly selected cases, with a total of 10 judges, where the intraclass coefficients for the secure Q-scores were .81 (Pierrehumbert, et al., 2009).

Criterion variables. Parenting was assessed using the *Evaluation des Pratiques Educatives Parentales* (EPEP, Meunier & Roskam, 2007). This is

based on previous studies by Van Leeuwen and Vermulst (2004) and contains 35 items relating to nine factors: Positive Parenting, Monitoring, Rules, Discipline, Inconsistent Discipline, Harsh Punishment, Ignoring, Material Rewarding, and Autonomy. Recently validated on 493 French-speaking mothers and fathers of normally-developing children, the EPEP scale has good psychometric properties. Cronbach's α ranged from .65 to .89; the total percentage of variance explained by the nine factors was 64.3%; test/retest correlations for a sample of 45 parents varied between .51 and .84; and the items were not correlated with social desirability. Confirmatory factor analyses showed that two second-order factors covering the Support and Negative Control parenting dimensions reported in the literature (Aunola & Nurmi, 2005; Baumrind, 1971) emerged from the initial factor solution. The Supportive factor was composed of Positive Parenting, Autonomy, Monitoring, and Rules, while the Negative Controlling factor included Discipline, Harsh Punishment, Material Rewarding, Inconsistent Discipline and Ignoring. Both these factors were used in the present study.

The children's cognitive abilities (verbal and reasoning IQs) were measured with the *WPPSI-III* (Wechsler, 2004).

Statistical analysis

The main objective of this study was to compare the Fr-AQS and the Fr-ASCT. This was done using both the continuous and the categorical scores from the two instruments. Two-tailed correlations and crosstabs were computed.

The relations between age, gender, cognitive abilities and parenting and attachment (as assessed with the Fr-AQS and the Fr-ASCT) were studied. Crosstabs and chi-squared statistics were computed for the categorical variables, by age and gender. ANOVAs were performed for cognitive abilities and parenting. For the continuous scores, ANOVAs were computed by age and gender, while correlations were used for cognitive abilities and parenting.

Results

The correlation between the secure scores of the Fr-AQS and the Fr-ASCT for the same children ($n = 106$) was .09. This was not statistically significant.

Each child was categorised as either 'secure' or 'insecure' on the Fr-AQS and on the Fr-ASCT. 60.3% of the children were placed in the same category on the two instruments ($n = 64$): 47 of the children were consistently classified as secure, and 17 as insecure. Like the very low and non-significant correlation obtained from the continuous scores, the two classifications yielded different results: a child categorised as secure with the Fr-AQS was not categorised as secure with the Fr-ASCT ($\chi^2(1) = 2.15, p > .10$).

Categorical scores

As expected, the chi-squared test revealed no significant differences between secure and insecure patterns on either the Fr-ASCT or the Fr-AQS with age ($\chi^2(2) = 4.82, p > .05$) or gender ($\chi^2(1) = 3.25, p > .05$). Moreover, contrary to our expectations, there were no significant differences in parenting between secure and insecure children as assessed by the Fr-ASCT and the Fr-AQS (see Tables 1 and 2). There were, however, a significant difference in the cognitive abilities of the secure and insecure children as measured by the Fr-ASCT, but not

the Fr-AQS, for verbal IQ ($F(1;102) = 11.38, p < .01$), with secure children having higher verbal and total cognitive abilities than insecure children.

Table 1
Descriptive statistics for the Fr-AQS

	Secure			Insecure		
	<i>N</i>	<i>Mean (SD)</i>	<i>95% CI</i>	<i>N</i>	<i>Mean (SD)</i>	<i>95% CI</i>
Father support	63	3.85 (.44)	[3.74-3.96]	36	3.83 (.42)	[3.68-3.97]
Father control	63	2.53 (.56)	[2.39-2.67]	36	2.67 (.52)	[2.51-2.86]
Mother support	67	3.96 (.45)	[3.85-4.07]	43	3.93 (.41)	[3.81-4.06]
Mother control	67	2.60 (.60)	[2.46-2.75]	43	2.75 (.56)	[2.57-2.92]
Verbal IQ	65	97.91 (15.37)	[94.10-101.71]	42	95.52 (12.44)	[91.65-99.40]
Reasoning IQ	66	94.58 (13.03)	[88.11-96.03]	44	92.07 (13.03)	[92.63-100.33]
Total IQ	58	96.48 (14.65)	[95.63-102.15]	37	93.54 (12.95)	[89.22-97.86]

Note. CI= Confidence Interval

Table 2
Descriptive statistics for the Fr-ASCT

	Insecure			Secure		
	<i>N</i>	<i>Mean (SD)</i>	<i>95% CI</i>	<i>N</i>	<i>Mean (SD)</i>	<i>95% CI</i>
Father support	31	3.78 (.48)	[3.60-3.95]	65	3.88 (.35)	[3.80-3.97]
Father control	31	2.59 (.51)	[2.40-2.77]	65	2.59 (.56)	[2.45-2.73]
Mother support	35	3.88 (.45)	[3.73-4.04]	71	3.96 (.43)	[3.86-4.07]
Mother control	35	2.74 (.54)	[2.56-2.93]	71	2.60 (.60)	[2.46-2.74]
Verbal IQ	30	90.53 (14.71)	[84.05-96.02]	74	100.24 (12.69)	[97.30-103.18]
Reasoning IQ	33	92.27 (11.06)	[88.03-96.51]	74	95.24 (13.86)	[92.03-98.45]

Note. CI= Confidence Interval

Continuous scores

No main effects of gender or age were observed on the Fr-AQS (gender: $F(1;110) = .71, p > .10$; age: $F(2;111) = 1.76, p > .10$). On the Fr-ASCT, girls were perceived to be more secure than boys ($F(1;108) = 3.38, p < .10$), but there were no significant age effect ($F(2;107) = 1.81, p > .10$) (see Table 3).

Table 3
Descriptive statistics for the Fr-AQS and Fr-ASCT according to gender and age

	Boys			Girls		
	<i>N</i>	<i>Mean (SD)</i>	<i>95% CI</i>	<i>N</i>	<i>Mean (SD)</i>	<i>95% CI</i>
Fr-AQS	89	.14 (.21)	[.09-.18]	24	.07 (.27)	[-.04-.18]
Fr-ASCT	86	.29 (.25)	[.23-.34]	24	.39 (.25)	[.29-.50]

	Three-year-old group			Four-year-old group			Five-year-old group		
	<i>N</i>	<i>Mean (SD)</i>	<i>95% CI</i>	<i>N</i>	<i>Mean (SD)</i>	<i>95% CI</i>	<i>N</i>	<i>Mean (SD)</i>	<i>95% CI</i>
Fr-AQS	47	.11 (.23)	[.04-.17]	36	.16 (.22)	[.09-.23]	30	.10 (.25)	[.01-.19]
Fr-ASCT	44	.25 (.28)	[.17-.34]	36	.35 (.24)	[.27-.44]	30	.34 (.23)	[.25-.43]

Note. CI= Confidence Interval

There were significant correlations (see Table 4) between the secure scores of the Fr-AQS and of the Fr-ASCT and children's verbal IQ scores (Fr-AQS: $r = .17, p < .10$; Fr-ASCT: $r = .30, p < .01$). However there was only one significant correlation between the parenting scores, specifically the father's control, and the child's secure score on the Fr-AQS ($r = -.20, p < .05$). It should also be noted that the mother's support and control were correlated respectively with the father's support ($r = .24, p < .05$) and control ($r = .23, p < .05$).

Table 4

Two-tailed correlations between Fr-AQS and Fr-ASCT scores and the criterion variables

Measures	1	2	3	4	5	6
1. Secure score of Fr-AQS	-	.09	.10	-.15	.03	-.20*
2. Secure score of Fr-ASCT		-	.08	-.05	.17	-.06
3. Mother Support			-	-.04	.24*	-.03
4. Mother Control				-	-.03	.23*
5. Father Support					-	-.10
6. Father Control						-.20*

Measures	1	2	3	4
1. Secure score of Fr-AQS	-	.09	.17(*)	.15
2. Secure score of Fr-ASCT		-	.30**	.01
3. Verbal IQ			-	.48*
4. Reasoning IQ				-

(*) $p < .10$

* $p < .05$

** $p < .01$

Discussion

Our general conclusion is that the Fr-AQS and the Fr-ASCT are not interchangeable measures of attachment. They have to be employed according to their methodological properties and constraints. The low correlations between the instruments indicate that they do not assess the same feature of the attachment concept. On the one hand, the Fr-AQS assesses children's attachment behaviours that are specific to the relationship between the parents and their child in daily situations, especially those involved in the mother-child relationships. This refers to the concept of secure base, defined as the caregiver's ability to provide a source of security to the child leading him/her to feel safe to explore the environment (Cassidy, 1999). Experiencing the secure base allows children to learn adequate and effective emotion regulation, in the case of security, and consequently they are not afraid to deal with negative emotion. Secure children have thus experienced this secure base with their principal caregiver, integrated adequate emotion regulation and so are able to deal with negative emotion. By contrast, insecure children have not had such positive experience. Consequently, they lack this 'secure base' feeling, and this leads to emotion regulation whose effectiveness is non-optimal, such as minimizing or maximizing their emotional expressiveness. Thus they are ill at ease in the presence of negative emotion. This is observed in the form of behaviors such as being ill at ease, anxious, and

inhibited in the presence of a stranger. All these aspects of child's behaviors are linked to the items displayed on the cards being sorted in **the Fr-AQS**.

On the other hand, the Fr-ASCT assesses the behavioural component of the children's internal working model (IWM), particularly those aspects involved in the parent-child relationships reflected in the story stems. In accordance with other story stem procedure (Robinson, Hérot, Haynes, & Mantz-Simmons, 2000), two main domains of children's narrative in the Fr-ASCT were identified: the performance features, or the engagement, in which the story responses were delivered and the content created by the child (Stievenart, Roskam, Meunier, & Van de Moortele, in revision). The engagement feature could be seen as the child's ability to be at ease when interacting with a stranger, interpreted as illustrating his or her emotional availability. Such a capacity is considered to be built on a significant number of earlier secure-base experiences and reflected in the context of the Fr-ASCT testing. About the content, four characteristics of the children's stories can be picked out: resolutions, emotional responses, parental representations and aggressive or destructive themes. Some children do not usually report aggressive or destructive content. Their resolutions are active and positive. Their parents are depicted in a positive way, with behavior which is both appropriate and caring. Some other children frequently tell stories including extreme aggression and/or destruction (serious injury, death, etc.). Their resolutions are often negative (anxiety, negative events and passivity), and their parental representations are either sketchy or characterized by negativity, indifference and/or inadequate parental behaviors. In sum, while the Fr-AQS is devoted to the behavioural aspect of the attachment concept in the family setting, the Fr-ASCT assesses the cognitive aspect of attachment in broader situations.

Although previous research has been almost exclusively based on categorical measures of attachment, our results provide an interesting insight into categorical and continuous perspectives. While the cross-tabulations indicated that about 61% of preschoolers were categorised consistently by both the Fr-AQS and the Fr-ASCT as secure or insecure, the correlations between the continuous scores obtained for the same children with the two instruments were low, contrary to Bretherton's (2008; 1990) findings. This difference could be partially due to the use of different coding systems. A deeper comparison between these coding systems would be necessary to explain this difference better. Also, the result based on categories could lead to the conclusion that the two instruments provide comparable results, but the continuous scores suggest that this is not so: not all the children categorised as secure are secure to the same extent. Being securely attached with a moderate correlation coefficient of .30 is different from being securely attached with a high correlation coefficient of .60. The continuous scores actually allow a more nuanced assessment of the children categorised as secure or insecure and support the idea of considering attachment as a dimension (as opposed to a category). This contributes to an often-debated question in attachment theory, namely whether attachment is better considered as a category or as a dimension. As suggested by Cummings (2003), our results tend to confirm that treating attachment as a dimension allows variations between individuals classified in the same pattern to be taken into account, by illustrating the relative

level of security/insecurity. On the other hand, attachment considered as a category is useful as a means of describing general attachment dispositions.

Such nuances could be important, for instance, in the study of the intergenerational transmission of attachment or the stability of attachment security. Most previous studies of these topics have been mainly based on categorical scores, rather than on continuous ones. They have consistently concluded that transmission across generations occurs (e.g. DeKlyen, 1996; Gloger-Tippelt, et al., 2002; Miljkovitch, et al., 2004; Steele, Steele, & Fonagy, 1996) and that attachment security is stable across time (e.g. Bar-Haim, Sutton, & Fox, 2000; Gloger-Tippelt, et al., 2002; Moss, Cyr, Bureau, Tarabulsky, & Dubois-Comtois, 2005). It is possible that continuous scores, by providing a more detailed picture of children's attachment patterns, reveal a less obvious and less linear picture of both transmission and stability. These differences in results according to whether they are treated as categorical or continuous measures are also observed with the criterion variables. All these results tend to confirm the relevance of taking both categorical and continuous scores into account when studying attachment. Adopting this procedure would focus attention on the arguments in this debate. It would also support the position of some researchers (Cummings, 2003; Cummings, et al., 1990; Fraley & Spieker, 2003) who propose a compromise by considering attachment dimensions as a complement to pattern classification.

Another general conclusion is that the two instruments interact with the criterion variables in a similar way. The majority of our hypotheses have been confirmed: there were no age or gender effects with the categorical or continuous scores for the Fr-AQS or the Fr-ASCT; however the relations between attachment and IQ were significant with the exception of the categorical score on the Fr-AQS. Nevertheless, the expected association between attachment and parenting was not evident. These results are detailed and discussed below.

Like previous studies of attachment behaviour using the AQS and the SSP (e.g. Clark & Symons, 2000), no age-related effect was reported for the attachment patterns or for the secure score of the Fr-AQS. Similarly, no age-related effect appeared with the Fr-ASCT, in line with previous results for children's attachment representations (e.g. Pierrehumbert, et al., 2009). Nor were any gender-related effects displayed, with the exception of both the categorical and the continuous scores of the Fr-ASCT. These results confirmed our hypothesis and previous results (e.g. McCabe, et al., 2006) that the child's gender does not have an effect on attachment patterns as assessed by the Fr-AQS. However, girls appeared to be more secure according to the Fr-ASCT, perhaps because of the sort of task employed (Green, et al., 2007; Pierrehumbert, et al., 2009). Further studies are needed to confirm that this gender-related effect is indeed due to the sort of task (i.e. narrative production). Mean comparisons on verbal abilities should be run between boys and girls, with the expectation that girls will display higher verbal abilities than boys. If this is true, gender-related effects on the Fr-ASCT could be explained by this difference in verbal abilities. This would lead to the recommendation that this variable be controlled in any further analyses employing data from the Fr-ASCT. Another explanation of this

gender difference in the Fr-ASCT is that the children who completed this attachment assessment were older than the children in the SSP (Pierrehumbert, et al., 2009), suggesting that the gender difference appears in the course of the child's development. However, this gender difference did not appear in the Fr-AQS, which related to the same sample with the same age, suggesting that this gender difference is specific to the Fr-ASCT. Consequently, the explanation in terms of task type seems more plausible.

Significant interrelations between cognitive abilities and the continuous attachment scores were found with both the Fr-AQS and the Fr-ASCT. The effect of verbal abilities on the Fr-ASCT could be explained by the use of language in the completion of the Fr-ASCT. However, previous authors (e.g. Bretherton, 2008; Gloger-Tippelt, Lilith, & Olaf, 2008; Miljkovitch, et al., 2007) suggested that language skills do not play any role in completion, because the use of material allows the child to depict his/her representations without speaking. In our opinion however, when the child did not speak or spoke little, this had an impact on the completion of the Fr-ASCT, and the Q-sort procedure was difficult to carry out, resulting in false estimates of the attachment patterns. However, and besides this clinical consideration, the effect of verbal abilities was also apparent in the continuous scores of the Fr-AQS, but not in the categorical scores, which did not depend on children's language. This result suggests that verbal abilities played a role in both the Fr-AQS and the Fr-ASCT, over and above the impact of language on completion. Consequently, an alternative to this assumption is that verbal IQ is a resilient factor in attachment security, in accordance with previous results (Atkinson, et al., 1999; Stievenart, et al., 2011): the higher the child's verbal abilities the better his or her reasoning about attachment relationships. High verbal abilities, referring to the capacity to acquire knowledge (Wechsler, 2004), would actually lead to more flexible and resilient IWM, taking account of relational experiences with various caregivers in different settings.

Also contrary to what was expected, no significant relations with parenting were found with the Fr-AQS or the Fr-ASCT, with the exception of fathers' control which was linked to the continuous score on the Fr-AQS. It could be that the comparability between the results of the current study and those of previous studies is limited due to measurement. Very few studies have used the AQS (Pierrehumbert, Mühlemann, et al., 1995; Waters & Deane, 1985) and none was reviewed using the ASCT. Also, although parenting has been demonstrated as having an influence on the child's attachment (e.g. Barnett, et al., 1998), many studies have shown that parental sensitivity has to be considered as a key factor (for a review, see De Wolff & van Ijzendoorn, 1997). Sensitivity is defined as the ability to accurately perceive and interpret the child's attachment signals, and to respond to them promptly and adequately (Ainsworth, et al., 1978). Low sensitivity is often related to children's insecure attachment. Further research would be needed to explore the influence of parental sensitivity on children's attachment, assessed with the Fr-AQS and/or the Fr-ASCT.

Concerning parenting, the significant correlations among the couples for support and control parenting provided additional interesting information. This suggests that parents were to an extent consistent with each other in their

parenting behaviour. This finding concerning the parenting couple's relationship may be a critical variable for studying the effect of parenting on children's attachment. Further analyses are needed to explore this possibility.

While innovative and important in terms of recommendations about assessing attachment security in preschoolers, the results of the present study still need to be extended in several ways. They should first be verified with normally-developing preschoolers. The preschoolers in our sample had all been referred to mental health services for externalising behaviour problems. Second, the relations between Fr-AQS and Fr-ASCT should be explored with the Fr-AQS completed by an observer. This was not done in the present study since it requires extended observation of the child's behaviour in the family setting. This is usually impossible with referred samples. As suggested by Bretherton (1990), the prediction from the Fr-AQS on later measures of the Fr-ASCT could usefully be verified in a longitudinal design. Third, it is important to emphasise that the cut-off points used in the categorisation procedure are arbitrary in nature. The results that were obtained here have to be considered with caution because of the methods we employed.

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