

**ASSESSING ATTENTION DEFICIT HYPERACTIVITY DISORDER IN
LEBANON:
THE ADAPTATION OF THE CONNERS TEACHER RATING SCALE FOR USE
WITH LEBANESE CHILDREN**

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The Adaptation of the Conners' Teacher Rating Scale for Use with Lebanese Children

ABSTRACT

Attention Deficit Hyperactivity Disorder (ADHD) is a multifaceted disorder that remains a controversial subject in education. While some practitioners see it as a real issue that blights the lives of children and adolescents, who need dedicated help to overcome it, others dismiss it as an excuse for the failures of parents and teachers. It is a wide spectrum of interpretation. This study started from the viewpoint that ADHD is a serious medical, social and educational issue that has an adverse effect on sufferers, their families, their peers and their teachers, but that these effects can be lessened and controlled by effective educational interventions guided by the principles of the bio-psycho-social approach. Accordingly, the framework for the study was twofold: the bio-psycho-social approach to understanding and treating the disorder; and the mixed-methods research approach to designing, implementing and analyzing the information obtained by this study.

One of the reasons for the divergence in professional opinion on ADHD is that the symptoms and associated behaviours make it difficult to assess, especially in younger children. This highlights the need for a reliable and valid assessment tool that can be adapted across languages and cultures, to allow for diagnosis and cross-comparison. In this study, the short form of the Conners' Teacher Rating Scale Revised (CTRS-R: S) was adapted to make it suitable for use with Lebanese nationals. It was adapted by a team of translators, carefully selected *per* the ITC guidelines, using the backward-translation design, a small pilot test, structured interviews and a survey. This multilayered approach produced very interesting results regarding prevalence of ADHD in Lebanon, as well as a rating scale with proven reliability and validity. Thus the two research questions posed by this study were answered comprehensively, giving an important insight into the requirements for a successful adaptation and using that adapted assessment tool to deliver new information about ADHD in the Lebanese setting.

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To Dad,

May He Rest in Peace

I wish you were alive to be proud of me, I know that's what you would have wanted,
but better late than never. This thesis is for you! I know that you are smiling now! I love you
baba

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CHAPTER 1

BACKGROUND TO THE STUDY

1.1 INTRODUCTION

Attention Deficit Hyperactivity Disorder (ADHD) is characterized by pervasive and impairing symptoms of inattention, hyperactivity and impulsivity, according to DSM-IV (APA, 1994). The World Health Organization (WHO) (1992) uses a different name for it — hyperkinetic disorder (HD) — but lists similar operational criteria for the disorder. Regardless of the name used, ADHD/HD is one of the most thoroughly researched disorders in medicine (Goldman *et al.*, 1998). It has been associated with a broad range of negative outcomes for affected subjects (Dulcan, 1997; Swanson *et al.*, 1998) and with placing a serious financial burden on families and on society (Barkley, 2006). For this reason, it is characterized as a major public health problem (Faraone *et al.*, 2003), which is why it has been to the forefront of medical research.

For those afflicted with the disorder, ADHD impairs major life activities, including social relations, education, family functioning, occupational functioning, self-sufficiency and adherence to social rules, norms and laws (Carey and Diller, 2001). There is also evidence that sufferers are more prone to physical injury and accidental poisonings (Douglas, 2004). Its effects can be diverse and devastating for the individual. Follow-up studies of clinical samples suggest that sufferers are far more likely than persons in the general population to drop out of school (32–40%) and out of college (90–95%), to have few or no friends (50–70%), to underperform at work (70–80%), to engage in antisocial activities (40–50%) and to use tobacco or illicit drugs. Children growing up with ADHD are more likely to experience teen pregnancy (40%) and sexually transmitted diseases (16%), to speed excessively and have multiple car accidents, to experience depression (20–30%) and personality disorders (18–25%) as adults, and in hundreds of other ways to mismanage and endanger their lives (Barkley *et al.*, 2002).

Lying, cursing, stealing and blaming others are frequent components of ADHD, especially as the child gets older. According to some particularly depressing data gathered by Barkley *et al.* (1990), here is how ADHD children compare to typical children:

- 72% of ADHD children argue with adults (vs. 21% of typical children);
- 66% of ADHD children blame others for their own mistakes (vs. 17% of typical children);
- 71% of ADHD children are irritable or easily annoyed (vs. 20% of typical children);
- 40% of ADHD children swear (vs. 6% of typical children);
- 49% of ADHD children lie (vs. 5% of typical children).

In short, the symptoms of ADHD become less “cute” as the child progresses from elementary to secondary school. The “good” news is that these problems are commonly part of the syndrome we call ADHD and therefore are not the fault of the child or of his parents. This important understanding points the way towards coping with these issues in an effective way (Kutscher, 2008). Accordingly, the assessment process and the subsequent treatment must reflect both the developmental nature of the disorder and its complexity. The nature of ADHD and how it is expressed demands a consideration of biopsychosocial and developmental factors in both assessment and treatment (Sayal *et al.*, 2008). The premise of the biopsychosocial approach is that while a behavioural disorder, such as ADHD, is associated with certain neurological and genetic patterns, these patterns do not determine the existence or development of the disorder (Cooper and Jacobs, 2011). In other words, it is likely that there are people who possess the frontal lobe dysfunctions and genes associated with ADHD, but who do not go on to develop the disorder. It is only when the biological characteristics interact with specific passive learning environments that ADHD-like symptoms develop to the point of impairment. This perspective helps to explain why ADHD is most strongly associated with the school years, where compliance and orthodoxy are rewarded in the traditional passive learning environment (*ibid.*).

Taking the above into account, it is the finding of this research that ADHD is best explained and understood through the biopsychosocial model. This model interprets ADHD as a product of a complex interaction between biological and social-environmental factors.

According to this explanation, from their inception biologically inherited factors (i.e. genetic endowments) are in constant and dynamic interaction with environmental factors. Gene-environment interaction leads to the development of certain patterns in brain architecture (e.g. lobe development) and functioning (e.g. the neurotransmitter systems), which in turn leads to the development of certain cognitive characteristics (e.g. the efficiency of the executive functions, such as those concerned with self-talk and working memory). Importantly, though, the extent to which and the ways in which these cognitive characteristics contribute to presenting behaviours that are functional or dysfunctional is heavily influenced by environment and by experience (Cooper, 2008, Cooper and Jacobs, 2011).

In spite of this modern understanding and comprehensive explanation of ADHD, the disorder continues to be a controversial issue among some educationalists. As will be argued later, negative reactions to the concept of ADHD are generally based on outdated thinking and a lack of understanding of the diagnosis and of the biopsychosocial paradigm through which it can be usefully understood. Some commentators have simply dismissed ADHD as a medical construct that individualizes educational failure and disruptive behaviour in the classroom (e.g. Slee, 1995; Lloyd and Norris, 1999; Skidmore, 2004; Visser and Travell, 2006). The effect of such individualization, it is argued, is to distract attention from the roles that schools and teachers may play (wittingly or unwittingly) in the construction of learning and behavioural problems, and to allow educators to absolve themselves of their responsibility to provide appropriate educational opportunities to certain groups. This negative reaction is based on a number of erroneous assumptions, which we will examine and refute at a later point. For now, the key point to be made is that educationalists who dismiss the ADHD concept from an uninformed position are not only hindering the development of effective interventions for ADHD but are failing to grasp and exploit the potential solutions offered by a biopsychosocial perspective for the educational setting and beyond.

The classic symptoms of the disorder and the timing of the development of those symptoms, in early childhood, make a diagnosis of ADHD difficult. Overactive behavior and restlessness are common in children, especially in boys aged between six and twelve

years. Some “problem” children are never referred for hyperactive behavior, either because they have parents or teachers who are tolerant of their behavior or do not regard it as problematic, or because they are fortunate enough to have optimal environments that provide structure for their behaviour. On the other hand, there are typical children who are referred for evaluation because of less tolerant teachers, parents or environments (Smoot *et al.*, 2007). This gives credit to the biopsychosocial model, which explains ADHD as a construct of and an interaction between specific cultural and social factors. The difficulty of accurate diagnosis is reflected in the fact that the WHO and the DSM differ in their measures of clinical significance, resulting in different prevalence rates, even though similar criteria are used by both. The WHO’s criteria are less inclusive, and therefore produce lower prevalence rates than the DSM criteria (NICE, 2000).

In terms of diagnosing and treating the disorder, many clinicians and researchers consider the use of reliable and valid teacher-completed rating scales as standard practice (American Academy of Child and Adolescent Psychiatry, 2002; American Academy of Pediatrics, 2000; Mattison, *et al.*, 2003). Rating scales that assess ADHD provide an effective, quick and standardized approach to the measurement of problematic behaviours observed in children with ADHD. The development and use of diagnostic manuals, namely the *Diagnostic and Statistical Manual of Mental Disorders* (DSM), published by the American Psychiatric Association (APA) (2000), amplified interest in rating scales, as the diagnostic criteria suggested in these manuals are, in fact, symptom lists (Angold, 1989). Rating scales do have a number of disadvantages, however, some of which are shared by other measurement procedures. They are, for example, limited to the informant’s perspective and characteristics of the informant and the tendency toward response biases are sources of variation in ratings (Carter *et al.*, 2004). Nevertheless, when combined with other measurements, these instruments should prove to be particularly useful in assessing children who have attention problems and hyperactivity (Barkley, 1981).

At present, there is a growing need for adaptations of psychometrically sound rating scales, mostly from English into other languages. This demand comes from researchers and clinicians in various countries, but also from researchers and clinicians who work in major

metropolitan areas with their multi-ethnic, multi-language character (Achenbach and Rescorla, 2007). Examples of scales that have been translated into multiple languages include the Child Behavior Checklist (CBCL) (Achenbach, 1991), the Child Symptom Inventory (CSI) (Gadow and Sprafkin, 1998), the Conners' Rating Scales Revised (CRR: S) (Conners, 1997), the Devereux Scales of Mental Disorders (DSMD) (Naglieri *et al.*, 1994) and the Revised Rutter Scales (Rutter, 1993). Adapting tests prepared in one language and culture for use in other languages and cultures has been a long-standing practice. However, there is considerable technical evidence to suggest that the quality of test adaptations varies considerably, with poor adaptations occurring regularly, which reduces the validity of results produced using these adapted tests (Hambleton *et al.*, 2005; Weeks *et al.*, 2007; Wang *et al.*, 2006).

There is an agreement among researchers that, further to selecting an accurate instrument, an accurate translation is the first step in adapting tests. The second step is the testing of the instrument's psychometric properties in these other contexts, including reliability and validity. The third step is the derivation of reference scores in the form of standard scores (Crijnen *et al.*, 1997; Crijnen, 1999; Crijnen, 2000).

There are no generally accepted guidelines for gauging the adequacy of translation, although there is an increasing awareness of the many difficulties inherent in the faithful translations of instruments. To ensure optimal accuracy in translation, some authors advise using the back-translation design (Weisz *et al.*, 1995), others emphasize the importance of field-testing (Byrne and Campbell, 1999), while others again advise implementing both steps (van de Vijver and Poortinga, 2002; van de Vijver and Leung, 1997; Miller, 1997; Berry *et al.*, 1992). In truth, even very accurate translations may contain linguistic nuances that require explicit revising and reporting. For these reasons, the International Test Commission (ITC) developed guidelines on adapting tests, which are currently being used in most test-adaptation studies (Stansfield, 2003; Heo *et al.*, 2008; Hambleton, 2001; Hambleton *et al.*, 1999).

1.2 CONTEXTUAL BACKGROUND TO THE STUDY

Lebanon is a small country with big hopes that is emerging from fifteen years of civil war that have caused a decline in educational and vocational training levels. At present, it is Lebanon's priority to invest in these vital factors because they are the roots of a stable and competitive country (Friedman, 2006).

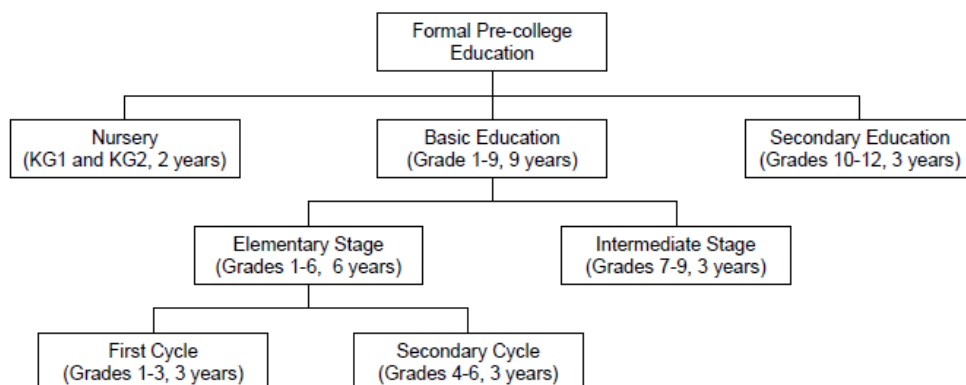
The Lebanese population in 2005 was estimated at 3,505,794, of which 86.4% are literate. That leaves 476,788 people (13.6%) who cannot read or write. The general budget the government puts into education makes up 12.96% of the total budget involved in developing Lebanon. With this, the country can reconstruct the private and public educational and vocational systems, thereby increasing employment possibilities for school and university graduates (Fisk, 2002).

The educational level of disadvantaged men and women in Lebanon is low due to the lack of high school education among adult family members. However, a high percentage of the youngsters are enrolled in the public schools, although many drop out sooner or later for reasons such as prohibitive higher education costs for low income families, low occupational and economic return on education, and the insufficient number of government schools in poor neighbourhoods. Many major programs have been devised with the aim of solving such problems. One important project is the ministry of vocational training set up by the Hariri government in 1990. Its purpose is to improve vocational training and enable the poor to find employment in productive jobs. It also aims to increase the number of students enrolled in public vocational education (Traboulsi, 2006).

In Lebanon, there are two ministries for education: the Ministry of Vocational Training and the Ministry of Education. The Ministry of Vocational Training has two separate fields for which it is responsible: vocational training and technical education (Tecsult-Kredo, 2004). The Ministry of Education is responsible for all public and private schools in the country. It is mandatory for all schools to follow the same curriculum, which is set by the Ministry of Education (Skilling Australia, 2005).

School education in Lebanon starts at the nursery stage, ages 3–6, and the years of instruction are divided into four three-year cycles. Figure 1.2 shows the grades and the number of years in school education in Lebanon.

Figure 1.1 Grades and number of years in school education in Lebanon



Source Boujaoude (2002)

Now that we have briefly introduced the general context of education in Lebanon, we can discuss the particular issue of special education.

People with special needs are found in the general population of Lebanon. It is difficult to estimate the percentages in each of the usual special needs categories (e.g. Autism, ADHD) as there is no central data-collection agency. Furthermore, there is no federal legislation requiring accessibility for people with special needs. However, two studies regarding ADHD in Lebanon have shed light on this. Fayyad *et al.* (2007) noted that a prevalence of ADHD in a Lebanese sample was 1.8% (n=595). Similarly, Cordahi *et al.* (2002), in her follow-up study of 81 Lebanese children and youths, revealed the ADHD prevalence was 1.4%.

Moreover, the Ministry of Social Affairs plays an important role in sponsoring a number of centers that provide facilities and services for people with mild, moderate and severe handicaps. Among these centers is the Ideal Center for the Disabled, which is the only center eligible to examine the reasons behind poor academic achievement and learning difficulties and to establish the appropriate interventions. In 2005, this center received 232

cases that were treated by a psychologist. Among these, 23% had conduct disorders, 28% had hyperactivity problems and 19% had ADHD (Ministry of Social Affairs, 2005).

At the present time, a specific categorical system for identifying and supporting students with special needs does not exist in any formal way in the public school network. Neither the Ministry of Education nor its public schools play any role in supporting children with special needs, especially one of the most challenging behavioural disorders, ADHD. The private school system, on the other hand, varies considerably in its organizational sophistication for supporting children with special needs. Some private schools employ counsellors who diagnose and implement the necessary interventions. Such interventions include assigning students to special classes or to a resource room. Special classes are classes with a maximum of twelve students, allowing for closely directed work in a smaller classroom setting. The resource room provides intensive, small group remedial instructional services in a pull-out system, with groups varying from two to about five students. Resource rooms are generally staffed by teachers who have studied special needs education (Ministry of Education, 2007). These sorts of facilities and aids are not standardized, however, and the level of care varies widely from institution to institution. This is an issue that must be addressed from the top down, from the political sphere to the educational sphere, if the necessary changes are to be made for the benefit of all children.

1.3 AIMS AND FOCUS OF THE STUDY

The basis of this study are two major, broad research questions.

1. Adapt the Conners' Teacher Rating Scale: Revised – Short version (CTRS-R: S) (Conners, 1997) in order to make it suitable for use with Lebanese nationals
2. Validate the adapted version of the CTRS-R: S on a sample of Lebanese students

These aims entail sub-objectives and level 1 sub-objectives also. These were justified in relation to the existing literature and are, therefore, as such best discussed after the review of literature.

1.4 SIGNIFICANCE OF THE STUDY

Early identification and treatment of children with developmental or educational problems has been widely promoted as a valuable and responsible approach for serving children who have specific needs (Rutter and Taylor, 2002). The process of assessment is a critical factor in the diagnosis and treatment of any behaviour disorders, and this is no less the case with ADHD (Brent, 1985). ADHD requires consideration of the biopsychosocial approach, which integrates fully the internal biological and intra-psychic dimensions with the interpersonal and social dimensions (Cooper and Jacobs, 2011). As a result of the co-morbidity of ADHD with other difficulties, such as learning disabilities, an evaluation must take into account these individual psychological factors. The problem behaviours must be inappropriate when compared to those of other children of the same mental age, so these behaviours must be assessed within a developmental context, using assessment instruments that have appropriate normative data (Spencer *et al.*, 2007). Furthermore, the chronic nature of ADHD suggests that the problematic behaviours must be examined in the context of maturational changes. This requires knowledge of the way in which the disorder manifests itself across these ages and the co-occurrence of ADHD with other problems. Assessment measures must therefore be selected to cover the relevant ages and range of behaviours (Shah, 2005). Professionals must also rely on several methods of assessment, must utilize several different sources of information from different settings and must interpret the data obtained within both a biopsychosocial and a developmental perspective (Sayal, 2008).

Recommended assessment practices involve multi-disciplinary assessment (NICE, 2008; BPS, 2000) that focuses on the individual's functioning over the life course to date and requires the feedback of parents and the children themselves, as well as the child's teachers and other professionals who may be involved with the child (e.g. social workers, educational psychologists). The diagnosis should apply only if the assessment process indicates that symptom thresholds laid down in the diagnostic criteria (APA, 1994) are met. These refer to severity, pervasiveness and longevity. Finally, early diagnosis is crucial, along with multi-disciplinary and trans-disciplinary interventions as part of a long-term management plan (Murphy and Barkley, 1996).

In a comprehensive evaluation of a client with ADHD, probably the most important components are the clinical interview and the medical examination. Appropriate teacher norm referenced rating scales are also commonly employed in the assessment process (Sharkey and Fitzgerald, 2007; Reid, 2001). Teacher rating scales provide necessary information about the child in the school setting. The teacher also becomes a secondary informant who can judge the behaviour of the child in the context of his peers (Fee and Matson, 1993).

Among the present rating scales is the short form of the Revised Conners' Teacher Rating (CTRS-R: S), devised by Dr C. Keith Conners (Conners, 1997) (see Appendix 1, The Conners' Teacher Rating Scale-Revised: Short Form). The CTRS-R: S is the most popular of the newer DSM IV-based rating scales and it has been used in many diverse research and clinical applications (Merrell, 2008). The CTRS-R: S incorporates many new enhancements to a set of measures that have long been the standard for measuring ADHD in children and adolescents, and it has excellent reliability and validity indexes as well as large normative data.

After a long, serious examination of the studies carried out by the National Centre for Educational Research and Development (NCERD) (a centre associated with the Lebanese Ministry of Education responsible for conducting educational studies) and after searching in the libraries of the major universities in Lebanon, the researcher failed to locate any study that addressed adaptations of an ADHD rating scale in the Lebanese setting. However, one study was located in Sudan (Al-Awad and Sonuga-Brake, 2002). In the absence of such studies, it becomes imperative to undertake the task of adapting a reliable and valid rating scale for measuring ADHD in Lebanon.

Adapting an imported rating scale to suit the Lebanese setting is associated with methodological issues and challenges that are in turn associated with the adaptation of achievement and psychological instruments (Berry *et al.*, 1992; Achenbach *et al.*, 2007). Although significant advances have been made in the methodologies used to adapt tests (van de Vijver, 2008), there remain a number of difficult, challenging issues in this area. Van de Vijver points out that a recurring theme in adaptation studies is the question of the

extent to which instruments developed in Western countries can be applied in different cultural contexts. Accordingly, as interest in test adaptation increased, a thirteen-person committee was established in 1992, with representatives from a number of international organizations. It was called the International Test Commission (ITC) and its remit was to develop technical standards for test adaptation (Hambleton, 2001; Hambleton *et al.*, 1999). The objective was to produce a detailed set of guidelines for adapting psychological and educational tests for use in various different linguistic and cultural contexts. In fulfillment of this aim, the Commission produced a set of twenty-two guidelines for adapting educational and psychological tests.

This particular study, which is the first of its kind in Lebanon, will permit multi-modal assessment and takes into consideration the cultural characteristics of Lebanese children/adolescents. The availability of such a scale could be of value to Lebanese epidemiologists in as much as it provides a basic index of childhood psychopathology. It will help teachers and psychologists to judge the efficacy of their interventions on the basis of the scale's scores. It will also assist clinicians in judging when treatment is necessary, is effective or should be terminated. Finally, and in accordance with Hambleton (2001), adapting the instrument of interest (in this case the CTRS-R: S) may be cheaper and faster than to completely recreate it in another language. It may also be desirable where the expertise to construct an instrument measuring the desired trait, skill or ability does not exist in the population of interest (in this case the Lebanese setting). Therefore, this should account for the need to adapt a valid and reliable imported rating scale that measures ADHD and its multifactorial conditions.

In addition, this study will serve as an excellent reference for subsequent studies wishing to adapt similar or other tools to suit the Lebanese culture. It is a considerable benefit, then, that this study addresses most of the relevant and available literature about test adaptation (*see* Chapter 2). It also illustrates in detail how the rating scale devised by this study was adapted, and in that, adaptation retained acceptable levels of reliability and validity. The rigor achieved in the adaptation processes was guided by the ITC guidelines. This is an area of major importance as tests become used in more and more countries, and as tests developed in one country get adapted for use in another. Test adaptation must consider the

whole cultural context within which a test is to be used, as this study shows. Finally, this study sheds light on educational interventions from a biopsychosocial perspective.

The following section provides methodological background information for this study, which is useful for an understanding of the process that defined how this study was carried out.

1.5 RESEARCH METHODOLOGY

Two research paradigms seem to dominate the literature: the quantitative paradigm and the qualitative paradigm (Cohen *et al.*, 2000). The quantitative paradigm is derived from a positivist philosophy, whereby the social world is viewed as identical to the natural world and thus can be investigated in the same ways. In contrast, the qualitative (interpretive) paradigm rejects the positivist philosophy and instead supports the view that there is a basic difference between the social world and the natural world (Bryman, 2001).

In this study, neither the quantitative nor the qualitative paradigm was adopted. A third way was found that better suited the parameters and procedures of this study, namely the pragmatic approach. Robson (2003, p. 43) points out that “Pragmatists use whatever philosophical or methodological approach works best for a particular research problem at issue.” In other words, pragmatism can serve as the philosophical underpinning for conducting mixed methods research, where both quantitative and qualitative methods are used in a single research study (Creswell, 2003). The pragmatic approach sees a continuum between the quantitative and the qualitative paradigms (Johnson and Onwuegbuzie, 2004). Taking this more inclusive approach as the framework of the study, both quantitative and qualitative data were collected. For example, qualitative data was collected through standardized open-ended interviews, while quantitative data was obtained using survey and quantitative statistical analysis. (A detailed description of data collection methods and data analysis is presented in Chapter 3.)

First and foremost, then, this study adopted an interpretive qualitative approach in which standardized open-ended interviews were conducted with two psychiatrists on the subject

of the assessment of ADHD. Following on from this a positivist/quantitative approach was adopted to establish the psychometric properties of the CTRS-R: S. Survey methods were employed to establish the normative properties and to validate an adapted Arabic version of the CTRS-R: S, as based on the responses of Lebanese teachers' ratings of 820 Lebanese school students.

1.6 ORGANIZATION OF THE THESIS

This thesis is divided into five chapters.

Chapter 1 outlines the overall structure of the study by establishing its focus and aim, describing the contextual background to the study, explaining the significance of the study and its findings and, finally, delineating the research methodology.

Chapter 2 reviews the theoretical literature on the subject of ADHD in order to establish a theoretical framework for the study. It sets out an explanation of ADHD through a brief examination of the research conducted on the underlying causes for understanding ADHD, the primary symptoms, the associated problems and the co-morbid factors. It also discusses the prevalence of ADHD and its nature and expression across gender and age variables. Finally, it relates the international research on ADHD to the Lebanese setting. In support of the theoretical approach chosen for this study, chapter 2 also discusses the evidence for ADHD as a biopsychosocial construct, followed by an analysis of the challenges to a valid diagnosis of ADHD and the most effective educational interventions. This discussion then proceeds to the diagnostic considerations and their long association with rating scales to measure ADHD, which is examined from an international and a local point of view. Following on from this, the essential requirements for rating scales are described, along with their advantages and disadvantages as compared to other measures. The rating scale under study, namely the Conners' Teacher Rating Scale Revised: Short Form (CTRS-R: S), is discussed, with particular attention given to the rationale behind selecting it over other available and valid rating scales. This incorporates a thorough analysis of the limitations and criticisms of the CTRS-R. Finally, the ITC guidelines are critically discussed and related to the objectives of the study that set the framework for adapting the CTRS-R: S.

This is followed by an evaluation of the merits of other studies that have approached the adaptation of similar tools. To conclude the chapter, the sub-objectives and level one sub-objectives are illustrated because these stemmed from the literature review.

Chapter 3 provides a theoretical discussion of the different phases of the methodology used in the present study, describing in detail the pragmatic approach, mixed methods research and the strategies and methods of collecting data. It illustrates how the fieldwork methodology and the theoretical perspectives of this study are the basic factors that determine the level of reliability and validity of the thesis. Given the scope of this study, the methods were classified *per* objectives and in a chronological fashion, when possible, meaning that the method used to achieve each objective was discussed and justified. The chapter goes on to discuss the process of test translation and adaptation. It describes the normative sample, administration, scoring procedures, statistical analysis conducted on the data obtained and the evidence for scales' reliability and validity. Finally, the relationship between the participants and the researcher is examined in terms of research ethics.

Chapter 4 is devoted to presenting the results obtained and discussing how they relate to existing international studies. The mode of analysis is also illustrated by objective or by a cluster of interrelated objectives. Similarities and differences are noted and examined with a view to discovering if anything is distinctive about the Lebanese experience of ADHD. Briefly, the findings are classified into four themes: (1) investigating how ADHD is assessed locally, (2) translating the CTRS-R: S according to the ITC guidelines, (3) establishing the normative data for the adapted CTRS-R: S and (4) examining the reliability and validity of the adapted CTRS-R: S. The results are specifically compared to the review of literature in Chapter 2, to other local studies and to similar studies that adapted the same or similar rating scales. Finally, the implications of these results are discussed along with their application to practice.

Chapter 5 closes the study with the conclusions arrived at and an account of the original knowledge that emerged from the study. It also identifies new directions for future research, makes recommendations and provides guidelines for improving the quality of test adaptations.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

As this study concerns adapting the CTRS-R: S, a rating scale that measures ADHD, it was essential to review the theoretical literature to establish a theoretical framework for the thesis. Accordingly, this chapter will present a review of material that already exists on the topic in question. It will also show how this study builds on that existing knowledge. In view of this, this section aims to achieve the following:

- to discuss the research that has been done and build on it;
- to indicate how the study's focus relates to previous research; and
- to describe how the previous research gave rise to particular issues, challenges and ideas and how the current research addresses those elements.

First, the various approaches to understanding ADHD and its evolution into an issue of education will be discussed. This entails an examination of recent findings on the causes of ADHD. These studies are then compared to information and findings from the Lebanese settings.

Following on from the discussion of the etiologies of ADHD, a critical analysis on the clinically useful findings on the primary symptoms is presented, along with associated problems and psychiatric co-morbidity of ADHD. Prevalence of ADHD and its nature and expression across gender and age will also be presented and, again, compared to the Lebanese setting. The prevalence of ADHD and issues regarding estimating its prevalence in a given population will be discussed from a macro level, internationally, and then from a micro level by looking specifically at the Lebanese context. To complete this profile of ADHD, the nature and expression of the disorder across age and the heterogeneous outcome in persistent ADHD are discussed. Such a critical review will help the researcher to explain and the reader to understand the findings evident from the teachers' ratings.

Having discussed the evidence for the presentation of ADHD as a real difficulty and syndrome, we shall examine the evidence for interpreting ADHD as a biopsychosocial construct. Further to reviewing the biopsychosocial perspective, a critical analysis of the challenges to the validity of an ADHD diagnosis will be presented and we shall inquire as to how this has been dealt with by scholars in the field. Once the disorder has been categorised as an educational issue, we shall discuss the multimodal educational interventions for students with ADHD, again from a biopsychosocial perspective.

This will lead to an examination of how ADHD is diagnosed internationally, with a focus on the advantages and disadvantages, and how this international perspective relates to and compares with the Lebanese setting. Then we shall introduce some of the diagnostic considerations and their long association with rating scales used to measure ADHD. The essential requirements for rating scales are set out, plus their advantages and disadvantages over other modes of measurement. Finally, we shall examine the rating scale that forms the basis of this study, the Conners' Teacher Rating Scale Revised: Short Form (CTRS-R: S), stating the rationale for selecting it over other available and valid rating scales, presenting a thorough analysis of its limitations and criticisms of it and describing its history, advantages and disadvantages.

In terms of the parameters of this study, the ITC guidelines are particularly important as they provide the framework within which the CTRS-R: S is adapted. Accordingly, there is a theoretical discussion of issues, design and technical guidelines for adapting tests in multiple languages and cultures. This is followed by an evaluation of the merits of other studies that have approached the adaptation of similar tools. Finally, the sub-objectives and level one sub-objectives are set out because these were developed further to reviewing the literature.

Throughout the study, the terms test and scales will be used interchangeably. That is , the ITC guidelines pertain to all measurement instruments including rating scales and other tests .

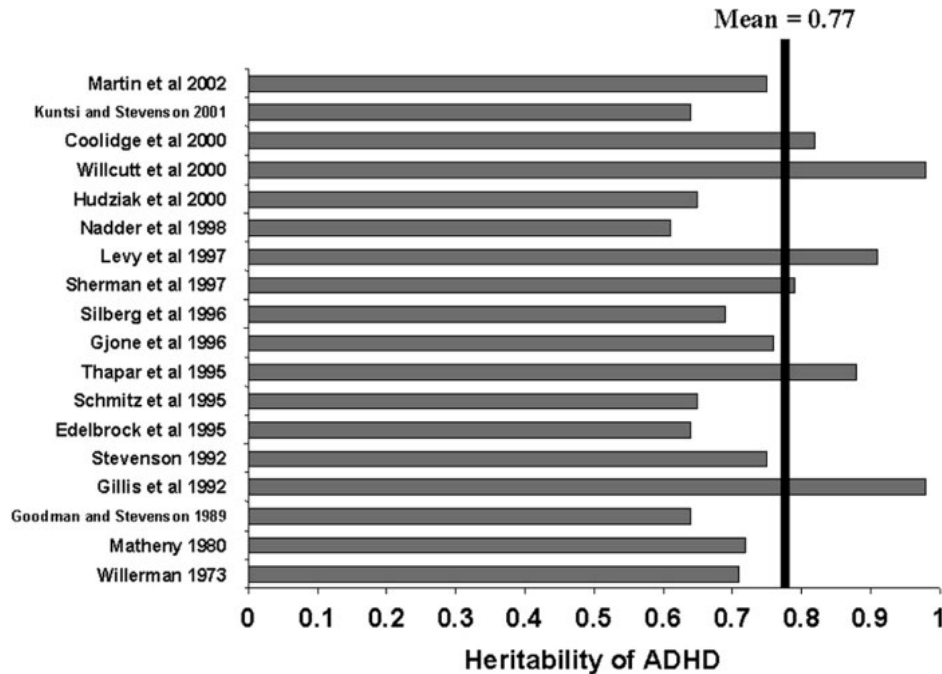
2.2 UNDERSTANDING ADHD

In common with many complex psychobiological disorders, the causes of ADHD are not fully known, even though it has become one of the most widely researched of all disorders of its type in the psychological and psychiatric literature (Cooper, 2008). Tannock (1998) identified three major areas of theoretical exploration of the disorder:

1. Cognitive research
2. Neurobiological research
3. Genetic research

Evidence from studies in these three key areas creates a compelling argument for ADHD as a biopsychosocial phenomenon and also provides a sound base for recommending a multi-modal approach to intervention, combining medical, psychosocial and educational dimensions. Cognitive research has tended to focus increasingly on impulsiveness as the central feature of the disorder, positing the theory that the fundamental problem is a dysfunctional response inhibition system. This is a neuropsychological mechanism that implicates the physiology of, or relates to, the frontal lobes of the brain (Arnsten, 2007). This neurobiological explanation is supported by a number of neuro-imaging studies (Kelly *et al.*, 2007; Tannock, 1998) as well as by various neurochemical studies, which have detected dysfunctions in certain neurotransmitter systems implicated in the regulation of attention and behavior (McMullen *et al.*, 1994). The focus on neurobiological factors in the etiology of ADHD is further supported by findings from genetic studies, which have shown a far greater incidence of ADHD among identical (monozygotic) twins than among non-identical (dizygotic) twins, and among children who are biologically related as opposed to adopted (Ibid.). Figure 2.1 summarizes the findings of those studies demonstrating the heritability of ADHD.

Figure 2.1 Heritability of attention-deficit/hyperactivity disorder



Adapted from Faraone *et al.* (2005)

Moreover, molecular genetic research has identified abnormalities in the dopamine system (Arnsten, 2007). Dopamine is a neurotransmitter found in brain systems concerned with, among other things, the regulation of movement (Thompson, 1993). These findings suggest that children with ADHD are biologically predisposed to experience considerable difficulty in trying to inhibit, or delay, a behavioural response. The nature of the dysfunction is described as a failure of the inhibitory control system to become activated (Barkley, 1997) or as an extreme delay in its activation (Sergeant, 1995).

Barkley (1997) proposes an integrated model that connects neurologically based problems of response inhibition to adverse effects in four major “executive functions” of the brain that are essential to effective self-regulation. The first executive function is working memory. When this is impaired, the affected individual finds it difficult to retain and to manipulate information for purposes of appraisal and planning. The second function is internalized speech. The proposition here is that self-control is exerted through a process of self-talk, during which possible consequences and implications of behaviours are weighed up and “discussed” internally. The third function is motivational appraisal. This facilitates decision-making by providing information about the emotional associations generated by

an impulse to act and about the extent to which the impulse is likely to produce desirable outcomes. The fourth function is reconstitution, or behavioural synthesis, which enables us to plan new and appropriate behaviors based on an analysis and understanding of past behaviours.

In addition to the cognitive-neuroscientific evidence, data from a number of studies suggests that factors in the family environment may also be significant in the development of ADHD. Such factors include parenting skills, disorderly home environments (Cantwell, 1996), marital disagreements (Barkley, 1997), maternal mental health and paternal personality factors (Nigg and Hinshaw, 1998). These data, combined with the neurophysiological research, suggest that ADHD is a biopsychosocial phenomenon, in other words a behavioural manifestation that has its origins in a biologically based predisposition, although the biological predisposition and the behavioural outcomes are mediated by social, environmental and other experiential factors (Rutter, 2001; Frith, 1992). In this biopsychosocial territory, it quickly becomes clear that the polarity sometimes stated in terms of biological versus social explanations for learning and behavioural problems (e.g. Visser, 1997; Slee, 1995) is outmoded and unhelpful. In the case of ADHD, both factors play a role: certain individuals are more prone to being “disordered” in this way by virtue of a combination of their biological inheritance and their social circumstances (Cooper, 1997b). ADHD has been described as “socially constructed” (Purdie *et al.*, 2002; Cooper, 1997a), and the school setting is a prime place for this process of social construction. This process is the outcome of traditional patterns of institutional control and pedagogical practices, but these same patterns and practices also provide the means by which deconstruction can take place.

In view of these findings, it is essential now to discuss how ADHD is understood locally, from a Lebanese perspective.

2.3 ETIOLOGY OF ADHD AND THE LEBANESE SETTINGS

With regard to the Lebanese settings, a study of ADHD in a Lebanese clinical sample of 270 subjects with ADHD aged between 2 and 24 years (conducted by Fayyad *et al.*, 2001),

showed that 42.1% of the subjects had at least one biological parent with symptoms of inattention and/or hyperactivity/impulsivity during the parent's early school years. Moreover, 40.2% of the subjects had at least one perinatal factor that was associated with ADHD, such as prematurity, hypoxia at birth, poor maternal health during pregnancy, smoking or alcohol intake during pregnancy. The significant correlation between perinatal factors and ADHD, such as smoking during pregnancy, hypoxia and prematurity, found by Fayyad *et al.* (2001) in Lebanon were all found to be significant in other studies conducted in other places (Button *et al.*, 2005; Lou, 1996; Milberger *et al.*, 1996).

Now that we have set out the causes associated with ADHD, we shall turn to the question of the associated symptoms of the disorder, which will help us to understand the construct of ADHD.

2.4 PRIMARY SYMPTOMS: INATTENTION, HYPERACTIVITY AND IMPULSIVITY

This section reviews the clinically useful findings on the primary symptoms of ADHD. This is of significance to this study because these symptoms comprise the primary subscales of the CTRS-R: S and most of other scales measuring ADHD.

The first primary symptom of ADHD is **inattention**. By definition, children and adults who have ADHD are said to display difficulties with attention relative to non-disabled children or other control groups of the same age and gender. Parents and teachers often describe these attention problems in terms such as: "Doesn't seem to listen", "Fails to finish assigned tasks", "Daydreams", "Often loses things", "Can't concentrate", "Easily distracted", "Can't work independently of supervision", "Requires more redirection", "Shifts from one uncompleted activity to another" and "Confused or seems to be in a fog". Many of these terms represent the most frequently endorsed items from rating scales completed by the caregivers of these children (Mahone *et al.*, 2002). Research shows that people with ADHD experience the greatest difficulties with aspects of attention related to persistence of effort or sustaining their attention (responding) to tasks. This is sometimes called "vigilance" and is believed to be mediated through frontal brain attention circuits

(Huang-Pollack and Nigg, 2003). These difficulties with persistence are seen most dramatically in situations requiring a child to sustain attention to dull, boring, repetitive tasks (Fischer *et al.*, 2004), such as independent schoolwork, homework or chores. There is also ample justification for believing that adults with ADHD suffer from many of the same attention problems as do children who have the disorder. One study (Murphy and Barkley, 1996) found that 83% of adults diagnosed with ADHD reported difficulties with sustaining attention; 94% reported being easily distracted; 90% claimed that they often did not listen to others; 91% reported that they often failed to follow through on tasks or activities; and 86% reported that they frequently shifted from one uncompleted activity to another.

The second primary symptom of ADHD is **impulsivity**. ADHD patients are often noted to respond quickly to situations without waiting for instructions to be completed; careless errors are often the result. They also engage in frequent and unnecessary risk-taking. Consequently, accidental poisonings and injuries are not uncommon in children with ADHD. Furthermore, they may carelessly damage or destroy others people's property much more frequently than do children without ADHD (Cantwell, 1996). Waiting for their turn in a game or in a group line-up before going to an activity is often problematic for children with ADHD. They often opt for the immediate, smaller reward that requires less work to achieve. Hence, they are notorious for taking "shortcuts" in their work, applying the least amount of time to performing a task they find boring or aversive (Murphy *et al.*, 2001). Similarly, situations or games that involve sharing, cooperation and restraint with peers are problematic for these children. They tend to blurt out answers to questions too early and interrupt the conversations of others (Spencer *et al.*, 2007). Scheres *et al.* (2004) indicated that the symptoms characterizing childhood ADHD are likely to be associated with its adult equivalent.

The third classic symptom of ADHD, and one that is related to the difficulties with **impulse control**, is excessive or developmentally inappropriate levels of activity, whether motor or vocal (Connor, 2003). A parent will often describe such a child as: "always up and on the go", "acts as if driven by a motor", "climbs excessively", "can't sit still", "talks excessively", "often hums or makes odd noises" and "is squirmy". Observations of such children at school or while working on independent tasks find them out of their seats,

moving around the classroom without permission, restlessly moving their arms and legs while working, playing with objects not related to the task, talking out of turn to others, and making unusual vocal noises. The restlessness is likely to be more problematic in boring or low stimulation situations (Fischer *et al.*, 2006). In adults with ADHD, symptoms of hyperactive or restless behavior are often present but appear more often to involve difficulties with fidgeting, a more subjective sense of restlessness and excessive speech than the more gross motor over-activity characteristic of young children with ADHD (Thorell and Rydell, 2008).

2.5 ASSOCIATED COGNITIVE, DEVELOPMENTAL, AND HEALTH PROBLEMS

Besides their primary problems with inattention, impulsivity and over-activity, children with ADHD may experience a variety of other difficulties. They have a higher likelihood of developing other cognitive, developmental, academic and even medical or health-related difficulties. Not all children with ADHD display all of these problems, but as a group they display them to a greater degree than is expected in typical children. As these difficulties are not considered to be the core or essence of the disorder, they are discussed here as associated features. They are not diagnostic of the disorder when present nor do they rule out the diagnosis when absent (Barkley, 2006). In line with the scope of this study, only the following will be discussed here: adaptive functioning, academic performance, learning disabilities, speech and language development. This section is of importance to this study because it presents clinicians with the latest research on these difficulties and therefore is essential to a comprehensive understanding and assessment of ADHD.

For example, several studies have consistently documented diminished overall adaptive functioning in children with ADHD relative to nondisabled or other control groups of children (Clark *et al.*, 2002; Sparrow *et al.*, 1984). In other words, children with ADHD may face difficulties in performing some of the daily activities required for personal and social sufficiency.

Another area of difficulty for children with ADHD is their work productivity in the classroom or academic achievement (Barkley and Gordon, 2002). Research studies have reported that as many as 56% of children with ADHD may require additional academic tutoring, that approximately 30% may repeat a grade in school and that 30-40% may be placed in one or more special education programs. As many as 46% may be suspended from school, and 10-35% may drop out entirely and fail to complete high school (Rapport *et al.*, 1999).

Children with ADHD also seem to face difficulties with cognitive-related tasks. For example, they perform more poorly than controls on standard measures of intelligence and achievement tests (Campbell and Werry, 1986). In addition, they perform more poorly in school than do controls, as evidenced by more grade repetitions, poorer grades in academic subjects, more placement in special classes and more tutoring (Lahey *et al.*, 1984; Edelbrock *et al.*, 1984; Semrud-Clikeman *et al.*, 1982). At a certain point, deficits in academic achievement skills rise to the level of being considered specific LDs (Seager and O'Brien, 2003). Frick *et al.* (1991) estimated that 16% of children with ADHD had a reading disability, whereas 21% had a math disability. Another area of difficulty for children with ADHD is related to their speech development. Studies show that children with ADHD are more likely to have problems in expressive language than in receptive language, with 10-54% having speech problems compared to 2-25% of typical children (Barkley *et al.*, 1990).

2.6 PSYCHIATRIC CO-MORBIDITY

This section briefly discusses the co-morbid disorders that often co-exist with ADHD. Co-morbid disorders are evident on the CTRS-R: S, which means they require our attention. In line with the scope of this study, only the following will be addressed here: anxiety disorders, depression, oppositional defiant and conduct disorders, social relationships, tics and substance abuse.

Children with ADHD may meet the criteria for Overanxious Disorder (Biederman *et al.*, 1991). This was highly evident by earlier studies at Massachusetts General Hospital.

Moreover, Szatmari *et al.* (1989), in their large epidemiological survey, found that 17% of girls and 21% of boys with ADHD between 4 and 11 years of age had at least one anxiety or mood disorder; these figures rose to 24% for boys and 50% for girls during the adolescent years. The same symptoms were also evident to other researchers in their follow-up studies (Pfiffner *et al.*, 1999; Wilens *et al.*, 2002; Tannock, 2000; Peterson *et al.*, 2001; Lang *et al.*, 2007).

Signs of depression such as sad or irritable mood or a persistent loss of interest in some activities are common in children with ADHD. Associated features of depression in children include school difficulties, school refusal, withdrawal, somatic complaints, negativism, aggression, and antisocial behavior. Conduct disorder and substance abuse commonly co-occur with depression in older children and adolescents (Kunwar, *et al.*, 2007; Ostrander *et al.*, 2006).

Moreover, it is widely accepted by scientists studying children with ADHD that they display a greater degree of difficulties with oppositional and defiant behavior, aggressiveness and conduct problems, and even antisocial behavior than typical children do (Connor *et al.*, 2007, Cukrowicz *et al.*, 2006). Peterson *et al.* (2001) observed that ADHD showed a consistent relationship to ODD/CD across all four follow-up time periods. Again, all this implies a true co-morbidity between these disorders and not just referral bias, chance or an artifact of ascertainment of disorders (Barkley, 1989).

Children with ADHD often have difficulties in their family and peer relationships. Regarding their relationships with their parents, they tend to be more talkative, negative, and defiant; less compliant and cooperative; more demanding of assistance from others; and less able to play and work independently of their mothers (McKee *et al.*, 2004; Gerdes *et al.*, 2003; Diamantopoulou, 2005). As for their peer relations, Peris and Hinshaw (2003) estimated that more than 50% of children with ADHD have significant problems in social relationships with other children. Moreover, Shaw-Zirt *et al.* (2005) found that ADHD children tend to have more inflated perceptions of themselves, their likelihood of success in tasks, and the extent to which others like them than do nondisabled children. Substantial research suggests that children act this way to protect their self-esteem (Barkley, 1989).

Research also shows that children with ADHD have higher rates of tic disorders, which may contribute an additional dysfunction due to distractions and social impairments directly attributable to the movements or vocalizations themselves (Mahone *et al.*, 2002; Spencer, *et al.*, 1999).

Other studies have indicated that juveniles with ADHD are at increased risk for substance abuse. Specifically, recent work suggests that ADHD youth disproportionately become involved with cigarettes, alcohol and then drugs (Biederman *et al.*, 1998; Milberger *et al.*, 1997). Individuals with ADHD, independent of co-morbidity, tend to maintain their addiction longer as compared to their non-ADHD peers (Wilens *et al.*, 1998).

2.7 ASSOCIATED DIFFICULTIES AND CO-MORBIDITY WITH ADHD IN LEBANON AND OTHER ARAB COUNTRIES

Assessing these elements of ADHD in the context of the Lebanese settings, a few studies were found that had been conducted in the Arab world to investigate associated difficulties co-occurring with ADHD.

For example, Bu-Haroon *et al.* (1999) observed that children with ADHD symptoms did not achieve as highly in academic terms as other children, based on teacher reports on children's scholastic performance in Sharjah (UAE). This association of poor school performance and ADHD is similar to the findings made by Al-Sharbati *et al.* (2004) in Muscat, among Omani schoolchildren. Similarly, in the study conducted in Qatar by Bener *et al.* (2006), children who had a higher score for ADHD symptoms were judged by teachers as having poorer academic performance than those with lower scores for ADHD symptoms.

Co-morbidity with ADHD was also evident in the Lebanese settings. A study by Fayyad *et al.* (2001) in Lebanon showed that ADHD in a clinical sample of children and adolescents was often co-morbid with one other psychiatric disorder. The most common co-morbid conditions were mood disorders (19.1%); Learning/Language or Communication Disorder (18.8%); anxiety disorders (15.6%); enuresis (14.8%). In the World Mental Health Surveys

study on adult ADHD, which was conducted in ten countries (Lebanon among them), subjects with adult ADHD had an odds ratio of 11.1% for a co-morbid mood disorder, 9.9% for an anxiety disorder and 12.5% for substance use disorder (Fayyad *et al.*, 2007). These results show evidence that co-morbidity with ADHD in Lebanon and other Arab countries exists.

2.8 PREVALENCE OF ADHD: ESTIMATE ISSUES

The National Institute of Mental Health (NIMH) estimates that between 3% and 5% of preschool and school age children have ADHD, or approximately two million children in the United States. This means that in a class of 25–30 students, it is likely that at least one student will have this condition. Studies about ADHD prevalence in children and adolescents have been conducted recently in the USA (Barbaresi *et al.*, 2002; Cuffe *et al.*, 2005) and in the UK (Ford *et al.*, 2003).

A recent review documented the prevalence of ADHD in various countries worldwide (Faraone *et al.*, 2003) and a meta-regression analysis of worldwide studies of ADHD among subjects 18 years and younger revealed a pooled prevalence of 5.29% (Polanczyk *et al.*, 2007). For example, prevalence estimates of childhood ADHD in the USA are estimated at 5–8% (Dulcan, 1997).

Predictably, however, estimates vary depending on methodology. Definitions that require both symptom dimensions (hyperactivity/impulsivity and inattention) are more restrictive than those that require only one of these dimensions. Thus, estimates based on pre-DSM-III definitions or the International Classification of Diseases (ICD) codes of hyperkinetic disorder produce lower estimates. In addition, the surveys that estimate based on symptoms alone and do not include impairment yield higher estimates (Wolraich, *et al.*, 1996).

While there is a popular conception that ADHD is a cultural phenomenon, much of the cross-cultural disagreement has been due to criterion variance. In a scholarly review, Faraone *et al.* (2003) reviewed twenty US studies and thirty non-US studies. The results

revealed that the prevalence in non-US studies was at least as high as that in US studies, especially when using DSM-IV criteria.

Despite the number of studies discussed above, there is a marked lack of studies conducted in developing countries. Based on the higher prevalence of psychosocial risk factors in these countries, there may be a higher prevalence of ADHD and other disorders. Epidemiological studies in developing countries are needed to determine the nature of the condition in these countries (Spencer *et al.*, 2002). This is highly relevant to Lebanon. Published studies on ADHD in the Arab world are scarce, despite the fact that this disorder commonly affects schoolchildren and adolescents and is encountered frequently in clinical settings in the Arab world (Fayyad *et al.*, 2001; Saigh, 1984).

2.9 THE PREVALENCE OF ADHD IN LEBANON AND OTHER ARAB COUNTRIES

Investigating the prevalence of ADHD in Lebanon and other Arab neighbouring countries is an important prerequisite to the primary objective of this study. As discussed later in section 2.22 and in accordance with the ITC guidelines, researchers involved in test adaptation studies have to ensure that the construct(s) measured by a test in the original source cultural/language group can be found in the same form and frequency in the other groups under investigation (Hambleton, 2001).

Although there was scarce literature available on the question of the prevalence of ADHD, a number of studies were located. These studies are summarized in Table 2.1.

Table 2.1 Studies of ADHD prevalence in Lebanon and Arab Countries (by country, alphabetical order)

Country	Authors	Sample and Age Range	Prevalence
Egypt, Alexandria	Attia <i>et al.</i> (2000)	N = 1,350 8 to 13	7.48%
Palestine, Gaza	Miller <i>et al.</i> (1999)	N = 669	11.9% Males; 8.5% Females

		6 to 11	
State of Qatar	Bener <i>et al.</i> (2006)	N = 1541 6 to 12	9.4%
Sultanate of Oman, Muscat	Al-Sharbati <i>et al.</i> (2004)	N = 708 Females 6 to 13	5.1% Females
Sultanate of Oman, Muscat	Al-Sharbati <i>et al.</i> (2004)	N = 1,502 Males 6 to 14	7.8%, Males
United Arab Emirates,Sharjah	Bu-Haroon <i>et al.</i> (1999)	N = 1,110 5 to 12	14.85%
United Arab Emirates, Al Ain	Eapen <i>et al.</i> (1998)	N = 3,278	0.46%
Kingdom of Saudi Arabia	Al-Haidar (2002)	N = 416 2 to 18	11.5%
Ten countries in the US, Europe, and Middle East (including Lebanon)	Fayyad <i>et al.</i> (2007)	N = 11,422 18 to 44 Lebanon: N = 2,857	1.8 %
United Arab Emirates,Al Ain	Eapen <i>et al.</i> (2004)	N = 278 6 to 18	1.4%
United Arab Emirates,Al Ain	Eapen <i>et al.</i> (2003)	N = 329 6 to 18	0.9%

Adapted from Farah *et al.* (2009)

In conclusion, further to reviewing the above studies, the rates of ADHD in Arab countries are not that different from rates of prevalence found in other cultures. This finding is also supported by the review done by Farah *et al.* (2009) to studies conducted from 1996 to 2008 on the prevalence of ADHD in Arab countries populations that revealed similar results to those in other cultures. They reported that the rate of ADHD in the school setting among Arab students, using rating scales, ranges from 5.1% to 14.9%, whereas the rate of ADHD diagnosis using structured interviews in children and adolescents ranges from 0.5% in the school setting to 0.9% in the community. They concluded that this prevalence is comparable in range to what has been reported in other international studies.

2.10 PREVALENCE OF ADHD ACROSS GENDER AND GENDER DIFFERENCES IN THE NATURE AND MANIFESTATION OF ADHD SYMPTOMS

Many research studies identify age and gender as important factors in the prevalence of ADHD (Rucklidge, 2008; Graetz *et al.*, 2006; Biederman *et al.*, 2002; Diamantopoulou *et*

al., 2005; Greene *et al.*, 2001; Greshen *et al.*, 2002; Thorell and Rydell, 2008). Moreover, the CTRS-R: S percentiles are presented separately by gender, based on the prevalence of ADHD across gender and gender differences (Conners, 1997). Accordingly, it is essential to discuss these differences briefly and to present *some* of the related studies.

Studies about prevalence of ADHD across gender show percentages are three to seven times greater among males than among females (Biederman *et al.*, 2002). Boys are three times more likely to have ADHD than girls, and five to nine times more likely than girls to be seen with ADHD among clinic-referred children. Given the differences in prevalence, one might wonder whether there are differences in the expression of the disorder or its related features between boys and girls (Rucklidge, 2008). One study (Graetz *et al.*, 2006) evaluated a sample of clinic-referred children diagnosed as having ADHD. They found that girls (n=18) were more socially withdrawn and had more internalizing symptoms (anxiety, depression) than did boys (n=38). Studies of school-identified hyperactive children by Thorell and Rydell (2008) tended to find that girls were rated as having fewer behavioural and conduct problems (e.g. aggressiveness) than boys, but were usually no different on any laboratory measures of their symptoms.

2.11 PREVALENCE OF ADHD ACROSS GENDER IN LEBANON AND ARAB COUNTRIES

In a review of epidemiological studies conducted from 1996 to 2008 on ADHD in Arab countries (Egypt, Ghaza, Qatar, UAE, Lebanon, Muscat, Saudi Arabia), Farah *et al.* (2009) reported that all the Arab studies they reviewed showed gender differences. It was found that in every school and community sample there was a preponderance of males with ADHD. Only in the primary care setting (Eapen *et al.*, 2004) was there a higher rate of girls with DSM-IV disorders, which may have been due to the overrepresentation of girls with somatic symptoms presenting to the primary care clinic. However, the numbers of subjects with ADHD in the study was too low to allow for meaningful examination of gender distribution. Results in all the Arab studies reviewed by Farah *et al.* (2009) revealed the prevalence rate of ADHD was higher in males than in females, with ratios varying from 2:1

to 3:1, which is compatible with the international literature on ADHD in both epidemiological and clinical samples.

2.12 NATURE AND EXPRESSION OF ADHD ACROSS AGE: THE HETEROGENEOUS OUTCOME IN PERSISTENT ADHD

There are many studies documenting the nature and expression of ADHD across age, which is worth a brief examination at this juncture (Biederman *et al.*, 2000; Gualtieri *et al.*, 2006; Rasmussen *et al.*, 2000; Applegate *et al.*, 1997; Cumyn *et al.*, 2007; Frazier *et al.*, 2007). Moreover, the CTRS-R: S percentiles are presented for five age groups (3–7 in three-year intervals), therefore it is helpful to present the profile of ADHD across age in order to explain the differences of group performances as based on the teachers' ratings on the adapted CTRS-R: S. Accordingly, this section will discuss some of the related studies.

Research by Cumyn *et al.* (2007) reported that the adolescent years of individuals with ADHD might be some of the most difficult because of the increasing demands for independent, responsible conduct, as well as the emerging social and physical changes inherent in puberty. Issues of identity, peer group acceptance, dating, and physical development and appearance erupt as a second source of demands and distress with which these adolescents must now cope. Similarly, other studies show that the chronic course of ADHD is associated with academic underachievement, poor occupational functioning (Morrison, 1980), impaired cognition, an increased risk for motor vehicle citations and accidents (Barkley *et al.*, 1996) and high rates of substance use disorders (Faraone *et al.*, 2000).

Finally, longitudinal studies have shown that ADHD is in fact a chronic disorder that persists into adulthood in about 60% of individuals diagnosed with ADHD in childhood. Data collected from studies following ADHD children into adulthood are summarized in Table 2.2. As this table shows, although the syndromatic persistence of ADHD into adulthood is low, there is substantial symptomatic persistence of the disorder.

Table 2.2 Persistence of ADHD into adulthood

Study, author & date	ADHD diagnosis		Age at follow-up (years)	ADHD persistence
	Recruitment	Follow-up	Mean	%
Borland (1976)	DSM-IIa	DSM-IIa	30.4	50*
Mannuzza (1993)	DSM-II	DSM-III, IIIR	25.5	8
Mannuzza <i>et al.</i> (1998)	DSM-II	DSM-IIIR	24.1	4
Barkley (2002)	DSM-IIIRb	DSM-IV	21.1	58
Barkley (2002)	DSM-IIIRb	DSM-IV	21.1	66*
Weiss (1985)	DSM-IIa	DSM-III	25.1	66*
Rasmussen (2000)	DSM-IIIC	DSM-IV	22	56*
Rasmussen (2000)	DSM-IIIC	DSM-IV	22	48
Yan (1996)	DSM-IIa	DSM-IIIRd	25.5	70*

*** symptomatic persistence of ADHD: (a) diagnostic system not stated but completed in DSM-II era; (b) diagnoses shown to be equivalent to DSM-IIIR; (c) diagnoses shown to be equivalent to DSM-III; (d) diagnostic system not stated but completed in DSM-IIIR era**

2.13 EVIDENCE BASE FOR ADHD AS A BIOPSYCHOSOCIAL CONSTRUCT

The discussion so far had examined the causes, primary and associated difficulties and co-morbidities of ADHD, giving a broad understanding of the disorder. We will now expand the discussion to include the evidence base for interpreting ADHD as a biopsychosocial construct.

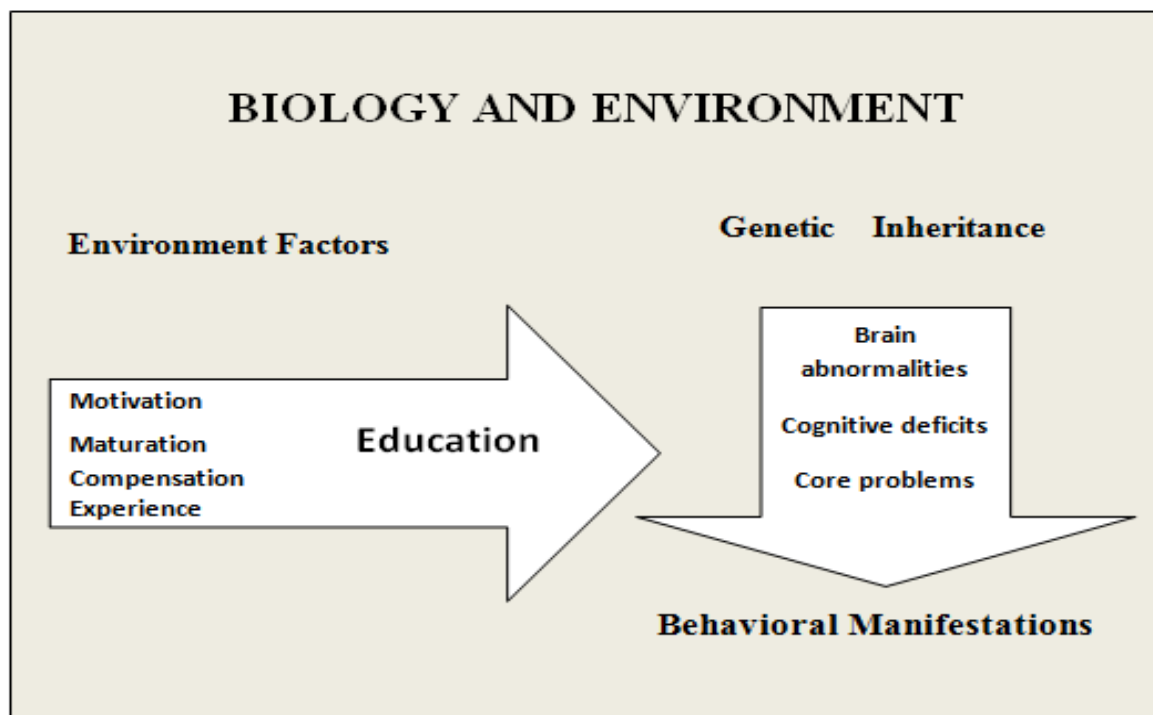
Purdie *et al.* (2002) stated that ADHD is a diagnostic label that is applied to certain individuals and that it is influenced by biology and the social environment. Cooper (2008) argued that ADHD is the product of a complex interaction between biological and social-environmental factors. This argument is consistent with current and recent models of gene-environment interaction, such as that presented by Plomin (1988) and, in relation to

developmental disorders, Frith (1992). An adaptation of Frith's model of this interaction is represented in Figure 2.2.

Frith's model shows that biologically inherited factors are in constant dynamic interaction with environmental factors. Gene-environment interaction leads to the development of certain patterns in brain architecture (e.g. lobe development) and functioning (e.g. the neurotransmitter systems), which in turn leads to the development of certain cognitive characteristics (e.g. the efficiency of the executive functions, such as those concerned with self-talk and working memory). A central feature of this is recognition that biological systems, such as neurology, are strongly influenced by genetic inheritance. From the earliest stages of life, however, other key factors also play an important role. The development of biological systems is affected by environmental factors, such as nutrition, and by experiential factors, including parenting styles, peer influences and the stimuli to which the developing individual is exposed. For example, the neurological development of children can be negatively affected by extended exposure to abuse and neglect, which can lead to cognitive and social impairments. On the other hand, any modification to the environment may in certain situations help to turn around these effects positively. For instance, an individual who is prone to memory problems can learn mnemonic strategies that help to compensate for the difficulties experienced. Furthermore, positive, affirming relationships with others may encourage the individual to develop a high level of motivation, which he/she can deploy in attempting to overcome aspects of his/her functioning that are potentially problematic in social situations (Cooper and Jacobs, 2011).

Hughes and Cooper (2007) also indicate that ADHD is socially constructed, in the sense that the social environment will influence the ways in which ADHD symptoms are manifested. They argue that because of biological inheritance and social circumstances, some children are more prone to being viewed as inattentive and disruptive than others. For example, if a child is prone to attention problems, impulse problems, or has difficulty regulating his/her motor activity, there are certain settings, like schools, that are likely to exacerbate these symptoms.

Figure 2.2 The interaction between biological inheritance and environmental factors in the development of behavioural difficulties



Adapted from Cooper (2008)

The primary implication of this biopsychosocial perspective for education is that the more we understand about the biological and psychological correlates of ADHD, the better placed we will be to provide educational environments that avoid exacerbating the difficulties ADHD children may experience and that promote their optimal educational engagement (Cooper, 2008).

If parents, children and teachers believe that ADHD is solely the result of simplistic biological factors, this erroneous understanding will weaken the individual's sense of responsibility for tackling the difficulties associated with ADHD. As a result, they will resort to medications as the sole treatment for the condition. On the other hand, if parents, children and teachers place too much emphasis on the psychological factors as the cause of ADHD symptoms, this may lead to impractical expectations of what it is possible to achieve. Therefore, a combination of biological and social-environmental factors allows for the acknowledgment of the fact that there are important individual differences at work, one

cluster of such differences being defined as ADHD. Moreover, it is the social-environmental factors that affect the manner in which these differences are manifested, whether in an increasing or decreasing fashion (Hughes and Cooper, 2007). It is, therefore, the characteristics of the school setting and environment, and not biological factors *alone*, that affects the educational and social engagement of the student (Cooper, 2008).

The most important implication of this discussion, as implied by Cooper (2008), is that the biopsychosocial account needs to be translated into educational interventions. This implication is also supported by Hernandez and Blazer (2007), who emphasize that educationists need to update their understanding of how individual factors and differences relate to the teaching and learning processes and then to engage constructively with the biopsychosocial paradigm. They argue that this paradigm should guide the development of teaching and educational provision, as well as educational interventions. From this point of view, the more that educational professionals can learn about how biological, psychological and social factors interact to influence social and educational engagement, the more they will value and pursue co-operation with their health and social welfare counterparts. For these reasons, a biopsychosocial framework of understanding ADHD should be advocated (Cooper and Jacobs, 2011).

2.14 DEALING WITH CHALLENGES TO THE VALIDITY OF ADHD DIAGNOSIS

Some commentators have dismissed ADHD as a medical construct that individualizes educational failure and disruptive behavior (e.g. Lloyd and Norris, 1999; Skidmore, 2004; Slee, 1995; Visser and Travell, 2006). The effect of such individualization, it is argued, is to divert attention away from the roles that schools and teachers may play (intentionally or unintentionally) in the development of learning and behavioural problems. This allows educators to ignore their responsibility to provide appropriate educational opportunities to at-risk students. This negative reaction is based on a number of false assumptions. The first is that we have to choose between bio-medical and environmental explanations for learning difficulties. This view reflects, at best, a profound ignorance of modern understandings of (a) the relationship between biological and environmental factors in human development,

and (b) the scientific and educational literature on ADHD. At worst, this portrayal of ADHD reflects a stubborn distortion of the topic that is likely to hamper the development and dissemination of well-informed and effective educational interventions that will benefit many school students directly and influence the development of educational knowledge practice in ways that will benefit all students. It is now necessary to highlight and address the flaws in the arguments presented by Skidmore (2004) and others that were mentioned earlier.

First, it is claimed that the ADHD diagnosis is somehow false because there is an absence of neuro-scientific evidence.

This claim is obviously fallacious. There is a wealth of evidence from many studies over many years that points to the neurological basis of ADHD. If official USA DSM-IV criteria are applied, ADHD occurs in roughly 6% of schoolchildren, no matter where in the world we look (Barkley, 2000, 2006). Even though only about 6% (i.e. 1 out of 16) of children have the condition, it seems even more prevalent. That's because its presence of 1 out of 16 people means that one in every four families are affected by the condition (assuming roughly four people per family). Hence, if four mothers get together, then one of their households will be affected by ADHD (Kessler *et al.*, 2006).

ADHD does have some compelling neuro-scientific evidence. In simple observable terms, the current understanding about ADHD, by Kutscher (2008), is as set out below.

1. The frontal and pre-frontal lobes (located, conveniently enough, in the front part of our brain, behind the forehead) are the home of our executive and inhibitory functions.
2. The neurotransmitters dopamine and norepinephrine play a major role in the inhibitory functions of these frontal and pre-frontal lobes.
3. In ADHD, there is insufficient action by these neurotransmitters.
4. People with ADHD show poor executive and inhibitory behaviours.

To understand the significance of the above, one would have to imagine that in children with ADHD, the frontal lobe and other executive functions are dormant. This is why these children get cranky and can't concentrate when they are over-tired because their frontal lobes are not fully awake (Murphy *et al.*, 2001). After all, this is how stimulant medications work: by increasing dopamine and norepinephrine levels in order to 'wake up' the frontal lobe brakes (DuPaul and Barkley, 1993).

To further answer the claim of false diagnosis, ADHD and its treatment have been the subjects of thousands of scientific studies to date. Adoption and other genetic studies, epidemiological studies, MRI studies, EEG studies and PET scans all combine to give frankly incontrovertible evidence for the existence of this medical condition and the effectiveness of current treatments. Smith *et al.* (2006) have discussed some of the peer-reviewed research findings and it is very convincing:

- SPECT (single-photon emission computed tomography) shows decreased bloodflow to the pre-frontal regions (especially on the right-hand side).
- PET (positron emission tomography) scans show diminished glucose metabolism in adult frontal lobes.
- MRI (magnetic resonance imaging) scans show smaller anterior right frontal regions, along with smaller cerebellar vermis and some of the basal ganglia to which they connect.
- fMRI (functional MRI) scans show abnormality in the same regions when ADHD children attend or inhibit.
- EEGs (electroencephalograms) show frontal lobe slowing and excessive beta activity (indicative of under-arousal of the frontal lobes).
- Twin studies show that genetic factors control up to 75–97% of a person's risk for ADHD.
- Psychological tests show poor working memory and other executive functions in ADHD patients.
- Biological factors in the environment associated with ADHD include lead exposure, premature birth, low birth weight and prenatal exposure to alcohol and tobacco.

In 1998, the American Medical Association (AMM) concluded that ADHD is one of the best-researched medical conditions and that evidence for its validity is much more compelling than the evidence for most mental conditions and even many medical disorders (Goldman *et al.*, 1998). Further, Smith *et al.* (2006, pp. 73–6) concluded, based on research, that:

“purely social causes of ADHD can be largely ruled out as likely contributors to most forms of ADHD. Studies consistently find little if any effect for shared (rearing) environment on the traits of ADHD; this refutes an effort to attribute ADHD to poor parenting, family diet, household television exposure, or other popularly held causes for the disorder.”

In general, as clarified by Kutscher (2008), the only “blame” for these behaviors that can be attached to the parents is the contribution of their genes.

The earliest clinical accounts of what we now refer to as ADHD were given by George Still in the Coombs lectures of 1902 (Still, 1902 a, b, c). He described an “abnormal defect in moral control in children”. Moral control was defined as “the control of action in conformity with the idea of the good of all (that) can only exist when there is a cognitive relationship to the environment.” Thus, moral control required a “consciousness” that informed the capacity of “inhibitory volition” (Still, 1902 a, b, c). Other early observations on the relationship between behavioural disorders and cerebral trauma or encephalitis supported theories of a biologic etiology. For example, Strecker and Ebaugh (1924) and Ebaugh and Franklin (1923) noted behaviour disorders, including hyperkinesis, explosive behaviour, fatigability and attention deficit, after acute epidemic encephalitis and cerebral trauma in children.

It was not until the late twentieth century, however, and the introduction of advanced brain imaging technology that it became possible to study the functioning of the living human brain in greater detail. This ongoing research continues to produce findings that enrich our understanding of the relationship between cognitive and neurological functioning (e.g.

Kelly *et al.*, 2007). In addition to these sources, both twin studies and advanced molecular genetic studies have produced a wealth of data pointing to specific genetic correlates of ADHD (Levy and Hay, 2001). So, in conclusion and in response to this first claim, it is important that the science behind ADHD is disseminated and understood and that baseless ‘myths’ about the condition are exposed as just that. ADHD should be depicted in the media as realistically and accurately as it is depicted in science — as a valid disorder that has varied and substantial adverse impacts on those who suffer from it, through no fault of their own or their parents and teachers (Barkley *et al.*, 2002).

Secondly, it is claimed that ADHD is an example of biological determinism.

The fear of biological determinism is well founded, partly because it denies the importance of human action (Rose, 2004) and leads, in some cases, to a weak sense of fatalism in relation to the developmental opportunities available to some individuals. The key point to be made here is that there is no perfect account of the biological underpinnings of ADHD. This is hardly surprising, not least because of the complexity of the biological and psychological systems that are implicated. The same would have to be said of other complex conditions, such as Autistic Spectrum Disorders. Another, possibly more significant reason for the lack of a definitive biological cause is that there may not be one. Not only are there numerous biological pathways implicated in the development of ADHD (Barkley, 1997), but it is also almost certainly the case that ADHD is not biologically determined in the simplistic sense suggested by Skidmore and others. Quite the opposite, in fact, as we have indicated, ADHD is widely argued to be the product of a complex interaction between biological and social-environmental factors. This argument is consistent with the current and recent models of gene environment interaction discussed previously, such as that presented by Plomin (1990) and, in relation to developmental disorders, by Frith (1992).

The essence of this biopsychosocial approach is, therefore, that while a behavioural disorder such as ADHD is associated with certain neurological and genetic patterns, these patterns do not determine the existence of the disorder. It is likely that there are people who possess the frontal lobe dysfunctions and genes associated with ADHD who do not develop

the disorder. The disorder is only triggered when these biological characteristics interact with environmental factors, which renders the cognitive patterns that flow from the biological make-up dysfunctional. For example, environmental settings that emphasize passive as opposed to active approaches to learning, and social conformity over individualism will render the cognitive characteristics associated with ADHD problematic. This helps to explain why ADHD is first identified at schools, where obedience and conformity in a factory-model framework forms the basis of successful studenthood (Cooper, 2008). The same student during his/her adulthood may be regarded as spontaneous and be praised for his/her unusual style. Prominent examples of this are the actor Jim Carey and the comedian Billy Connolly (Stevenson, 2001).

The key educational implication here is that, as mentioned previously, the more we understand about the biological and psychological correlates of ADHD, the better placed we will be to provide educational environments that avoid exacerbating difficulties that children may experience and that promote their optimum educational engagement. What must be understood is that while biological inheritance plays an important role in the development of the characteristics associated with ADHD, whether or not these characteristics lead to problems in the school setting that affect the educational and social engagement of the student is largely determined by characteristics of the school environment. Arguments such as that posed by Skidmore (see above), which portray ADHD as an example of biological determinism, simply divert attention from the important process of converting a biopsychosocial account of ADHD into educational and other interventions. Yet it is pedagogical skills within the biopsychosocial model that are very much needed by educators (Cooper and Jacobs, 2011).

Thirdly, it is claimed that the ADHD ‘diagnosis’ rests on value-laden, culturally specific judgments about behavioural or cognitive norms.

This criticism is irrational because it is self-evidently true that all judgments about the appropriateness or inappropriateness of behaviour or cognitive expression are socially and culturally based. Culture reflects the values, attitudes and beliefs of a social group and as such helps to hold the group together. On the other hand, it is illogical to imply that it is

possible for human beings to adopt a culture-free stance. Having said this, there are situations where cultural values and assumptions serve to disadvantage members of the social group and require adjustment. Most importantly, the ADHD diagnostic criteria, when considered through a biopsychosocial -informed educational perspective, offers a case in point.

Cooper (2008) highlighted the fact that the diagnostic criteria for ADHD are premised on a particular set of circumstances, i.e. a classroom setting in which the student works within a teacher-centered classroom from an early age, conforms to a set of rigid rules of behaviour and learns via a curriculum-focused method within a group of age-appropriate peers. Within this traditional classroom setting, the teacher: pupil ratio creates a potential for disorder, which is addressed by the imposition of rules designed to restrict pupils' movements around the classroom and their interactions with each other. Externally imposed curricula (as opposed to negotiated curricula) are based on the assumption of a direct relationship between age and cognitive ability, and tend to be managed by teachers in ways that require pupils to follow a lineal program of tasks at scheduled times and within strict time limits. As a result, teachers often become 'instructors', accounting for an estimated 80% of the talk that occurs in the classroom (Sage, 2002).

It is the case, of course, that schools have been making these sorts of demands on their pupils since they were first established. However, this has created a divergence between the demands made by the school types discussed above and the behavioural expectations and activities commonly experienced by students outside of schools. It is this divergence that explains why the school environment can exacerbate the symptoms associated with ADHD for a student who is biologically predisposed to develop the disorder. This student, who is already predisposed to having ADHD, is immediately placed at a disadvantage by the culturally based assumptions regarding "proper" behaviour in a school and classroom setting. Cooper (2008, p. 657) elucidates the point further by suggesting that:

... this is not the fault of the clinicians who drafted the criteria but on the contrary, the ubiquity and persistence of ADHD and its diagnostic forerunners and equivalents reflect, unintentionally but accurately, one of the most

persistent criticisms of Western mass education, namely that it stresses rigid authoritarian values and is relatively unresponsive to individual differences and needs.

While there are many factors to be considered in an assessment of the pros and cons of the education system as it stands, it is clear that it is important and necessary to learn the lesson taught to us by ADHD to allow us to shape the educational environment in order to improve access to learning opportunities. A biopsychosocial perspective on education would ideally advocate a combination of environmental and individual changes. When taking this approach, the advocacy and use of medication for students with ADHD is best understood as an indication of the school's failure to make the changes necessary to allow that student to engage effectively in the curriculum and in the daily life of the school. It is important to note that this is not the responsibility of the ADHD diagnosis itself. On the contrary, an understanding of the ADHD diagnosis and the biopsychosocial theories underpinning it can be effective tools in developing robust educational practices that will, in some circumstances, rule out the need for medication to be introduced at all (Cooper and Jacobs, 2011).

Fourthly, it is claimed that acceptance of the ADHD diagnosis “legitimizes the practice of drugging defiant children into obedience, using stimulants whose long-term side effects are unknown, in the service of an implicit project of social control” (Skidmore, 2004, p. 4).

This is possibly the most dangerous of all the arguments that are posed against the ADHD construct because the failure to acknowledge the validity of ADHD creates a major obstacle to the development of educational interventions, leaving those diagnosed with ADHD to the mercy of medical practitioners.

Barkley (1997) noted that when some cases call for medicines to be prescribed, medications should be integrated with a multimodal treatment program that includes psychosocial and educational interventions. This practice is in line with the recommendations of other researchers in the field (Maras and Cooper, 2000; National Institute of Health and Clinical Excellence, 2000). Psychosocial and educational

interventions should always be the first choice of interventions (e.g. BPS, 2000) because they employ pedagogical strategies that use and exploit, rather than inhibit, the characteristics associated with ADHD (Cooper, 1997a; Cooper and O'Regan, 2001; Purdie *et al.*, 2002; Zentall, 1995). Zentall and Smith (1992), for example, exploited the over-activity of ADHD students and allowed for frequent physical activities, a strategy that was favoured by the students. Zentall (1995) also describes strategies designed to increase the active participation of students with ADHD through the provision of visual motor-tasks. Pellegrini and Horvat (1995) found that levels of disruptive behaviour decreased and levels of on-task behavior increased when frequent periods in which students were required to engage in structured physical activity were used instead of prolonged hours of seat work. For now, these short examples of effective pedagogical interventions will suffice; this topic will be discussed in greater depth in the section on Educational Interventions.

For the purposes of this section, it is worth highlighting the central importance of pedagogical approaches in reducing the negative outcomes of ADHD. Multi-modal approaches, which combine medical, psycho-social and educational interventions, were found to be second only to medication in achieving improvements in behaviour, and even better than medication in producing improvements in social functioning (Cooper and Jacobs, 2011).

Fifthly, it is claimed that ADHD represents the wrongful medicalization of defiance in school children.

As noted above, the relationship between diagnosing ADHD and prescribing medications is not a causal one where, if diagnosed with ADHD, a medication is immediately prescribed to remedy the condition. Instead, a biopsychosocial perspective allows for a medical diagnosis, such as ADHD, to be used to inform a choice of psycho-social and educational interventions, which indeed may prevent the need for medical intervention at all. The ability to identify and implement the correct educational interventions for any given case depends on an accurate understanding of the nature of ADHD. Conversely, the claim made by Skidmore, among others, that ADHD is basically a medical term applied to “defiant children” is certain to produce misunderstanding and inappropriate educational

interventions for children with ADHD (Cooper, 2008). Obviously, children with ADHD are like all children in that sometimes they are deliberately disobedient and defiant. However, ADHD is clearly defined as relating to difficulties in various self-regulatory processes, including sustaining attention, inhibiting responses and controlling motor activity. Remarkably, ADHD is non-volitional. Children with ADHD perform differently from other children on tests of vigilance and impulse control (Barkley, 1997). Their failure to comply with the wishes of teachers and parents are theorized to be the result of cognitive deficits, such as problems with executive functions (Barkley, 1997, and see above).

This in turn helps to explain why ADHD symptoms respond well to pedagogical interventions (Cooper, 2008). Interventions intended to support children whose core problem is that of defiance are quite different. Defiance, when it reflects a child's dominant style of social engagement, is characterized by an aggressive and uncooperative response to adults and/or other children. Defiance is therefore often better understood as cognitive distortion, rather than as cognitive deficit. Cognitive distortions require interventions that enable children to observe and reflect on the ways in which they interpret situations and the choices that they make on the basis of these interpretations (Frith, 1992). There is another facet that should be noted here, however. A high percentage of children with ADHD have co-morbid diagnoses of Conduct Disorder or Oppositional Defiance Disorder (Barkley, 1997; McArdle, 2007), so interventions specifically targeting either deficits or distortions will greatly benefit such children.

The key point being made here is that an understanding of the differences between cognitive distortions and deficits can be extremely valuable to teachers, while confusion between deficits and distortions are likely to lead to ineffective intervention (Royer, 1999). Therefore, teachers should be enabled to use the knowledge and skills that flow from the biopsychosocial perspective so that they can engage with the ways in which individual differences interact with social circumstances.

2.15 CREATING MULTIMODAL EDUCATIONAL INTERVENTIONS FOR ADHD STUDENTS

It is important to start a search for effective interventions from a position that recognizes the validity of a biopsychosocial perspective (Norwich, 1990; Cooper, 2008; Cooper and Jacobs, 2011); whereby nature (genetic inheritance) and nurture (environmental influences) are seen as being in constant fluid and dynamic interaction (*see* previous discussion and Plomin, 1998; Frith, 1992).

It follows from a biopsychosocial approach that the search for effective interventions should range widely across disciplines as diverse as education, psychology, sociology, medicine and psychiatry. This makes the approach truly holistic and lends itself well to an understanding and a treatment of the complexities of ADHD and its associated interventions (Cooper and Jacobs, 2011). Furthermore, the biopsychosocial view provides a paradigm that is of vital importance to multimodal problems, such as ADHD, that require multi-disciplinary intervention (Hernandez and Blazer, 2006).

The main educational implication of discussing effective educational interventions is the development of positive educational engagement, which concerns all of the emotional, social and social functions involved in the learning process. This entails the creation of a school and classroom climate that is conducive to the development of positive emotional, mental and social skills (Cooper and Jacobs, 2011). The term *positive educational engagement* is highly associated with another essential concept, that of school attachment. When students are educationally engaged, they are “attached” to schooling in an emotional sense. Attachment to school (Smith, 2006) can be defined in terms of the degree of commitment towards and engagement with schooling felt by a student. Students who have a strong attachment to school believe that schooling is a worthwhile experience in itself and that success in school will lead to significant rewards, both in the short term and in later life. On the other hand, weak attachment to school is characterized by indifference or hostility towards teachers and doubt in relation to the value of schooling.

Accordingly, a key factor of the construct of educational engagement, as we see it, is a biopsychosocial perspective because it recognizes that there is a wide range of human diversity. When understood properly, this view enables schools and teachers to make accommodations for students. The argument being put forward here is that when we develop such understandings, we learn things about human functioning in general that enable us to improve learning environments in ways that benefit *all* students (Hughes and Cooper, 2007).

There are several reasons why addressing educational interventions is of significance to this study. First, it sets out to address the imbalance in the way in which ADHD is portrayed in the academic and professional literature. Most of the literature available focuses on the medical and neuropsychological aspects of ADHD, rather than effective teaching. Thus, a discussion on effective educational interventions should remedy this imbalance. Secondly, after parents, it is teachers who should be most familiar with effective educational interventions since they spend most of the time with children aged between of 5 and 16. Thirdly, it is crucial to explain what is meant by pedagogy and to analyze how ADHD relates to the pedagogical thinking of teachers (Hughes and Cooper, 2007).

The first element we shall examine is the question of how effective teaching is learned. For the ADHD student, if educational interventions are to be effective, they should be guided by the concepts of the biopsychosocial paradigm. Teaching is governed by the ability to make quick decisions in a complex, diverse but specific setting. Performing similar teaching activities can have different learning outcomes, depending on whether the teacher is experienced or a novice. It is insight that distinguishes the performance of the novice from that of the expert teacher, even when performing the same teaching activities. It is these insights that have redefined teaching as similar to a craft (Hughes and Cooper, 2007).

Teachers vary in the way they think. For example, some teachers may be inclined to ignore the significance of psychosocial theories for behaviour change once they become aware that a child has been prescribed psycho-stimulant medication. Such teachers will rely entirely on medications to improve the child's behaviour (Hughes, 2004). Morrison and McIntyre (1968) noted that processes of reflection are the cornerstones of refining teachers' practices.

The key point here is that teachers come to different decisions about their students on the basis of moderately restricted interactions and observations. These decisions can be understood in terms of the theory of “typing” (Hargreaves *et al.*, 1975), by which the teacher places pupils into ready-made categories relating to pupils’ perceived ability, behaviour and motivation and other personal attributes (for example, appearance, gender and so on) (Cooper and McIntyre, 1996). This “typing” process is mostly seen with expert teachers who make prompt decisions based on complex situations where there is limited time for extended reflection and analysis (*Ibid.*).

We shall move on now to examine how various aspects of the theoretical construct of ADHD contribute to the development of teachers’ pedagogical decision-making processes. In other words, how teachers can make their teaching style work for students with ADHD.

We have already discussed how schooling can provide a major source of stress to all students with ADHD problems because it forces them to operate within the factory model. Given that, teachers should be familiar with the distinction made between what is meant by cognitive deficiencies and cognitive distortions, as discussed earlier (Hughes and Cooper, 2007). Accordingly, cognitive behavioral therapy (CBT) (Meichenbaum and Goodman, 1971), sometimes referred to as cognitive behaviour modification (CBM), provides the basis for classroom interventions that can be used by teachers to accommodate cognitive deficiencies and cognitive distortions. To elaborate on this, consider the following two cases illustrated in Table 2.3.

Table 2.3 Comparative cases of a child with cognitive deficits and a child with cognitive distortions

Child A: Child with cognitive distortion	Child B: Child with ADHD
Situation: Every time there is a disagreement the child aggressively fights with other students. The teacher in this case can implement different strategies to change his/her beliefs.	Situation: Given the child’s deficits associated with ADHD, it would be concluded that the child has a problem at the processing level, and therefore has problems with short-term memory. Hence, his or her behavior may appear the same as Child A, but this child’s underlying cause of behavior is different.

Teacher's desired outcomes: The outcomes are generally the same which is to change the behaviour.
--

Teacher's strategies: The strategies differ for each child.
--

As noted above, in order to achieve the same desired outcome for each child, different strategies must be used. These individualized strategies must take into account the fact that Child B has a deficit, not a distortion.

The teacher can reach the desired outcome by considering the following.

1. Teaching students to use internal dialogue to control their thinking and behavior that involves first rehearsing with students the desired thinking outcomes through verbalization, and then through internal dialogue (Hughes and Cooper, 2007).
2. Using direct instruction and modeling to self-reinforce desired behaviours through self-instruction techniques and problem-solving routines (Ervin *et al.*, 1996).
3. Employing self-instruction techniques that derive from the social constructivist theories of Luria and Vygotsky, where students are taught how to gain control over their own learning (Goldstein, 1995).

Evidence in support of the efficacy of cognitive behavioral therapy for ADHD is far from decisive. Reviews by Purdie *et al.* (2002) and Ervin *et al.* (1996) report mixed findings. Although it is suggested that school-based programs tend to be more effective than clinic-based approaches in promoting behavioural change (Ervin *et al.*, 1996), this change is not often generalized to settings outside of the school setting (*Ibid.*). Lerner and Lowenthal (1994) concluded that self-instruction and self-monitoring are effective in reducing the major symptoms associated with ADHD, including inattention, distractibility, impulsivity, difficulty in following rules and poor social skills. Basically, these interventions will mostly work if a clear distinction is made between cognitive deficits and cognitive distortions (Ervin *et al.*, 1996).

Moreover, CBT techniques will be more successful if they focus on providing students with skills that equip them to delay and inhibit their responses. This effect would be better understood with reference to Barkley's (1997) convincing view, that it is dysfunctions in the operation of children with ADHD that makes it difficult for them to perform the strategies, even when they know them.

Given that cognitive deficits are believed to lie at the heart of ADHD, it is clear that the above interventions are likely to play an important role in pedagogical approaches designed to meet the particular needs of students with ADHD. Research shows that these interventions are more effective in promoting educational engagement when administered within an educational focus, as opposed to being implemented by clinicians in off-site settings where the focus is the regulation of ADHD symptoms (Purdie *et al.*, 2002).

In addition to the cognitive strategies resulting from the understanding of the cognitive deficits related to ADHD, there are educational approaches used by teachers for supporting students with ADHD (Purdie *et al.*, 2002; Zentall, 1995). As mentioned previously, the main objective of these approaches is to use and exploit, rather than to inhibit, some of the characteristics associated with ADHD. The assumptions underpinning these approaches view ADHD as a cognitive style rather than as a cognitive deficit and they consequently contribute positively to teachers' attitudes towards ADHD (Cooper, 1997a).

Among these approaches is increasing students' participation through the provision of visual motor-tasks (Zentall, 1995). One such task requires students to write answers to teachers' questions on cards and hold these up to be checked by the teacher. This approach helps reduce periods of delay between the completion of tasks by students and receiving feedback. Such strategies were shown to improve performance and behaviour of students with ADHD when compared with their performance on tasks requiring more inactive involvement. Moreover, Hinshaw *et al.* (1984) reported that interventions based on the belief that students with ADHD tend to have an active learning style increased opportunities for students to engage in role-play and kinesthetic learning tasks, thus increasing their attention span and reducing their impulsive and disruptive behaviour.

Related to this is the insight that students with ADHD benefit greatly when breaks are integrated with periods of seatwork (Pelligrini and Horvat, 1995).

In relation to the principle of using and exploiting the characteristics associated with ADHD, one recommendation is for teachers to utilize the excessive talking evident in children with ADHD by increasing opportunities for on-task verbal participation by students (Zentall, 1995). For example, Dubey and O'Leary (1975) found that students performed better on comprehension tasks when they were required to read comprehension passages aloud, rather than silently. Similarly, teachers can exploit the tendency of students with ADHD to control verbal interactions with peers in negative ways by training them to use questioning techniques rather than assertion in combination with social skills training (Zentall, 1995). It was found that the quality of students' engagement was enhanced when teacher: pupil ratio was reduced in situations involving teacher-group verbal interaction (*Ibid.*). This effect was enhanced when teachers provide behavioural models for active listening strategies (Carter and Schostak, 1980).

It was shown that students' inattention and impulsive symptoms, along with evident positive academic outcomes, were vivid when pedagogical strategies of behavioural modeling and teacher direction were implemented. These effects become more successful when teacher direction involves clear and distinct information about performance, behavioural expectations and expected outcomes. Accordingly, optimal student performance is associated with conciseness and clarity of sequences of instruction, the accompaniment of verbal instructions with visual cues and the availability of resources that students can refer to for reminders of direction and expectations (Zentall, 1995).

Once the above approaches have been implemented in conjunction with the provision of a distraction-limited class environment, self-pacing can be introduced into practice. Self-pacing, as opposed to external (that is, teacher-directed) pacing, is associated with greater accuracy (Zentall, 1995) and higher student self-reported satisfaction (Cooper and Shea, 1998) with learning tasks. For example, students with ADHD can remove themselves to a quiet area in stressful situations or when the need arises (DuPaul and Stoner, 1994; Zentall, 1995).

It is evident that the approaches discussed above regard ADHD as an educational issue and therefore may seem to neglect the bio-medical definition of ADHD suggested by some researches, such as Slee (1995). As suggested earlier in the definition of ADHD, it is considered to be a devastating problem but only when defined within the constraints and demands of the present factory-model schooling system. The concept of ADHD should highlight the positive effect that pedagogical insights incorporated into the craft knowledge of teachers reduces the usage of medications as a means for enabling students to participate and succeed in educational settings. Furthermore, the role of “typing” in teachers’ pedagogical decision-making is problematic if they perceive ADHD as solely medically constructed. Where this is the case, the teacher will resort to medications as the sole approach in helping students adapt to the learning situation. This challenge can be met by educating teachers about ADHD and enabling them to assimilate accurate knowledge about the disorder and its effects into their craft knowledge (Cooper and Hughes, 2007).

In addition to the approaches described above, there is evidence to suggest that nurture groups are also a promising intervention for children with the kinds of behavioural difficulties often associated with ADHD. Bennathan and Boxall (2000) described the classic nurture group as small classes, of between ten and twelve students, located in a mainstream primary or infant school and staffed by two adults. Cooper and Whitehead (2004) suggested that the curriculum ought to be holistic and developmental in design, with classroom activities being designed carefully to match the developmental status of individual children. They emphasized the development of social, cognitive and emotional self-management skills. They further added that the effectiveness of such an approach stems from: the calmness of the nurture group environment; the setting of individual learning and development targets; the high availability of adult attention; the emphasis on social skills development; and the raising of self-esteem. Behaviour is seen to positively change after two terms, but results are difficult to maintain once the children move back to regular classes.

In summation, then, students with ADHD do well in classroom environments that are managed in ways that acknowledge the involuntary difficulties they may have with:

- regulating their attention;
- motor activity;
- impulsiveness.

This could be said of virtually all pupils in most schools throughout the world. The difficulties experienced by ADHD children are not unavoidable. The fact of the matter is that ADHD is largely constructed by assumptions about what a mainstream classroom and schools are meant to look like. When discussion whether ADHD should be mainstreamed or not, the discussion must focus not on the child with ADHD but on our willingness to challenge the traditional assumptions about ADHD. If ADHD students are to be accommodated in a manner that allows them to prosper in the school environment, we must be prepared to invest every necessary resource in educating all teachers about ADHD and successful educational interventions (Hughes and Cooper, 2007).

2.16 ASSESSMENT OF ADHD

It is proposed that the assessment of students who may exhibit symptoms of ADHD-related behaviours involves the use of multiple assessment techniques across home and school settings. The purpose of the assessment is not simply to arrive at a diagnosis but, more importantly, to guide the development of an effective treatment plan. The use of functional behavioural assessment is particularly critical in making the connection between evaluation and treatment (Barkley and Murphy, 2006). The major difficulties of hyperactive children present clinicians, psychologists and counsellors with assessment problems (Sattler, 1990). In this section, we shall discuss briefly some of the processes of demonstrated utility in clinically assessing ADHD children.

To begin with, one indispensable component in the evaluation of ADHD is interviews with parents, children/adolescents and teachers, as these interviews provide useful information for differential diagnosis and treatment planning. Following on from this, medical examination can also be useful because they rule out the possibility of visual or hearing deficits that may give rise to ADHD-like symptoms (Knouse, 2008).

There is agreement among many researchers that the assessment process should be multimodal and involve a multidisciplinary team guided by a pluralistic system (Brent, 1985; Dulcan, 1997; Barcken and Nagle, 2007; Carter *et al.*, 2004). These researchers add that the assessment process should be guided by the following goals of evaluation:

1. the determination of the presence or absence of ADHD, as well as the differential diagnosis for ADHD from other psychiatric disorders,
2. the identification of the actual reason to diagnose; this helps to delineate the types of intervention needed to address the psychiatric disorders and psychological, academic and social impairments identified in the course of assessment,
3. the identification of any of the conditions that often co-exist with ADHD and the manner in which these conditions may affect prognosis or treatment. For instance, the presence of high levels of assaultive behaviour by a child with ADHD may indicate that a parent-training program is contraindicated, at least for the time being, because such training in limit-setting and behaviour modification could temporarily increase child violence toward parents when limits on non-compliance with parental commands are established.

The point being made here is that the evaluation of a child for the presence of diagnosable ADHD is but one of many purposes of the clinical evaluation.

More traditionally, the clinician may conduct an intake interview with the parents first, after which any rating scale deemed necessary may be completed by parents and teachers. During a second session, the clinician can conduct the child interview and any testing deemed necessary. The feedback session with parents may be conducted during a third session followed by medical exams.

Barkley and Murphy (2006) add that on the day of the appointment, the following remains to be done.

1. Administer parent and child interviews.
2. Complete parent rating scales.

3. Administer any psychological testing that may be indicated by the nature of the referral (intelligence and achievement testing, etc.).
4. Prepare teacher rating scales (TRS) to be sent to the child's teachers.

The reliability and accuracy of the parental interview have much to do with the manner in which it is conducted and the specificity of the questions offered by the examiner. An interview that includes highly specific questions about symptoms of psychopathology, history, course and periodicity that have been empirically demonstrated to have a high degree of association with particular disorders greatly enhances diagnostic reliability. For instance, although parents' recall may be imperfect with regard to precise times or ages of symptoms onset, they remain quite reliable and accurate with regard to symptom presence and whether or not a diagnosis is rendered. A structured interview, such as the Diagnostic Interview Schedule for children (Shaffer *et al.*, 2000) or the Diagnostic Interview for Children and Adolescents (Reich, 1997), provides the most reliable method for gathering information about existing symptoms of psychopathology in both externalizing and internalizing domains (Barkley, 2006; Shah *et al.*, 2005).

At some point before or soon after the initial evaluation session with the family, contact with the child's teachers may be helpful to further clarify the nature of the child's problems. This contact is most likely to occur by telephone, unless the clinician works within the child's school system. It seems, however, that completion of TRS by the teachers is a common practice.

As can be seen from this brief appraisal, the process of assessment of ADHD is difficult, but is critical for diagnosis and treatment. A comprehensive evaluation should be based on three essential components: interviews, medical examinations and the completion of behaviour rating scales, supplemented with some individual psychological tests.

2.17 CONSENSUS DIAGNOSTIC CRITERIA FOR ADHD

As the focal point of this study is assessment, it is helpful for us to review how ADHD is diagnosed internationally and then to move from this macro perspective to examine the micro perspective, i.e. how ADHD is assessed locally.

In the 1930s hyperkinesis, impulsivity, learning disability and short attention span were described as “minimal brain damage” — and later as “minimal brain dysfunction” — due to similarities to patients with frank central nervous system injuries. In the 1950s this label was modified to “hyperactive child syndrome” and then to “hyperkinetic reaction of childhood” in *Diagnostic and Statistical Manual of Mental Disorders* (DSM)-II in 1968. Each of these labels and sets of criterion focused exclusively on children and placed the greatest emphasis on motoric hyperactivity and overt impulsivity as hallmarks of the disorder (Barkley, 1989).

At present, the primary characteristics of ADHD and the diagnostic criteria officially developed for clinical use are set forth in the fourth edition of the DSM (DSM-IV: American Psychiatric Association, 1994) and its text revision (DSM-IV-TR: American Psychiatric Association, 2000), which are used primarily in the USA. The DSM definition is similar, though not identical, to the definition of the disorder in the tenth revision of the International Classification of Diseases (ICD-10, World Health Organization, 1992), which issued mainly in Europe. Table 2.4 presents the DSM-IV-TR criteria. These criteria stipulate that individuals must have had their symptoms of ADHD for at least six months, that these symptoms must occur to a degree that is developmentally deviant, and that symptoms producing impairment must have developed by seven years of age. From the inattention item list, six of the nine items must be endorsed as developmentally inappropriate. From the combined hyperactivity and impulsivity item lists, six of the nine items must be endorsed as deviant. The type of ADHD to be diagnosed depends on whether criteria are met for inattention, hyperactivity-impulsivity, or both: the Predominantly Inattentive Type (ADHD-PI), the Predominantly Hyperactive-Impulsive Type (ADHD-PHI), or the Combined Type (ADHD-C) (Barkley, 2006).

The DSM-IV-TR diagnostic criteria show considerable improvement over those provided in the earlier versions of DSM (American Psychiatric Association, 1968, 1980, 1987). They are the most rigorous and most empirically derived criteria ever available in the history of ADHD (Spencer *et al.*, 2007; Barkley, 2006). They were derived from a process in which (1) a committee of some of the leading experts in the field met to discuss its development; (2) a literature review of ADHD symptoms was conducted; (3) a survey of rating scales assessing the behavioural dimensions related to ADHD, along with their factor structure and psychometric properties, was undertaken; and (4) a field trial of the subsequently developed item pool was conducted with 380 children from ten different sites in North America (Applegate *et al.*, 1997). One of the most important merits of the DSM-IV relates to the fact that the items used to make the diagnosis were selected primarily from factor analyses of items from parent and teacher rating scales, in which the items already showed high inter-correlations and were able to distinguish children with ADHD from other groups of children (Lahey *et al.*, 1994).

In spite of these merits, some researchers have shown some concern regarding the validity of DSM-IV in diagnosing adults with ADHD. There has been very little research done in the area of adulthood ADHD and how the DSM-IV criteria conform to college students in the USA (DuPaul *et al.*, 2001). Adults rely heavily on self-reported scales diagnosis with ADHD (Jackson and Farrugia, 1997). Heiligenstein *et al.* (1999) performed a study using 448 university students that showed 4% of the participants had ADHD; this was found by using DSM-IV criteria. When they performed a similar study with self-rating scales, the percent of people who qualified for ADHD rose up to 11%. In conclusion, Heiligenstein *et al.* (1999) decided that rating scale criteria brought forth by the DSM-IV is too high when applied to universities. Moreover, various researchers believe that students will underscore themselves on the tests as a result of academic underachievement (Javorsky and Gussin, 1994). This is an area that needs more extensive research (Barkley, 1998).

Cooper (2008) (*see* section 2.14) discusses the diagnostic criteria from a biopsychosocial perspective. He noted that the ADHD diagnostic criteria take for granted fixed roles for students where from an early age they are expected to conform in a teacher-centered classroom to a set of rigid rules and a curriculum-focused method of teaching pupils in age-

related groups. Teachers impose rules about conduct, control and student interactions rather than negotiating these policies with their students. Teacher-centered classrooms and fixed lineal curriculum, as it is demanded by most of our schools, tend to increase the symptoms of ADHD for students who are biologically predisposed to develop the disorder. Cooper (2008, p.657) points out that "... this is not the fault of the clinicians who drafted the criteria but; on the contrary, the ubiquity and persistence of ADHD and its diagnostic forerunners and equivalents reflect, unintentionally but accurately, one of the most persistent criticisms of Western mass education, namely that it stresses rigid authoritarian values and is relatively unresponsive to individual differences and needs."

The implications of the above and as discussed in section 2.14 are that if we are advocating inclusive education, then we should be learning the lesson ADHD teaches us about how we might shape the educational environment in order to improve access to learning opportunities. Accordingly, an understanding of the ADHD diagnosis and the biopsychosocial theories underpinning it can be used to inform the development of effective educational practices that will, in some circumstances, preclude the need for medication (Cooper and Jacobs, 2011).

Table 2.4 DSM-IV-TR Criteria for ADHD

A. Either (1) or (2):
(1) six (or more) of the following symptoms of inattention have persisted for at least 6 months to a degree that is maladaptive and inconsistent with developmental level:
Inattention
(a) often fails to give close attention to details or makes careless mistakes in schoolwork, work, or other activities
(b) often has difficulty sustaining attention in tasks or lay activities
(c) often does not seem to listen when spoken to directly
(d) often does not follow through on instructions and fails to finish schoolwork, chores, or duties in the workplace (not due to oppositional behavior or failure to understand instructions)
(e) often has difficulty organizing tasks and activities
(f) often avoids, dislikes, or is reluctant to engage in tasks that require sustained mental

<p>effort (such as schoolwork or homework)</p> <p>(g) often loses things necessary for tasks or activities (e.g., toys, school assignments, pencils, books, or tools)</p> <p>(h) is often easily distracted by extraneous stimuli</p> <p>(i) is often forgetful in daily activities</p>
<p>(2) six (or more) of the following symptoms of hyperactivity-impulsivity have persisted for at least 6 months to a degree that is maladaptive and inconsistent with developmental level:</p>
<p>Hyperactivity</p>
<p>(a) often fidgets with hands or feet or squirms in seat</p> <p>(b) often leaves seat in classroom or in other situations in which remaining seated is expected</p> <p>(c) often runs about or climbs excessively in situations in which it is inappropriate (in adolescents or adults, may be limited to subjective feelings of restlessness)</p> <p>(d) often has difficulty playing or engaging in leisure activities quietly</p> <p>(e) is often "on the go" or often acts as if "driven by a motor"</p> <p>(f) often talks excessively</p>
<p>Impulsivity</p>
<p>(g) often blurts out answers before questions have been completed</p> <p>(h) often has difficulty awaiting turn</p> <p>(i) often interrupts or intrudes on others (e.g., butts into conversations or games)</p>
<p>B. Some hyperactive-impulsive or inattentive symptoms that caused impairment were present before age 7 years.</p> <p>C. Some impairment from the symptoms is present in two or more settings (e.g., at school [or work] and at home).</p> <p>D. There must be clear evidence of clinically significant impairment in social, academic, or occupational functioning.</p> <p>E. The symptoms do not occur exclusively during the course of a Pervasive Developmental Disorder, Schizophrenia, or other Psychotic Disorder, and are not better accounted for by another mental disorder (e.g., Mood Disorder, Anxiety Disorder, Dissociative Disorder, or a Personality Disorder).</p>
<p>Code based on type:</p> <p>314.01 Attention-Deficit/Hyperactivity Disorder, Combined Type: if both Criteria A1 and A2 are met for the past 6 months</p> <p>314.00 Attention-Deficit/Hyperactivity Disorder, Predominantly Inattentive Type: if Criterion A1 is met but Criterion A2 is not met for the past 6 months</p> <p>314.01 Attention-Deficit/Hyperactivity Disorder, Predominantly Hyperactive-Impulsive Type: if Criterion A2 is met but Criterion A1 is not met for the past 6 months</p> <p>Coding note: For individuals (especially adolescents and adults) who currently have symptoms that no longer meet full criteria, "In Partial Remission" should be specified.</p>

2.18 ASSESSMENT OF ADHD IN LEBANON

Now that we have examined the wider literature on ADHD, discussing the assessment of ADHD in Lebanon is essential because it reveals more information about the profile of ADHD in Lebanon. This will add to the significance of the study and confirm and guide the development of the study's objectives.

At present in Lebanon, no diagnostic criteria for the assessment of ADHD and other behavioural disorders are evident. As discussed in section 1.2, the Ministry of Social Affairs provides annual reports indicating the percentage of students with ADHD that they receive, but it doesn't indicate in its manual how these cases were diagnosed. This means that the only information available about ADHD assessment is that available in the studies that investigated the prevalence of ADHD in Lebanon, which were conducted by Fayyad *et al.* (2007) and Cordahi *et al.* (2002). For example, in an attempt to examine the prevalence of adult ADHD, Fayyad *et al.* (2007) used the WHO Composite International Diagnostic Interview (CIDI), version 3, to screen 595 Lebanese respondents. In addition, they also used the WHO Disability Assessment Schedule (WHODAS) to assess the frequency and intensity of impairment, or the lack of ability to perform activities in a number of domains over the past thirty days resulting from ADHD. Cordahi *et al.* (2002), on the other hand, used the Diagnostic Interview for Children and Adolescent-Revised (DICA-R) and the Conners' Parent Rating Scale (CPRS) to follow-up 81 children and youths and to investigate ADHD prevalence in Lebanon.

What we can say, then, about local assessment of ADHD in Lebanon is that several instruments were used by the researchers in these three investigative studies, namely the CIDI version 3, the WHODAS, the DICA-R and the CPRS. The implications of these studies for this study will be discussed in detail in Chapter 4. We will return to this issue at the end of this chapter, where it shall be described how the scarce literature on the assessment of ADHD in Lebanon led the researcher to identify other means than reviewing the literature to investigate this subject.

Following on from this discussion of the assessment of ADHD both internationally and locally, we shall now examine the role of rating scales in the diagnosis of ADHD.

2.19 DIAGNOSTIC CONSIDERATIONS AND THEIR LONG ASSOCIATION WITH RATING SCALES MEASURING ADHD

Diagnosis of ADHD has long been associated with rating scales, which have been proven to be extremely helpful in documenting the individual profile of ADHD symptoms as well as assessing the response to treatments. More recently, they have become essential elements in the evaluation and diagnosis of children with behaviour problems (Herndon, 2006). Margulies and Floyd (2004) have noted that the availability of several scales with excellent reliability and validity, as well as normative data across a wide age range of children, makes their incorporation into the assessment protocol quite convenient, extremely useful and, in many cases, utterly essential for establishing more accurately developmental deviance relative to same-age and same-sex peers .

For example, Table 2.5 provides an overview of results from reliability studies of ADHD rating scales and diagnoses. It shows high levels of reliability, as measured by Cronbach's alpha and Cohen's kappa. It also shows diagnostic efficiency exceeding 95% for sensitivity (the probability of correctly identifying a subject as having ADHD), specificity (the probability of correctly diagnosing non-ADHD children as not having ADHD), positive predictive power (the probability a child diagnosed with ADHD has ADHD) and negative predictive power (the probability a child diagnosed as not having ADHD does not have ADHD) (Faraone, 2005).

Table 2.5 Reliability of ADHD rating scales and diagnoses

Source	Rating Scale	Findings
Moss <i>et al.</i> (1998)	PAS-ADD	Kappa = 0.82; Percent Agreement 83%
Gadow <i>et al.</i> (2002)	DSM-IV-referenced Adolescent Self Report	$\alpha = 0.66\text{--}0.87$
Conners <i>et al.</i> (1997)	Conners'Wells Adolescent	$\alpha = 0.83\text{--}0.93$; Percent Agreement 83%

	Self Report	
Conners <i>et al.</i> (1997)	Revised Conners' Parent Rating Scale	Kappa = 0.89; Percent Agreement 93%
Hepperlen <i>et al.</i> (2002)	Knowledge about ADHD Test	$\alpha = 0.82-0.95$
Fossati <i>et al.</i> (2001)	Italian version of Wender/Utah Rating Scale	$\alpha = 0.89$
Faraone <i>et al.</i> (1995)	Kiddie-SADS Diagnoses	Kappa = 0.95, Sensitivity = 95%, Specificity = 97%, Positive Predictive Power ¹² = 98%; Negative Predictive Power = 95%

Kappa = inter-rater reliability; α = Cronbach's alpha. Adapted from Faraone (2005)

Merrell (2008) and Barkley (1990) noted that the most sophisticated rating scales can help to provide objective, reliable and socially valid information on broad and narrow dimensions of behavioural, social and emotional problems, but also warned that the nature of rating scale technology contains several potential flaws, which are important to understand. For this reason, the next section will examine the merits and limitations of rating scales, along with their essential requirements. This will give us a greater insight into the clinical interpretation of scales.

2.20 ESSENTIAL REQUIREMENTS FOR RATING SCALES

Barkley (2006) indicates that one of the most commonly employed methods for objectifying people's opinions about themselves or children in their care is to quantify their responses in behaviour rating scales and to develop normative data on those responses. He states that a clinically useful scale should meet certain standards, which are as follows.

1. The scale should have specific and operational items to enhance reliability.
2. The scale should have enough items pertaining to the behavioural construct of interest so that it can be considered as a reliable measure of it.
3. The answer format provided for the items should have a sufficient range to allow for a representative sampling of the range of frequency of the symptom within the

population of interest. Simple “yes-no” answers rarely permit this finer discrimination of frequency, which may be necessary to discriminate clinical from normal populations.

4. The scale should demonstrate validity in assessing the construct of interest, i.e. it should correlate significantly with other measures of the same construct taken by other means or from other sources.
5. The scale should demonstrate discriminant validity, i.e. does the scale discriminate between samples of subjects that are known to have more or less of this particular behaviour or symptom?
6. It is quite helpful clinically if the scale can demonstrate some predictive validity, i.e. that it correlates significantly with the same scale or other comparable measures taken at some later time in development.
7. Rating scales should also have acceptable levels of reliability both over time (“test-retest reliability”) and between raters (“interrater reliability”).

Practitioners should not, therefore, be convinced by the merits of particular rating scale simply because some expert in the field has created or recommended it. In every instance they should ensure that the rating scale meets the standards set out above prior to selecting and using it.

2.20.1 Advantages and disadvantages of rating scales over other measures

The widespread popularity of behaviour rating scales is not incidental — they offer many advantages for clinicians and researchers conducting child and adolescent assessment. Increasingly, there has been a remarkable congruence of opinion in this area, with a number

of the most widely used scales consisting of Likert ratings of the existing DSM-IV criteria (DuPaul *et al.*, 1998).

Merrell (2008) and Plante (2005) presented a thorough discussion of the main advantages of behaviour rating scales . These advantages are summarized in the following six points.

1. In comparison with direct observations, behaviour rating scales are less expensive in terms of professional time and amount of training required to use the assessment system.
2. They are capable of providing data on low-frequency but important behaviours that might not be seen in a limited number of direct observation sessions. An example is violent and assaultive behavior. In most cases, these types of behavior do not occur on a constant or consistent schedule, so they might be missed within the constraints of conducting two brief observations. It is extremely important to diagnosis and treatment to be aware of such incidents.
3. They are objective assessment methods that provide more reliable data than unstructured interviews or projective expressive techniques.
4. They can be used to assess children and adolescents who cannot readily provide information about themselves. Consider the difficulty in obtaining valid assessment data on an adolescent who is an inmate of a psychiatric hospital or juvenile detention center and who is unavailable or unwilling to be assessed through interviews or self-reports.
5. They capitalize on observations over a period of time in a child or adolescent's "natural" environment (i.e. school or home settings).
6. They capitalize on the judgments and observations of persons who are highly familiar with the child or adolescent's behavior, such as parents or teachers.

From this, it is easy to see why rating scales are widely used — they give the clinician the “big picture” of the assessment problem in a short amount of time, at moderate expense and with a good deal of technical precision and practical utility.

In spite of considerable agreement over the advantages of rating scales, a number of problems and questions concerning the reliability and validity of these scales have been raised recently. When discussing the problems associated with rating scales, it is useful to remember that by their nature (i.e. assessing perceptions of problems) rating scales are capable of providing a portrait of a general idea or conception of behaviour. Martin *et al.* (1986) categorized the measurement problems of behaviour rating scales into two classes: bias of response and error variance.

Bias of response refers to the way that informants completing the rating scales potentially may create additional error by the way they use the scale. There are two specific types of response bias: 1. halo effects, i.e. rating a student in a positive or negative manner simply because they possess some other positive or negative characteristic that is not pertinent to the rated item; 2. leniency or severity effects, i.e. the proclivity of raters to select midpoint ratings and to avoid endpoint of the scale such as “never” and “always”.

Error variance is closely related to and often overlaps with response bias as a rating scales measurement problem, but it provides a more general representation of some of the problems encountered with this form of assessment. The four types of variance identified that may create errors in the obtained results of a rating scales assessment are outlined below in Table 2.6.

Table 2.6 Types of Error Variance Found With Rating Scales

Type of Error Variance	Explanation
Source	Various source of response bias: different raters may have different ways of responding to the rating format.

Setting	Related to situational specificity of behaviour; eliciting and reinforcing variables present in one environment (e.g. classroom 1) may not be present in a closely related environment (e.g. classroom 2).
Temporal	Behaviour is likely to change over time, and an informant's approach to the rating scale task may change over time.
Instrument	Different rating scales may be measuring different hypothetical constructs; there is a continuum of continuity (ranging from close to disparate) between constructs measured by different scales.

Adapted from Merrell (2008)

These cited limitations are supported by other researchers. Margulies and Floyd (2004) have criticized rating scales for being unstable over time, that is lacking test-retest reliability. Another reliability issue ascribed to the rating scales is poor inter-rater reliability (Schuh *et al.*, 2009). They added that the question of inter-rater reliability might be answered more clearly, if the context, the familiarization time with involved children and the role of the observer (e.g. teacher, parent, counsellor) were held constant.

There are other limitations pertaining specifically to the functioning of the ADHD rating scales. Collett *et al.* (2003) noted that the scales demonstrate developmental relevance, referred to as suitability. While many internalizing scales were developed as downward modifications of adult scales, most ADHD measures were developed specifically for elementary school-aged youths, based on their behaviours in home and school settings. Thus, they are highly suitable for this age range. Suitability for younger and older ages is less clear, however, due to developmental changes in symptom manifestation (Barkley, 1998). This concern was also supported by researchers, who indicated that rating scales did not account for children under age four or for adults (Collett *et al.*, 2003).

The suitability of rating scales for girls is also somewhat unclear. Although there are numerous studies demonstrating differences in the rate of ADHD for boys versus girls (Nadeau and Quinn, 2002), DSM-IV does not consider gender in the diagnostic criteria, and research in this area has focused almost exclusively on boys. This means that rating scales with DSM-IV descriptors may not optimally describe ADHD as demonstrated in girls (Ohan and Johnston, 1999; Nadeau and Quinn, 2002). This discrepancy can lead to the subsequent misdiagnosis of females.

These are the main concerns regarding ADHD rating scales. In the main, these scales possess some form of measurement problems that fall into two classes: bias of response and error variance. In addition, they can exhibit reliability problems associated with test-retest and inter-rater reliability. Finally, there are further legitimate concerns with regard to gender bias and early childhood and adult ratings.

2.21 DESCRIPTION OF THE CTRS-R: S: HISTORY, ADVANTAGES AND DISADVANTAGES

Thus far, we have delineated the technical foundation for understanding the technology of rating scales, their application and uses and the problems associated with them. In this section, we shall progress to an in depth examination of the specific rating scale selected for this study: the Conners' Teacher Rating Scale Revised: Short Form.

The development of the first version of the Conners' Rating Scales was begun during the 1960s by clinicians at Johns Hopkins Hospital in Baltimore, Maryland, USA. These clinicians, who were implementing and researching psychopharmacological and psychotherapeutic interventions in children, developed a set of rating scale items that were used informally and qualitatively in order to obtain further information from teachers. In discussing how the scales progressed from this early informal prototype to the standardized versions now in use, Conners (1997) noted that "... when I compared data from normal children and clinical cases, it was clear that they differed on several different dimensions, not just in the number of total symptoms. Factor analysis confirmed the existence of stable clusters of items ... having much more clinical interest than a simple catalogue of problems" (p.vi). Research on this first standard version of the scales was published by Conners in 1969. The Conners' Teacher Rating Scale-Revised: Short Form (CTRS-R: S) (the 28-item version), which was chosen for this study, was developed later as a shorter form, with slightly different content and properties. An annotated bibliography of more than 450 studies that used the Conners' rating scales was assembled by the publisher (Wainwright and MHS Staff, 1996), and it provides extensive documentation evidence for the many reliability and validity studies that have been conducted. In terms of this study,

the CTRS-R: S was chosen because of its many distinguishing features, its use in research settings, its excellent psychometric qualities, its competitive comparison with other scales and its clinical applicability. These features shall be discussed briefly here.

Barcken and Nagle (2007) have pointed out that one of the most distinctive features of the CTRS-R: S is its ability to represent both externalizing items (e.g. conduct problems) and internalizing items (e.g. anxiety problems). Unlike other teacher rating scales, the CTRS-R: S measures the primary symptoms as well as other associated symptoms, such as oppositionality, cognitive and learning problems. An additional feature is the inclusion of the ADHD index, which contains the best set of items for distinguishing ADHD children from non-clinical children. This scale should be used when time is limited and when multiple administrations over time are desired (Conners *et al.*, 1998).

The CTRS-R: S is the most popular of the newer DSM-IV-based rating scales and has been used in many diverse research and clinical applications. For example, it has been used to establish convergent validity for other ADHD scales and other measures of externalizing behaviors (Merrell *et al.*, 2001). The CTRS-R: S has proven to have good clinical utility with psychiatric outpatients (Barkley, 2006).

The CTRS-R: S exceeds other rating scales in terms of psychometric properties and has even better reliability and validity statistics (Herndon, 2006). The scale was proven to be accurate in measuring the constructs they were intended to measure. In terms of reliability, internal consistency reliability coefficients ranged between 0.882 and 0.952, whereas test-retest reliability coefficients (6–8 weeks) ranged between 0.47 and 0.88. Therefore, internal reliability and test-retest reliability figures for the CTRS-R: S meet all standards of test excellence found in any reasonable methodology text.

Other evidence supporting the scale's sound psychometric properties relate to its factor structure (i.e. factorial validity). The parameter estimates for the three CTRS-R: S factors are summarized in 2.7.

Table 2.7 Parameter estimates for the three CTRS-R: S factors

CTRS-R: S factors	Parameter estimates
Oppositional with Cognitive Problems/ Inattention	0.37
Cognitive Problems/ Inattention with Hyperactivity	0.37
Cognitive Problems/ Inattention with Hyperactivity	0.46

p <.05

The results illustrated in Table 2.7 support the fact that the CTRS-R: S assesses three relatively distinct dimensions. As for discriminant validity, the CTRS-R: S was able to discriminate ADHD patients from non-ADHD subjects. This outcome supports the validity of the scale and indicates excellent clinical utility (Mattison *et al.*, 2003; Conners, 1997; Conners *et al.*, 1998).

Another distinguishing feature of the CTRS-R: S as discussed by Conners(1997) and Conners *et al.*(1998) is its competitive comparison with other scales. The bases of comparison are mainly related to the *response scale schema*, *item selection*, *scale development and normative data*. Each of these features will now be discussed.

- 1. Response scale schema:** with respect to the CTRS-R: S response scale schema, it continues to employ a schema that is widely accepted. Responses are given as: “Not at all true (Never, Seldom)”, “Just a little true (Occasionally)”, “Pretty much true (Often, Quite a bit)” or “Very much true (Very often, Very frequently)”. Practitioners generally find this response scale very easy to use and no systematic research indicates that any alternative response scale would be better for this type of instrument.
- 2. Item selection:** the CTRS-R: S final items were tested rigorously from a much larger pool of items before being selected. The items are clinically relevant, covering not only areas related to ADHD but also many areas that are often co-

morbid with ADHD. The items relate directly to DSM-IV criteria and have direct diagnostic implications.

3. **Normative data:** large data samples and cutting edge research and data analysis techniques were used in the development of the scale. The sample consisted of 1,897 children and adolescents (945 males; 952 females), who were rated by one of their teachers. Accordingly, the norms were developed using the same large sample.

Finally, one other feature proved to be of importance when choosing this scale, namely its clinical applicability. The author has a background in both clinical and academic research work and the CTRS-R: S offers a unique blend of psychometric soundness and the practical knowledge stemming from hands-on practice. In addition, it aligns with DSM-IV and facilitates the assessment of co-morbid disorders (Rowland *et al.*, 2007).

The CTRS-R: S has undergone a considerable amount of scrutiny, with subsequent refining, reshaping and revising, since its development in 1970. While this longitudinal scrutiny has ultimately led to a more reliable, valid assessment tool, it has also left in its wake a raft of literature filled with some ambiguity and various limitations (Hasselblad and Hedges, 1995). Accordingly, the following review is aimed at clarifying some of the issues associated with the CTRS-R: S as both a diagnostic instrument and a research tool.

Among the associated issues is that the CTRS-R: S scores do not correlate well with other measures of the same behaviour. Miranda *et al.* (2002) found that while teachers' remarks on their students' behaviours correlated well with direct observation, CTRS-R: S scores did not. This discrepancy may indicate that teachers find it difficult to translate behaviour into clinically differential classifications, such as "Pretty much" and "Very much". Numerous studies have shown that factors such as teachers' mental health, number of children in the class, and time spent with the child all have a significant effect on the CTRS-R: S scores. Similarly, and surprisingly, Naglieri *et al.* (2005) found few significant relationships between the CTRS-R: S and the Conners' Continuous Performance Test in their study to

examine the relationships among tests of ability, attention and behaviour for a sample of children with attention, emotional and behavioural problems. They explain that while it is reasonable to anticipate that measures of Cognitive Problems/Inattention subscale on the CTRS-R: S and Attentiveness on the Conners' Continuous Performance Test (CPT) should be related, the correlations were very small. These results suggest that the CTRS-R: S information and CPT results are likely to be inconsistent and therefore pose particular difficulties for practitioners striving to make an accurate diagnosis based on a convergence of data from tests that would be expected to yield similar results. Similarly, the CTRS-R: S has not been found to correlate well with behavioural measures of activity, such as teacher behavioural observations or structured free play observations (Edelbrock and Rancurello, 1985).

A final issue relates to the consistency of scores over time, especially when monitoring therapeutic progress. Sullivan and Riccio (2007) have pointed out that scores tend to drop from the first to the second administration of the CTRS-R: S. Similar results were found by Conners (1997), who indicated that such a drop could produce the erroneous impression that a treatment is effective if only the first and second administrations are considered (e.g. baseline vs. post treatment). As a result, Conners advised that the CTRS-R: S be administered twice before treatment is initiated, with comparisons being drawn between the second and subsequent administrations.

Taking into account the 'big picture' of research findings, it is clear that the CTRS-R: S shows considerable promise and utility. The extensive norming sample is impressive, as is the integration of DSM-IV criteria for ADHD into subscales. These instruments should prove to be particularly useful in assessing children with attention problems and hyperactivity. In short, the CTRS-R: S is a very reliable and prestigious rating scale, but the tester must be aware of its shortcomings.

2.22 THE ITC GUIDELINES: ISSUES, DESIGN, AND TECHNICAL GUIDELINES FOR ADAPTING TESTS

Before embarking on a discussion of the methodological aspects of this study, it is imperative to critically review the ITC guidelines. This is necessary for two reasons.

1. The guidelines contribute substantially to the development of the sub-objectives and level one sub-objectives of this study (This will be illustrated at the end of this chapter).
2. The guidelines justify and have a major role in shaping the methodological processes followed and the challenges encountered in this study.

Interest in adapting tests developed for a particular language and culture group was a high priority for educational and psychological researchers and practitioners for most of the twentieth century. Consider, for example, Hambleton *et al.*'s (2005) discussion of the early translations of the Binet-Simon intelligence test. They pointed out that the test was translated from French to English in 1911 and was used to evaluate intelligence among residents of New Jersey-based Vineland Training School. They pointed out that by 1916, the Binet-Simon had been translated into seven different languages (citing Stanely and Hopkins, 1972) and that other important intelligence tests and related scales were translated into the primary language of the examinees to be tested, such as the Otis Group Intelligence Scale, Wechsler Intelligence Scale for Children and the Wechsler Adult Intelligence Scale. Hambleton and Kanjee, (1995) add that test adaptation of instruments is a difficult, time-consuming but arguably cost-effective process. If conducted properly, it has the advantage that the adapted study instruments are accurate, easy to understand, accessible and culturally appropriate to the target audience, ultimately producing reliable and valid data.

Adapting an imported rating scale to suit the Lebanese setting is associated with methodological issues and challenges in the adaptation of achievement and psychological instruments (Berry *et al.*, 1992; Sireci *et al.*, 2006). Although significant advances have been made in the methodologies used to adapt tests (van de Vijver, 2008), there remain a number of difficult and challenging issues in this area. Van de Vijver highlights a recurring

theme in adaptation studies, which is the question of the extent to which instruments developed in Western countries can be applied in different cultural context. He also, along with Poortinga (1995), discussed multiple challenging issues surrounding test adaptation. They described how the process of adapting instruments to other languages and cultures involves not only the translation of the test items and test materials but other changes, too, such as changes in item format and testing procedures. Several researchers emphasize that when adapting tests, a good translation must reflect not only the meaning of the original item but should also try to maintain the same relevance, intrinsic interest and familiarity of the item content. If it does not do this, the item being measured may be altered (Miller, 1997; O'Neil *et al.*, 2004).

In the past, test developers have proceeded as if the only important factor in adapting a test to a different culture is the translation of the language originally used in the test into a new language (Poortinga, 1995). Hymes (1970) contended that it is wrong to equate a people's cultural identity with their linguistic identity and that singling out that language as the central embodiment of a people's psychological character negates the specific qualities of the culture that distinguishes it from others. In other words, simply translating a test from one language to another does not guarantee that a reliable and valid adapted version has been produced.

The key point being made here is that a casual approach to test adaptation leads to a false belief that accurate decisions can be based on the adapted test (Byrne and Campbell, 1999). Language translation, although an important aspect of test adaptation, is not by itself sufficient to safely use the adapted test in the target culture (Sireci *et al.*, 2006). As a result, in addition to the meticulous process of translation, the psychometric properties of the adapted test should be examined or quantitative empirical evidence should be provided in order to ensure the quality of the adapted version. Following this course of action can avoid any uninformed or faulty conclusions about the subjects involved (Heo *et al.*, 2008).

Unfortunately, guidelines for test adaptations for use in multiple languages and cultures do not appear to be well-known by researchers who do test adaptations. In view of the fact that "high stakes" are often associated with test-adaptation studies, the need for professionally

developed and validated guidelines for adapting tests seems clear. Technical standards or guidelines for assessment practices concerning test development, reliability, validity and norming are available in many countries (see, for example, the American Educational Research Association (AERA), American Psychological Association (APA) and National Council on Measurement in Education (NCME), 1985), but rarely has much attention been given to the preparation of guidelines for adapting tests. For example, in the widely used AERA, APA and NCME Test Standards, only three standards address the topic of test adaptations directly. The same holds true in Canada, a bilingual country, where only three guidelines addressing test adaptations appear in the Canadian Psychological Association's Test Standards (1987).

This trend is obvious in Lebanese universities as well. Psychologists are graduating from institutions in Lebanon with no knowledge of how to evaluate imported instruments in relation to the standards; any other statistical-complex measure is covered in the courses of those who major in the measurement field. The technical literature for guiding the test-adaptation process appears to be incomplete and scattered throughout a plethora of international journals, reports and books. Quite simply, there is no single and complete set of guidelines that practitioners can turn to for advice, nor had a complete set of guidelines for adapting tests ever been formalized until recently.

In 1992, in response to the difficulties associated with adapting tests, the International Test Commission (ITC) initiated a project to prepare guidelines for adapting tests and cross-cultural comparisons. Several organizations assisted the Commission in preparing the guidelines, including European Association of Psychological Assessment, European Test Publishers Group, International Association for Cross-Cultural Psychology, International Association of Applied Psychology, International Association for the Evaluation of Educational Achievement, International Language Testing Association and International Union of Psychological Science. A committee of twelve representatives from these organizations worked for several years to prepare twenty-two guidelines, which were later field-tested (see, for example, Hambleton, 2001; Hambleton *et al.*, 2005; Hambleton *et al.*, 1999; Tanzer and Sim, 1999). These guidelines were then approved by the ITC for distribution to national psychological societies, test publishers and researchers.

This section explores issues and challenges discussed by prominent researchers in test adaptation. Some of the pertinent ITC guidelines related to test adaptation, rather than cross cultural comparisons, will be assessed in relation to the objectives of this study. This will shed light on the solutions implemented by the researcher to remedy such issues and challenges. Accordingly, this discussion is of utmost importance to the study because it explains the rationale underlying the steps taken later on to adapt the CTRS-R: S.

First, however, let us set out the distinction between test adaptation and test translation. The term test adaptation is preferred to the more popular and frequently used term test translation because the former term is broader and more reflective of what should happen in practice when preparing a test constructed in one language and culture for use in a second language and culture. Test adaptation includes everything from deciding whether or not a test could measure the same construct in a different language and culture to selecting translators, to deciding on appropriate accommodations to be made in preparing a test for use in a second language, to adapting the test and checking its equivalence in the adapted form. Test translation is only one of the steps in the process of test adaptation and even at this stage adaptation is often a more suitable term than translation to describe the actual process that is taking place (Sireci *et al.*, 2006). As a result, this study adopts the term test adaptation, rather than test translation. Test translation, as illustrated in Figure 2.3 is only a sub-objective of the broader aim of this study, which is test adaptation.

Some of the most relevant and important ITC guidelines for test adaptation may be summarized as follows:

1. The test selected for adaptation must meet the required minimum technical quality standards.

As with any scientific instrument or precision tool, ADHD rating scales must be constructed properly if they are to be used effectively (Hambleton, 2001). The practitioner must gather pertinent-evaluative information about the test to be used to be able to

determine whether practitioners can make a compelling case that the test is valid and appropriate for the intended use (Nitko and Brookhart, 2010).). When attending to these standards, the researcher must evaluate test coverage, the appropriateness and representativeness of the samples used for test validation and norming, reliability, content validity and construct validity. The key point is that the test selected for adaptation should meet acceptable levels of psychometric indices. Evidence supporting its construct validity should also be available.

In response to the above key issue, it is worth noting that the researcher's choice in selecting the instrument (i.e. the CTRS-R: S) was guided by several principles. The researcher conducted an extensive research on generic ADHD rating scales prior to selecting the CTRS-R: S. In addition to the careful review of the distinguishing features of CTRS-R: S, such as its use in research contexts, its competitive comparison to other ADHD rating scales, its large representative sample and clinical applicability, the researcher also referred to the guidelines set out by Rowland *et al.* (2007) and by Plante (2005). Briefly, they noted that generic rating scales share more similarities than differences. They generally cover a roughly similar content, although their comprehensiveness varies, most have evidence of reliability and validity, most are user-friendly and most can be scored in a comprehensive way. There are some differences, however, that may be relevant for some purposes and they recommended that the answers to a series of pertinent questions could help in deciding which scale to use. The researcher followed this recommendation and chose the CTRS-R: S based on how much true were the answers related to the CTRS-R: S. Table 2.9 summarizes the questions, available pertinent appropriate scales, the researcher's replies (i.e. how much true) and the choice made (whether to use the CTRS-R: S). The list of rating scales involved in this discussion is listed in Table 2.8.

Table 2.8 List of rating scales involved in the recommendation made by Rowland *et al.* (2007) and by Plante (2005) regarding the choice of an appropriate rating scale

Rating Scale	Abbreviation
The Achenbach System of Empirically Based Assessment	ASEBA

Conners' Rating Scales: Revised	CRS-R
The Child Symptom Inventory	CSI
The Strengths and Difficulties Questionnaire	SDQ
The Eyberg Child Behaviour Inventory	ECBI
Achenbach System of Empirically Based Assessment	ASEBA
Behaviour Assessment System for Children	BASC
The Devereux Scales of Mental Disorders	DSMD
The Child Behaviour Checklist	CBCL

Table 2.9 Summary of the questions, available pertinent appropriate scales, the researcher's replies and the choice taken

Questions	Available Appropriate Scales	Researcher's Reply	Choice Made
Do I need multiple informants?	The ASEBA, CRS-R, CSI and SDQ have versions for parents, teachers and self-report on problems.	It would be helpful but this study concerns one type of informants, mainly teachers. It would, however be useful for future research to adapt the parent form as well.	The CTRS-R: S is, therefore, it is useful.
Do I need a rating scale for early assessment/screening, or do I need one for more extensive evaluation, and will the instrument be completed for one individual or for many individuals by the same informant?	Most scales take 10-20 minutes to complete. The ECBI, PSC, Revised Rutter Scales and the SDQ are much shorter. However, only the Revised Rutter Scales and SDQ can be scored on specific syndrome scales and not only, on a global index of malfunctioning. The CRS-R has both short and long forms.	I need a short form that can be completed in 10-20 minutes. It might also be the case that a teacher might rate several students.	Thus, the CTRS-R: S would suit.
Do I need to assess problems only, or do I need to assess competence as	The ASEBA, BASC, the Revised Rutter Scales and the SDQ have scales for adaptive functioning.	I only need to assess problems related to ADHD.	Hence; the rating scales mentioned are not suitable for my purpose.

well?			
Do I want to obtain ratings that can be scored on DSM-orientated scales, on empirically derived scales, or both?	Five instruments have empirically derived scales: the ASEBA, BASC, CRS-R, DSMD, and RBPC. The new version of the ASEBA will have both options: the same rating scale can be scored on empirically derived scales as well as on DSM-orientated scales.	I will need to obtain ratings on empirically derived scales.	So, the CTRS-R: S would suit.
Are translations of the instrument available in the languages I need?	The most widely used scales that have been translated in different languages are: CBCL, CSI, CRS: R, DSMD, ASEBA and the Revised Rutter scale.	I do need a translated scale, however none of these have been translated to Arabic.	The CTRS-R: S remains to be a good choice.
Are there norms available for the instrument or not?	The ASEBA and the CRS: R are probably the two instruments with the largest number of normative data from different countries.	A rating scale with normative data is of utmost importance since it is one of the psychometric prerequisites.	Accordingly, the CTRS-R: S would suit.

2. The people using the test should be competent to do so.

Regarding this criterion, the researcher has had extensive training in selecting and using tests and other measurements as part of the requirements of her MA in Educational Psychology /Tests and Measurements at the American University of Beirut

3. Researchers need to establish construct equivalence.

In relation to construct equivalence, Wang *et al.* (2006) indicated that the researcher must ensure that the construct(s) measured by a test in the original source cultural/language group can be found in the same form and frequency in the other groups under investigation.

Differences that exist between various cultural and language groups are a function not only of the different traditions, norms and values but also of different world-views and interpretations. It is thus entirely possible that the same construct can be interpreted and understood in completely different ways by two different groups. For example, the concept of “intelligence” is known to exist in almost all cultures. However, in many Western cultures this concept is associated with being able to produce responses very quickly, while for many Eastern cultures intelligence is often associated with thoughtfulness, reflection and saying the right thing.

In response to this criterion, the researcher, in accordance with ITC guidelines, investigated whether the construct (in this case, ADHD) exists in the target language (in this case, Lebanon). In an attempt to source data on ADHD in Lebanon, the researcher reviewed specialized textbooks. In addition, the references in the ADHD sections of major textbooks on child and adolescent psychiatry and on general psychiatry were reviewed to identify original surveys dealing with ADHD in Lebanon or other Arab settings. Experts who are scientific authorities in the field of ADHD were also contacted via email and asked whether they were aware of unpublished or ongoing studies on the aforementioned topic. The studies that were found as a result of this search are summarized in Table 2.10. These studies provide substantial evidence that ADHD exists in the target culture (The prevalence of ADHD in Lebanon and other Arab countries is discussed in Section 2.9).

4. Researchers should be sensitive to a number of factors related to administration procedures that can moderate the validity of the inferences drawn from the scores of the adapted test.

Byrne and Campbell (1999) pointed that a serious threat to the validity of the adaptation process can arise from communication problems between the administrator of the adapted test and examinees. For example, the instructions on the test could be unclear due to some translation errors. One way to circumvent problems associated with test administration, as discussed by van de Vijver and Poortinga (2002), is to ensure that the instructions on the adapted test are clear and self-explanatory, with minimal reliance on verbal communication. The administrator should also be unobtrusive and administrator–examinee

interaction should be minimized. Explicit rules, which are described in the manual for the test, should be strictly followed.

For these reasons, the proper selection of test administrators can be helpful. They should (1) be drawn from the target communities, (2) be familiar with the culture, language and dialects, (3) have adequate test administration skills and experience, and (4) know the importance of following any standardized procedures associated with the test (van de Vijver and Poortinga, 2002). In light of this, and as was noted in ITC guideline 1, the researcher, acting as the test administrator, is drawn from the target culture and has sufficient test administration skills.

5. Researchers should ensure that the item format of the adapted test is familiar to the target group.

In terms of the format of the adapted test, differential familiarity with particular item formats presents another source of invalidity. O'Neil *et al.* (2004) and Poortinga (1995) reported that instructions on the adapted test should include examples in order to reduce differential familiarity. In addition, administrator characteristics, such as gender, age, race, even style of clothing, etc., can influence the measurement outcome. They recommend that small pilot tests be conducted before money and effort are invested in large-scale tests. In keeping with this criterion, the researcher took several measures to reduce unfamiliar stimuli, such as conducting a pilot test and administering structured interviews before pilot testing on a larger sample.

6. Researchers should select competent translators for test adaptations.

The importance of obtaining the services of competent translators should be obvious. Berry *et al.* (1992) noted that researchers usually involve and select a single translator because he/she happened to be available: a friend, a wife of a colleague, someone who could be hired cheaply, etc. Competent translation work cannot, therefore, be assumed. The use of a single translator, competent or not, excludes the valuable interactions among independent translators to resolve different points that arise in the translation process. The translators

appointed should be more than persons familiar and competent with the languages involved in the translation. They should know the cultures very well, especially the target culture. Several researchers have emphasized the fact that translators need to possess some knowledge of the cultures involved, especially the target one, because it is essential for an effective adaptation (for a review, see Poortinga, 1995; Heo *et al.*, 2008; Hambleton, 2001; Hambleton *et al.*, 1999). Puhan and Gierl (2006) noted that inexperienced translators often resort to literal translations, which often pose problems for target language examinees and thus threaten the test's validity. Take a simple example: the sentence, "*je ne suis pas une valise*" has an easy literal translation in English, which is "I am not a suitcase", but the actual meaning of the sentence in French is, "I am not that stupid". In an adaptation scenario, a literal translation of this sentence from French to English would totally distort the meaning.

In accordance with this guideline, the researcher selected seven translators who were native and bilingual speakers of the target and source language, and knowledgeable of the construct and culture (Further information regarding the qualities of the translators is included in Appendix 3, Competency and Qualifications of the Translators.)

7. Researchers should employ judgmental translation designs and establish equivalence between the original test and the adapted one.

Judgmental translation designs, which are recommended by the ITC, are the forward and the backward translation designs. Casillas and Robbins (2005) discussed these two designs in detail. In forward translation design, a group of translators adapts the test from the source language to the target language. Then, the equivalence of the two versions of the test is judged by another group of translators and necessary revisions are made. The main advantage of the forward translation design is that judgments are made directly about the equivalence of the source and target language versions of the test. However, the main weakness of the forward translation design is associated with the high level of inferences that must be used by the translators about the equivalence of the two versions of the test. Tanzer and Sim (1999) identified other weaknesses, including (1) translators may be more proficient in one language than the other, (2) ratings of test equivalence involve judgments

by persons who are bilingual, who may use insightful guesses and may be more clever than monolingual candidates who take the test, and (3) test developers are not in a position to judge test equivalence themselves.

The back-translation design is the best known and most popular of the judgmental designs. In this design, a group of translators translates a test from the source language to the target language. A second group of translators takes the translated test (in the target language) and adapts it back to the source language. Then, the original versions of the test and the back-translated version are compared and judgments are made about their equivalence. To the extent that the two versions of the test in the source language look similar, support is available for the equivalence of the source and target versions of the test. The back-translation design can be considered as a general check on translation quality that can detect at least some of the problems associated with poor translations (Hambleton, 2001; Hambleton *et al.*, 2005; Hambleton *et al.*, 1999). Many researchers favour the back-translation design because it provides them with an opportunity to judge the original and the back-translated versions of the test so that they can form their own opinions about the translation process. This is not a possibility with the forward translation design. For example, and with particular relevance to this study, many researchers who were involved in adapting the teacher, parent or self-report forms of the Conners' Rating Scales to other languages have specifically adopted this design (Pal *et al.*, 1999; Kolakowski *et al.*, 1997; Al Awad and Sonuga-Barke, 2002; Luk *et al.*, 1988; Dereboy *et al.*, 2007).

Despite the popularity of the back-translation design, Tanzer and Sim (1999) acknowledge that one of its shortcomings is that the comparison of the adapted test is carried out in the source language. It is possible that the test adaptation could be poor, while the evidence on the compatibility of the original test and the back-translated one would suggest otherwise. A second shortcoming, which was also identified by Sierci *et al.* (2006), is that the adaptation could be poor because it retained inappropriate aspects of the source language test, such as the same grammatical structure and spelling. For example, the game "ice-hockey" may be retained in a Spanish version of a test and the words are then easy to back-translate. However, the sport may have little meaning to many persons who speak only the Spanish language.

Taking into account the number of advantages related to the back-translation design and its extensive use in similar studies (see above), it was chosen for this study.

Regarding the second part of the above guideline, *establishing equivalence between the original test and the adapted one*, the most frequently employed method involves empirical methods. Specifically, bilingual participants of equal proficiency should take the source and the adapted versions of the test and then their scores should be correlated (Stansfield, 2003). Accordingly, establishing equivalence between the original test and the adapted one will also be examined prior to establishing the psychometric properties of the adapted CTRS-R: S.

8. Researchers should ensure that the data-collection design involves large representative samples that permit the use and investigation of appropriate statistical techniques.

Statistical techniques help identify problematic components or aspects of the adapted test, which may be inadequate to one or more of the intended populations (Hambleton, 2001). These techniques should be used to supplement the judgmental designs i.e. forward- and backward-translation designs). Moreover, researchers should provide information on the evaluation of validity and reliability in all target populations for whom the adapted versions are intended. Hambleton and Kanjee (1995) raised the concern that many of the constructs taken for granted in the Western world, and for which many tests have been specifically developed, may not exist at all in other cultures. Where they do exist, their behavioural manifestations and interpretations may vary considerably. Thus, it is crucial to first determine the validity of the construct being assessed in the target language before adapting the test. Similarly, Drenth (1972, p. 77) confirmed that “a test should be validated with respect to a certain population.” Validity and reliability issues were also raised by Stansfield (2003) and Heo *et al.* (2008), who indicated that when a test is adapted from one language to another, its reliability and validity should be established to suit the target culture/groups. Therefore, in addition to the meticulous process of translation, researchers must conduct statistical techniques to assure the quality of the translated version prior to its usage.

The key point here is that one should not assume that linguistic relevance provided by translation of an imported test is sufficient to ensure confident use of the test. Semantic equivalence is a primary prerequisite for adapting imported tests, but one would still need to conduct statistical studies to ensure conceptual relevance (Heo *et al.*, 2008). Accordingly, and in accordance with the ITC guidelines and other studies in the field of test adaptation (e.g. Stansfield, 2003; Hambelton, 2001), the researcher will validate the adapted CTRS-R: S by developing its normative data on the basis of a representative sample. In support of this, evidence will be presented regarding the construct and discriminant validity and reliability of the adapted CTRS-R: S.

In summation, the growing interest in test-adaptation research means there is an increasing need for standard and validated practices for adapting psychological instruments. Developing a psychologically acceptable instrument for another cultural group almost always requires more effort than a literal translation, which all too often is the common practice. The adequacy of translations can be threatened by various sources of bias. Despite the long history and the many good reasons for adapting tests, proper methods for conducting test adaptations and establishing its validity should be well-known by researchers. When the ITC guidelines and suggested methods are applied correctly, the validity of any adapted uses of the adapted test should be increased.

Now we shall review how other researchers have approached the adaptation of the same or other similar tools. This is an important step as an appreciation and close evaluation of the practices involved in other studies will contribute significantly to shaping the design and objectives of this study.

2.23 HOW DID OTHER RESEARCHERS ADAPT THE CTRS-R: S AND OTHER SIMILAR TOOLS?

One of the challenges identified in this research project is the adaptation of rating scales to other languages and cultural contexts. In response, it is necessary to discuss the ways that this challenge has been met in the past and by other specialists in the process of adapting

the CTRS-R: S or other similar tools. To this end, we shall now discuss the methodologies used in such studies.

Given the fact that the CTRS-R: S has been used in only a few multicultural studies, the researcher referred to studies addressing adaptation of other similar instruments as well, such as the Conners' Parent Rating Scale–Revised (CPRS-R), the Conners' Adult ADHD Rating Scales (CAARS) and the Conners' Abbreviated Teacher Rating Scale (CATRS-10). For example, Pal *et al.* (1999) validated a translated version of the CPRS-R for use in a study of anti-epileptic drug side effects in rural India. Kolakowski *et al.* (1997) adapted the CTRS-R: S to Polish, and the CAARS was adapted to German by Christiansen *et al.* (in press). Al-Awad and Sonuga-Brake (2002) assessed the equivalence of Sudanese and North American versions of the CTRS-R: S and the CPRS-R. Similarly, the CTRS-R: S and the CPRS-R were adapted and validated to Turkish by Dereboy *et al.* (2007). O'Leary *et al.* (1985) adapted and investigated the psychometric properties of the Italian adapted version of the CTRS-R: S, as did Luk *et al.* (1988) for the Chinese adapted version. Only one study was found relating to the adaptation of the CATRS-10 and it developed its normative data in Brazil (Brito, 1987). The distribution of these studies by country is summarized in Table 2.10.

Table 2.10 The distribution of adaptation studies by country and alpha

No.	Country	Author/Year	Instrument	Translation Design	Sample
1	Brazil	Brito (1987)	CATRS-10	Forward	1,068
2	Germany	Christiansen <i>et al.</i> (in press)	CAARS	Backward	850
3	Hong Kong	Luk <i>et al.</i> (1988)	CTRS-R:S	Backward	914
4	India	Pal <i>et al.</i> (1999)	CPRS-R	Backward	123
5	Italy	O'Leary <i>et al.</i> (1985)	CTRS-R:S	Not mentioned	Not mentioned
6	Poland	Kolakowski <i>et al.</i> (1997)	CTRS-R:S	Backward	996

7	Sudan	Al-Awad and Sonuga-Brake (2002)	CTRS-R:S & CPRS-R	Backward	300
8	Turkey	Dereboy <i>et al.</i> (2007)	CTRS-R:S & CPRS-R	Backward	1,539

In terms of the methodologies of adaptation used in these studies, the forward-translation design was used by one study, that in Brazil, while all of the rest used the backward-translation design (per country: Germany, Hong Kong, India, Poland, Sudan and Turkey).

All of the studies examined both internal and test-retest reliability of the adapted scales. Internal consistency reliability coefficients ranged between 0.78 and 0.86, whereas test-test reliability coefficients ranged between 0.51 and 0.76. Following from this, the factor structure of the adapted scales was investigated (Italy, Brazil, Turkey, Hong Kong, Sudan, Germany and India). Only four of the eight studies (Germany, Sudan, Hong Kong and Italy) investigated gender differences on the adapted scales. Normative data for the adapted scales was developed in five out of the eight studies, specifically in Germany, Sudan, Hong Kong, Turkey and Brazil. All of the studies employed sufficiently large samples, except for India (*see* Table 2.10). Finally, *though many of their methodologies are related to the ITC guidelines*, none of the studies stated that in words.

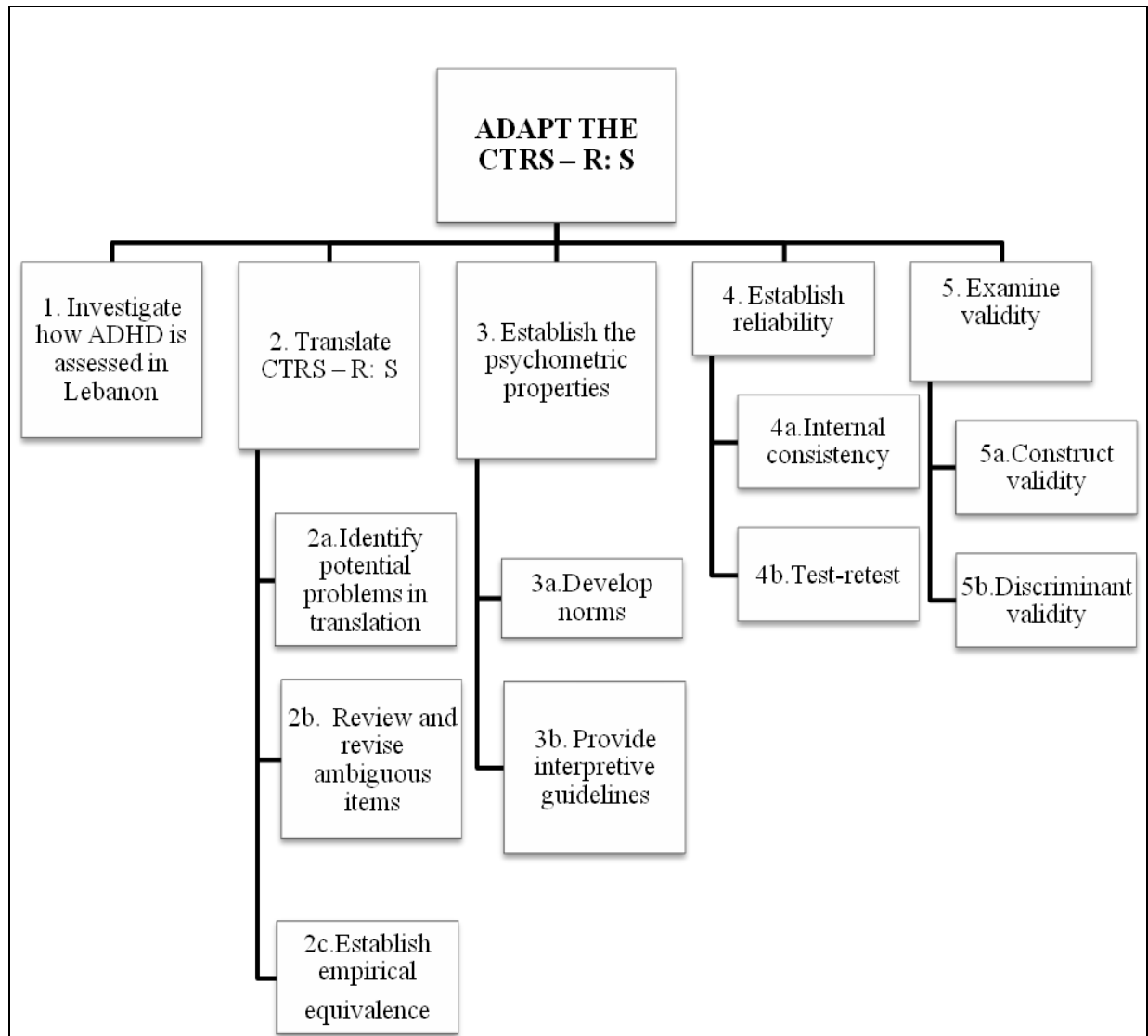
2.24 THE OBJECTIVES OF THE STUDY

As a result of reviewing the literature about ADHD and the Lebanese context, conducting frequent consultations with the advisor and completing the coursework assignments on the EdD program, the sub-objectives and level 1 sub-objectives for the broad aims of the study were identified and clarified. These may be illustrated by indicating what the study aims to achieve (*see* Figure 2.3).

1. To investigate how ADHD is assessed in Lebanon.
2. To translate the CTRS-R: S according to the ITC guidelines.
 - a. Identify potential problems in translation.

- b.** Review and revise ambiguous items following the pilot test
 - c.** Establish empirical equivalence between the original CTRS-R: S and the adapted version.
- 3. To establish the psychometric properties of the adapted Arabic CTRS-R: S, as based on the responses of Lebanese teachers' ratings of 820 Lebanese school students
 - a.** Develop norms for the adapted Arabic CTRS-R: S in the form of percentiles separately for males and females for the four subscales for five different age groups (3–17 years old).
 - b.** Provide interpretive guidelines for practitioners in the form of T scores.
- 4. To establish the reliability of the adapted Arabic CTRS-R: S.
 - a.** Assure the internal consistency of the adapted Arabic CTRS-R: S.
 - b.** Examine the stability (test-retest reliability) of the adapted Arabic CTRS-R: S over a 6–8 week interval.
- 5. To investigate the validity of the adapted Arabic CTRS-R: S.
 - a.** Examine the construct validity by conducting a series of two-way ANOVAs to examine gender and age differences with respect to the ratings on the adapted Arabic CTRS-R: S on the four subscales.
 - b.** Investigate the discriminant validity of the adapted Arabic CTRS-R: S by examining the differences in performances on the adapted CTRS-R: S between two contrasted groups, i.e. ADHD and non-ADHD.

Figure 2.3 Sub objectives and level 1 sub- objectives of the broader research questions in this study



2.25 CHAPTER SUMMARY

This chapter has established the theoretical framework for the study. It commenced with a brief discussion of the etiologies of ADHD. The findings from these diverse studies were then compared to those from the Lebanese settings. The etiological research implies that neurological and genetic factors make a substantial contribution both to symptoms of

ADHD and to the occurrence of the disorder *per se*. The local studies have also suggested evidence for genetic, biological and environmental predispositions.

As part of defining the construct of ADHD, we then examined the primary symptoms of the disorder, associated difficulties and co-morbidities. The clinically useful findings on the primary symptoms of ADHD indicate that those with ADHD are commonly observed as having chronic difficulties with inattention and/or impulsivity-hyperactivity. They are believed to display these characteristics early in life, to a degree that is excessive and inappropriate for their age or developmental level and across a variety of situations that tax their capacity to pay attention, restrain their movement, inhibit their impulses or regulate their own behaviours relative to rules, time and the future. These characteristics have been well documented from research using parent and teacher reports, direct observations and psychological tests.

Following on from this, the prevalence of ADHD and issues surroundings estimates were discussed. Briefly, estimates vary predictably depending on methodology. The National Institute of Mental Health (NIMH) estimates that in the USA between 3% and 5% of preschool and school age children have ADHD, which is approximately two million children. A meta-regression analysis of worldwide studies of ADHD among subjects 18 years and younger revealed a pooled prevalence of 5.29% (Polanczyk *et al.*, 2007). Definitions that require both symptom dimensions (hyperactivity/impulsivity and inattention) are more restrictive than those that require only one of these dimensions. Thus, estimates based on pre-DSM-III definitions or the International Classification of Diseases (ICD) codes of hyperkinetic disorder produce lower estimates. It also seems likely that the lack of appropriate description of adult symptoms may reduce the true prevalence of ADHD in adulthood (Brown *et al.*, 2001). The prevalence of ADHD in Lebanon and neighbouring countries is comparable in range to the figures recorded in various international studies. Finally, a comparison of prevalence in terms of gender showed that ADHD occurs in boys approximately three times as often as in girls in community samples, and five to nine times more often in clinical samples. As for the nature and expression of ADHD across gender, studies suggest that girls and boys with ADHD are quite similar in their presenting symptoms, but that girls may manifest somewhat lower symptom levels and are considerably less likely to manifest aggressive behaviour.

In addition to the primary symptoms associated with ADHD, i.e. inattention, impulsivity and over-activity, children with ADHD can also display a variety of other problems. They have, for example, a higher likelihood of having other cognitive, developmental, academic and even medical or health-related difficulties. Of course, not all children with ADHD will be afflicted by all of these problems, but as a group they display them to a greater degree than is expected in typical children. The full extent of these associated issues ranged beyond the scope of this study, so the discussion here focused on adaptive functioning, academic performance, learning disabilities, and speech and language development.

Alongside the myriad cognitive, academic, developmental and medical risks that exist for children with ADHD, there is also a higher probability of having co-morbid psychiatric disorders. Again, the full breadth of these issues was beyond the scope of this study, so the discussion was limited to anxiety, depression, oppositional defiant disorder, social relationships, tics and substance abuse. For example, it was revealed that around 75% of children diagnosed with ADHD are destined to have at least one of these additional disorders. Anxiety disorders may occur in 10–50% of clinic-referred children, while ADHD may occur in 15–30% of children with anxiety disorders. Although anxiety disorders may be associated with less severe impulsivity, they may also be associated with more severe inattention. Up to 84% of clinic-referred children with ADHD will have ODD.

Taking the evidence altogether, a clear picture emerges of ADHD as a chronic disorder that persists into adulthood in a significant number of patients. Although the full spectrum of symptoms characteristic of ADHD may not be present in adulthood, many adults nonetheless retain sufficient symptoms to experience clinical impairment. There is substantial symptomatic persistence of the disorder. Thus, in young adulthood ADHD symptoms continue to be a source of impairment for about 60% of patients diagnosed in childhood.

Once the construct of ADHD had been delineated, a strong argument was made in favour of a biopsychosocial approach to the disorder. This approach was deemed the optimum one

because it integrates the individual biological and intra-psychic dimensions with the interpersonal and social dimensions. This makes the approach truly holistic and lends itself well to understanding the complexities of ADHD and its concomitant interventions. The biopsychosocial approach thus provides a valuable theoretical framework within which to locate a fully trans-disciplinary approach to ADHD. The importance of this approach is that it emphasizes a contextualized view of ADHD, which suggests that the perceived problem may well be amenable to social and educational accommodations, which in turn go well beyond simplistic disciplinary procedures to embrace psycho-pedagogical interventions.

The discussion on optimum approach to ADHD relates to the broader issue of problems that can arise from different disciplinary cultures and languages. Hughes and Cooper (2007) indicated that ADHD is socially constructed in the sense that the social environment will influence the ways in which ADHD symptoms are manifested. They argue that due to biological inheritance and social circumstances, some children are more prone to being constructed as inattentive and disruptive than others. For example, if a child is prone to attention problems, impulse problems or has difficulty regulating his/her motor activity, there are certain settings, like schools, that are likely to exacerbate these symptoms.

Hence, it was emphasized that the suggested solution to such potential problems is the adoption of a biopsychosocial framework that incorporates and gives equal respect to the contributions of different disciplines. In short, we need to attempt to change our environment to be able to accommodate him/her. Hence, an understanding of the ADHD diagnosis from a biopsychosocial perspective can be used to inform the development of effective educational practices, which will in some circumstances preclude the need for medication to be used (Cooper, 2008).

Understanding ADHD from a biopsychosocial perspective led to the concept of effective educational engagement through the implementation of educational interventions that actually exploit the characteristics of ADHD rather than seek to inhibit them. In a recent meta-analysis of interventions for ADHD, Purdie *et al.* (2002) found that, in comparison to clinical interventions (such as medication, behaviour and cognitive behavioural therapy,

parent training and multi-modal interventions), educational interventions were the most effective methods in producing positive cognitive outcomes.

The evidence supports the contention that educational interventions that use and exploit, rather than inhibit, some of the characteristics associated with ADHD are the most effective. For example, it is far more useful and effective to view ADHD as a cognitive style rather than as a cognitive deficit. Focusing on and promoting these kinds of interventions has a positive effect on teachers' attitudes towards ADHD (Cooper, 1997 a). These approaches were found to be second only to medication in achieving improvements in behaviour, and to be superior to medication in producing improvements in social functioning.

These educational interventions are guided by the following principles.

1. ADHD means the subject has a deficit in terms of information-processing, not a cognitive distortion.
2. Understanding the limitations imposed by ADHD enables teachers to use new theories and insights to inform decision-making about pedagogy.
3. A combination of seatwork and physical activity, scaffolding visual motor tasks, teacher feedback and reinforcement are just some of the ways to improve the child's learning.
4. Self-instruction, self-reinforcement of desired behavior and problem-solving routines are just some of the ways to improve the child's behaviour.

The next point to be considered in this chapter was the assessment of ADHD, which was discussed from an international point of view and then the findings compared to the Lebanese settings. Barkley and Murphy (2006) summarized the useful steps that are necessary in assessment and that are agreed upon by many scholars, including:

1. Administering parental and child interview.

2. Completion of parent rating scales.
3. Administering any psychological test that may be indicated by the nature of the referral (intelligence and achievement testing, etc.).
4. Preparing teacher rating scales to be sent to the child's teachers.

The DSM-IV (-TR) was discussed and its merits and limitations presented. One of its most important merits relates to the fact that the items used to make the diagnosis are selected primarily from factor analyses of items from parent and teacher rating scales in which the items have already shown high inter-correlations with each. Moreover, the items were able to distinguish children with ADHD from other groups of children (Lahey *et al.*, 1994). Despite its merits, there has been very little research undertaken in the area of adulthood ADHD and how the DSM-IV criteria relate to college students in the USA (DuPaul *et al.*, 2001). Moreover, Cooper (2008) and Cooper and Jacobs (2011) have noted that the diagnostic criteria for identifying children with ADHD take for granted fixed roles for students whereby they are, from an early age, expected to conform to a set of rigid rules in a teacher-centered classroom that prioritizes a curriculum-focused method of teaching pupils in age-related groups.

In the case of Lebanon, there are presently no diagnostic criteria for assessment of ADHD and other behavioural disorders. Therefore, in order to find out about the assessment of ADHD in Lebanon, the researcher examined the assessment tools used by the authors of two local studies that investigated the prevalence of ADHD, namely Fayyad *et al.* (2007) and Cordahi *et al.* (2002). This showed the importance of rating scales in the assessment of ADHD, which led to an important discussion of that key subject.

First, it was shown how diagnostic considerations have enjoyed a long association with rating scales. Such scales have been proven to be extremely helpful in documenting the individual profile of ADHD symptoms, as well as assessing the response to treatments. This led to an examination of the essential requirements of rating scales, plus their merits and limitations. Briefly, some of the advantages of rating scales are that they: (1) have the capability of gathering information from participants with many years of experience with

the child across diverse settings and circumstances, (2) are inexpensive to administer and require little time to complete, (3) may have normative data for establishing the statistical deviance of child behaviour ratings and (4) incorporate the opinions of significant people in the child's natural environment who are responsible for the care, management and ultimately the therapeutic treatments the child will receive (Margulies and Floyd, 2004; Sayal, 2008).

In spite of considerable agreement regarding the advantages of rating scales, a number of problems and questions concerning the reliability and validity of these scales have recently been raised. For the most part, they possess some measurement problems that fall into two classes: bias of response and error variance. In addition, they have reliability problems associated with test-retest and inter-rater reliability. Further legitimate concerns relate to gender bias and early childhood and adult ratings.

Following this examination of rating scales in general, we then turned our attention to the specific scale used in this study: the Conners' Teacher rating Scale Revised: Short Form (CTRS-R: S). The rationale behind selecting it over other available and valid rating scales was set out, along with a thorough analysis of the limitations and criticisms of the CTRS-R: S. In brief, the CTRS-R: S shows considerable promise and utility. The extensive norming sample is impressive, as is the integration of DSM-IV criteria for ADHD into subscales. The CTRS-R: S is a very reliable and prestigious scale, but the tester must be aware of its shortcomings, some of which relate to the poor correlation between the CTRS-R: S and direct observational measures, redundancy in some of its subscales and its focus on the negative aspects of the child.

Within the context of this study, the aim of which was to translate and adapt the CTRS-R: S to the Lebanese setting, these shortcomings were addressed and contained by adherence to the ITC guidelines on the adaptation of psychological and education tests for different linguistic and cultural milieus. The researcher ensured that the adaptation project met all of the standards set down by the ITC in order to make the adapted CTRS-R: S as reliable as possible. The design chosen for this study was back-translation, which has proven to be the most popular and effective method in the international studies reviewed. The process and

outcome of the adaptation was discussed, which led in turn to a distillation of the sub-objectives and level one sub-objectives of this study (see Figure 2.3).

In conclusion, this chapter covered a lot of ground, from a review of the literature to an examination of the rating scale as a popular diagnostic tool. It built a detailed picture of the theoretical framework for the study of ADHD, put a strong case for the biopsychosocial perspective and set out a comprehensive critical review of the etiologies, prevalence and diagnosis of ADHD, both internationally and locally. This information contributed to the decision to use a rating scale as the primary tool of assessment and, further, to the choice of this specific rating scale: the CTRS-R: S. Now that we have examined all of this evidence and information we can move on to the next chapter, which will discuss the adaptation of the CTRS-R: S for use in the Lebanese setting.

CHAPTER 3

RESEARCH METHODOLOGY

This chapter establishes a theoretical framework for the methodology used in the study. It addresses the research questions, explains the research design, describes how the data was collected, justifies the selection of the data-collection instruments and explains the procedure followed in analyzing data. Issues relating to the validity, the reliability and the ethical considerations of the research methodology are also discussed. It also revisits how the research objectives were developed and justifies the paradigm chosen, which in this case was the pragmatic approach. Following from that, the mixed method research approach to distilling a workable solution from the data provided by qualitative and quantitative research will be examined. Finally, the links between the sub-objectives, the level one sub-objectives and the methodological processes are illustrated.

Specifically, this chapter will illustrate the three key research methods employed: standardized open-ended interviews, structured interviews and survey. It also discusses the process of translating the CTRS-R: S, including the selection of translators, the design of the translation, the pilot study and the establishment of the empirical equivalence. It examines the methodology for establishing the psychometric properties of the adapted CTRS-R: S, including developing the normative data, providing interpretive guidelines and examining the reliability and validity of the adapted CTRS-R: S. Accordingly, the sample selection and access to the research settings will be presented. In the final section, the chapter closes with the most important prerequisite for this study: ethical considerations.

3.1 KEY RESEARCH QUESTIONS AND THE METHODOLOGIES USED TO DEVELOP THEM

The purpose of this study was to adapt the CTRS-R: S according to the ITC guidelines in order to make it suitable for use with Lebanese nationals. The aim was to shed light on the presentation of ADHD in Lebanon through the findings generated from the application of the adapted CTRS-R: S to a sample of Lebanese students. In order to achieve this goal, five

sub-objectives were developed. These objectives, along with the level one sub-objectives, are set out in Figure 2.3.

The research questions and their sub-objectives emerged through a review of the literature on ADHD, an examination of the specific Lebanese context with regard to ADHD and ongoing dialogue with the thesis supervisor. In addition, the coursework assignments for the fulfillment of the Ed.D (RMO5; RMO7; RMO6, 2002; LTO1; LTO2, 2008), which were all completed successfully, had a significant influence on shaping the research question and its sub-objectives. These assignments acted as pilot elements for this thesis (It is worth mentioning that they were all related to ADHD and two were directly related to the adaptation of CTRS-R: S). The relationship of these assignments to the sub-objectives of this study are outlined in Table 3.1.

Table 3.1 The relationship of the Ed.D assignments to the sub-objectives of the study

Title of Module	Title of Assignment	RXP to sub-objectives /Relevant number of sub-objectives
RMO5 Foundations of Educational Research	Value of adopting focus group interviews in exploring teachers' knowledge, openness, awareness, and contribution in the process of ADHD diagnosis and interventions	1, 2b, 4a
RMO7 Observation and Experiment	A proposal for adapting and validating the CTRS-R: S on a sample of Lebanese children	2 (a,b,c), 3 (a,b,c), 4 (a,b), 5 (a,b)
RMO6 Survey Research	The methodological challenges involved in translating the CTRS-R: S	2 (a,b,c)
LTO1 The Experience of Teaching	ADHD: Characteristics, assessment, and interventions – problems and remedies	1, 5a
LTO2 Understanding and Promoting Learning	Examining the perceptions of students with ADHD through self-reports to enable better provision for their learning needs	1,3

3.2 CHOOSING THE RESEARCH PARADIGM

Once the topic of the study was chosen, the next step in designing the study was to select a paradigm (Creswell, 1994). A paradigm is “a set of basic beliefs that deals with ultimate or first principles. It represents a worldview that defines, for its holder, the nature of the “World”, the individual’s place in it, and the range of possible relationships to that world and its parts” (Guba, and Lincoln, 1994, p.107). This means that basic assumptions, such as ontological, epistemological and methodological assumptions, underpin each paradigm (Cohen *et al.*, 2000).

Two research paradigms dominate the literature: the quantitative paradigm and the qualitative paradigm (Cohen *et al.*, 2000). Quantitative purists maintain that social science inquiry should be objective. They hold that time-free and context-free generalizations (Nagel, 1986) are both desirable and possible, and that the real causes of social scientific outcomes can be determined reliably and validly. According to this school of thought, educational researchers should eliminate their biases, remain emotionally detached and uninvolved with the objects of study and should test or empirically justify their stated hypotheses. These purists have traditionally called for rhetorical neutrality in research and reporting, which involves a formal writing style using the impersonal passive voice and technical terminology, with the major focus being to establish and describe social laws (Tashakkori and Teddlie, 1998).

Qualitative purists (also called constructivists and interpretivists), on the other hand, reject what they call “positivism”. They argue for the superiority of constructivism, idealism, relativism, humanism and, sometimes, postmodernism (Guba and Lincoln, 1989; Lincoln and Guba, 2000; Schwandt, 2000; Smith, 1983, 1984). They also contend that multiple-constructed realities abound, that time-free and context-free generalizations are neither desirable nor possible, that research is value-bound, that it is impossible to differentiate fully causes and effects, that logic flows from specific to general (e.g. explanations are generated inductively from the data) and that knower and known cannot be separated because the subjective knower is the only source of reality (Guba, 1990). Qualitative purists

are also characterized by a dislike of the detached and passive style of writing, preferring instead detailed, rich and thick descriptions, written directly and somewhat informally (Guba and Lincoln, 1989).

The two paradigms, quantitative and qualitative, are based on different ontological and epistemological assumptions. From these two views on reality and knowledge have emerged two distinct methodologies: the quantitative methodology, where survey and experiment are the main methods used, and the qualitative methodology, where ethnography, grounded theory, case study, phenomenological research and narrative research are the main methods (Creswell, 2003). The ontological, epistemological and methodological assumptions of the quantitative and qualitative research paradigms are summarized in Table 3.2.

Table 3.2 Assumptions of the quantitative and qualitative paradigms

Assumptions	Questions	Quantitative paradigm	Qualitative paradigm
Ontological	What is the nature of social reality?	Reality is objective, singular and part of the researcher	Reality is subjective, multiple and socially constructed
Epistemological	What is knowledge?	Knowledge derives from scientific methods	Knowledge is constructed personally from everyday concepts and meanings
	How do we know that what we perceive is real?	By sensory experience	By reasoning
	What is the relationship of the researcher to that researched?	The researcher is independent of the studied object (outside perspective)	The researcher interacts with the studied object (inside perspective)
<i>Methodological</i>	<i>What is the process of research?</i>		
Quantitative research methodology		Qualitative research methodology	
Search the facts or causes of social phenomena		Offers understanding of behaviour from the actor's interpretation	
Controlled measurement		Naturalistic and uncontrolled observation	

Emphasize outcome	Emphasize process
Confirmatory Verification-oriented	Exploratory Discovery-oriented
Hypothetico-deductive	Inductive
Produce quantitative, hard and reliable data	Produce qualitative, real, deep, reach and valid data

(Source: adapted from Blaikie (1993), Bryman and Burgess (1999) and Creswell (1994))

In this study, neither the quantitative nor the qualitative paradigm was adopted. Instead, this study is based on the pragmatic approach. It is necessary, therefore, to explain the pragmatic approach and why it was used in this study.

An important question that is frequently asked is: should paradigms and research methods be linked? (Tashakkori and Teddlie, 1998). Some researchers believe that the epistemology–methods link is unnecessary, and that the methods can be separated from the paradigm from which they emerged (Creswell, 1994, 2003; Patton, 1990). Researchers for whom answering research questions adequately is more important than choosing a research paradigm advocate the pragmatic approach (Creswell, 1994, 2003; Tashakkori and Teddlie, 1998).

Regardless of paradigmatic orientation, all research in the social sciences represents an attempt to provide warranted assertions about human beings (or specific groups of human beings) and the environments in which they live and evolve (Biesta and Burbules, 2003). Therefore, pragmatism can serve as the philosophical basis for conducting mixed methods research where both quantitative and qualitative methods are used in a single research study (Creswell, 1994, 2003; Johnson and Onwuegbuzie, 2004; Patton, 1990; Robson, 2003; Tashakkori and Teddlie, 1998). Instead, at this time mixed methods research should use a method and a philosophy that attempt to fit together the insights provided by qualitative and quantitative research into a workable solution.

Mixed methods research is formally defined here as: *the class of research where the researcher mixes or combines quantitative and qualitative research techniques, methods, approaches, concepts or language into a single study*. Its logic of investigation includes the use of induction (or discovery of patterns), deduction (testing of theories and hypotheses)

and abduction (uncovering and relying on the best of a set of explanations for understanding one's results) (e.g. de Waal, 2001).

In order to mix research in an effective manner, researchers must first consider all of the relevant characteristics of quantitative and qualitative research discussed earlier. Gaining an understanding of the strengths and the weaknesses of quantitative and qualitative research, puts a researcher in a position to mix or combine strategies, and to use what Johnson and Turner (2003) call the "fundamental principle of mixed research". According to this principle, researchers should collect multiple data using different strategies, approaches and methods in such a way that the resulting mixture, or combination, is likely to result in complementary strengths and non-overlapping weaknesses (also see Brewer and Hunter, 1989).

Effective use of this principle is a major source of justification for mixed methods research because the product will be superior to mono-method studies. For example, adding qualitative interviews to experiments as a manipulation check, and perhaps as a way to discuss the issues under investigation and tap into participants' perspectives and meanings, will help to avoid some potential problems with the experimental method. As another example, in a qualitative research study the researcher might want to qualitatively observe and interview, but supplement this with a closed-ended instrument to systematically measure certain factors considered important in the relevant research literature. Both of these examples could be improved (if the research questions can be studied this way) by adding a component that surveys a randomly selected sample from the population of interest to improve generalizability. If findings are corroborated across different approaches, then greater confidence can be held in the singular conclusion; if the findings conflict, then the researcher has greater knowledge and can modify interpretations and conclusions accordingly. In many cases, the goal of mixing is not to search for corroboration, but rather to expand one's understanding (Onwuegbuzie and Leech, 2004).

According to Morgan (1998) and Morse (1991), time ordering of the qualitative and quantitative phases is another important dimension, and the phases can be carried out sequentially or concurrently. Ultimately, the possible number of ways that studies can

involve mixing is very large because of the many potential classification dimensions. It is a key point that mixed methods research truly opens up an exciting and almost unlimited potential for future research. In accordance with the above recommendations, the ordering of both paradigms is best illustrated in Table 3.3, which conceptually presents the links between the sub-objectives, the level one sub-objectives and the data-collection methods and/or procedures undertaken in the study, data-collection instruments and data-analysis procedures.

Table 3.3 Links between the sub-objectives, the level one sub-objectives and the methodological processes

Broad research question					
<i>Adapt the CTRS-R: S to Arabic in order to make it suitable for use with Lebanese nationals.</i>					
<i>Shed light on the presentation of ADHD in Lebanon through the findings generated from the application of the adapted CTRS-R: S to a sample of Lebanese students.</i>					
No.	Sub-Objectives	Level 1 Sub-objectives	Data collection methods/other procedures	Type of data obtained	Data analysis procedures
1.	Investigate how ADHD is assessed in Lebanon		Administer standardized open-ended interviews to two psychiatrists and review available literature	QUA	Note themes and make comparisons; analyze content of documents received
2.	Translate the CTRS-R: S according to the ITC guidelines		Use the backward translation design, select translators and follow ITC guidelines	QUA	Judgmental and logical methods as defined per ITC guidelines
2a.		Identify potential problems in translation	Conduct a pilot study: Teachers (n=15) rate the adapted Arabic CTRS-R: S	QUA	Teachers think aloud while filling out the adapted Arabic CTRS-R: S
2b.		Review and revise ambiguous items following the pilot test	Administer a structured interview (4 items) with the pilot sample participants	QUA	Record a list of problems, comments, suggestions, and then summarize them

2c.		Establish empirical equivalence between both versions	Choose a convenient sample of bilingual participants (n=17) of equal proficiency to take the original and adapted versions of the CTRS-R: S	QUAN	Correlate both scores using a Pearson product moment correlation
3.	Establish the psychometric properties of the adapted CTRS-R: S				
3a.		Develop norms	Survey /Cluster sample/ Administer the Arabic CTRS-R:S to a cluster sample of 820 teachers	QUAN	Run the Statistical Package for Social Sciences (SPSS), Chi Square and convert raw scores to percentile ranks
3b.		Provide interpretive guidelines	Same as above by using the same generated data	QUAN	Convert raw scores to standard scores (expressed as T scores)
4.	Establish the reliability of the adapted CTRS-R: S				
4a.		Investigate the internal consistency	Survey/ Compute reliability alpha coefficients for the total scale & subscales	QUAN	Cronbach's alpha coefficient
4b.		Investigate the stability	Survey /Compute the test-retest reliability coefficient n=20 over a 6–8 week interval	QUAN	Pearson product moment correlation
5.	Investigate the validity of the adapted CTRS-R: S				
5a.		Investigate construct validity	Survey /Investigate whether there are significant effects between ADHD and age as well as	QUAN	Conduct series of two-way ANOVAS (gender x age group)

			gender as reported by the teachers' ratings (n=823) of the adapted CTRS-R: S.		
5b.		Investigate discriminant validity	Randomly choose two contrasted groups (Non-ADHD vs. ADHD, n=30)	QUAN	Run a t-test analysis to compare means of the two groups

As illustrated in Table 3.3, the researcher conducted a qualitative mini –study to inform the quantitative phase. Then, the findings were integrated and mixed at some point in the research, specifically in Chapter 4.

As noted by Sechrest and Sidana (1995), growth in the mixed-method (i.e. pragmatist) movement has the potential to reduce some of the problems associated with singular methods. By utilizing quantitative and qualitative techniques within the same framework, mixed-method research can incorporate the strengths of both methodologies. Most importantly, investigators who conduct mixed-method research are more likely to select methods and approaches with respect to their underlying research questions, rather than with regard to some preconceived biases about which research paradigm should be dominant.

The remaining sections of this chapter justify, illustrate and critically discuss the methodology adopted for investigating each of the sub-objectives and level one sub-objectives.

3.3 RESEARCH METHODS

Three data-collection methods were employed in this study: standardized open-ended interviews; structured interviews; and a survey (*see* Table 3.3).

3.3.1 Standardized open-ended and structured interviews

Two types of interview were used to gather data for this study. In order to investigate how ADHD is assessed in Lebanon, standardized open-ended interviews with two well-known psychiatrists were administered, in addition to reviewing the relevant literature. The main aim underpinning these interviews was to find out more about the employment of ADHD rating scales and information about their adaptation. These interviews enabled the researcher to locate where and how the translated CTRS-R: S might fit into clinical practice in Lebanon. The interviewees' responses confirmed the pre-set research questions of the study. For example, the rating scales used by the two psychiatrists had some internal consistency issues, which confirmed that there is a very real need to adapt a reliable rating scale.

The standardized open-ended interview is extremely structured in terms of the wording of the questions. Participants are asked identical questions, with those questions being worded so that responses are open-ended (McNamara, 2009). This open-endedness allows the participants to contribute as much detailed information as they desire, while also allowing the researcher to ask probing questions as a means of follow-up. Standardized open-ended interviews are the most popular form of interviewing used in research studies because the open-ended questions allow the participants to fully express their viewpoints and experiences. If one were to identify a weakness of open-ended interviewing, it would likely be the difficulty with coding the data (Creswell, 2007). As open-ended interviews in composition (i.e. with written questions and answers) call for participants to give comprehensive responses, with as much detail as desired, it can be quite difficult for researchers to extract similar themes or codes from the interview transcripts as they would with less open-ended responses. Although the responses provided by participants are rich and thick with qualitative data, it can be a cumbersome process for the researcher to sift through the narratives in order to fully and accurately reflect an overall perspective of all interview responses through the coding process (Gall, Gall and Borg, 2003)

Denzin and Lincoln (2007) emphasize the need for researchers to develop an interview schedule that lists the wording and sequencing of questions in order to increase the reliability and credibility of research data. The interview schedule developed for this study took that into account. The schedule is illustrated in Appendix 8, Standardized open ended interview schedule.

The topics covered in the questions were mainly related behaviours (what a person has done or is doing) and knowledge (to get facts about a topic). It is worth noting that in terms of compiling a schedule, gaining access to the psychiatrists was very difficult because of their demanding professional commitments. For example, it took a full three months to be granted a slot with one of the psychiatrists. Moreover, even though appointments were planned and booked in advance, it was often the case that both psychiatrists were unable to meet for a variety of reasons: sometimes their sessions with the patients took longer than expected or they had important patients to attend to. Whenever this occurred, their secretaries would politely request a postponement and the meeting would have to be rescheduled.

During the first meeting with each participant, the researcher provided a copy of the thesis' tentative proposal. At the initial interview, neither participant was open to sharing information about his practice, so most of the answers were short. In order to establish a better rapport for the second interview, the researcher provided copies of her Ed.D assignments and also offered to provide a copy of the completed thesis. This action was helpful in that it encouraged the participants to open up and give more detailed answers.

In order to achieve level one sub-objective 2b — reviewing and revising ambiguous items following the pilot test — structured interviews were administered to the volunteered pilot test sample (n=15). A pilot test is a small experiment designed to test logistics, to gather information prior to a larger study and to reveal deficiencies in the design of a proposed experiment or procedure so that these errors can be addressed and rectified before time and

resources are expended on large-scale studies (Zikmund, 2003). The main purpose of these interviews was to investigate the clarity of the translated items appearing on the adapted CTRS-R: S. Though the methodology for achieving this objective should follow the methodology for translating the CTRS-R: S, it is best to discuss it in this section, as part of the interview method for gathering qualitative data.

The aim of the structured interview is to ensure that each interviewee is presented with exactly the same questions and in the same order (Johnson and Christensen, 2004). Denzin and Lincoln (2007) noted that structured interviews help researchers maintain a focus on a given issue, provide detailed information on the issue and provide structural relationships between concepts. As the researcher aimed to gather specific information about the plainness of the translation and had to do this with *fifteen* participants, structured interviews were best suited for this purpose.

Accordingly, the volunteer teachers who participated in the small pilot study were interviewed. The interview schedule is illustrated in Appendix 4, structured interview agenda. Each interview lasted from 30 to 40 minutes. The researcher recorded a list of the problem items, alongside the comments given and the participants' suggestions for improved wording (*see* sample of a participants' responses, Appendix 5). This information was summarized and then discussed with the team of translators (*see* Appendix 6, summary of participant's responses by item). Additional revisions were introduced after negotiations and with the approval of the translation team. Feedback from respondents enabled the researcher to gain an insight into ambiguous items.

Despite the advantages of standardized open-ended interviews and structured interviews, there are nonetheless many errors associated with their use, such as bias. Janesick (2000) suggests that bias in qualitative research is inevitable because the researcher is the primary instrument of the research, so the data he/she gathers will be biased regardless of the research method employed. Similarly, Bell (1993) and Tuckman (1988) pointed out that interviews are highly subjective, so there is always the danger of bias because the interviewer's manner may have an effect on the respondents. Keats (2000) mentions that

the response of an interviewee may be influenced by the emotional impact or the perceived purpose of an interviewer.

The danger here then is that the researcher's values and knowledge about assessment of ADHD could unwittingly affect the interview and the participants, with the participants perhaps not realizing the extent to which the researcher is dominating or controlling their opinions (Walker, 1993).

Marshall and Rossman (2006) noted that the qualitative research paradigm believes that the researcher is an important part of the process and cannot separate him/herself from the topic/people under study, and that it is in the interaction between the researcher and the researched that knowledge is created. So, the researcher's bias enters into the picture even if the researcher tries to stay out of it. The point that has to be made here is that the researcher should take great care to record detailed notes and to ensure that the research reveals more about the subjects than about him/her.

To remedy the potential errors in this study, the researcher was attentive to the situation during interviews and attempted to produce a valid and reliable transcript and findings. The researcher abided by an interview agenda. Moreover, the researcher asked for written documents to verify what the psychiatrists were saying (e.g. copies of rating scales used by the interviewees). When interviewing the participants involved in the pilot study, the researcher summarized their comments (see summary of participants' responses, Appendix 6), attempted to be objective at all times and made a conscious effort not to influence the participants' statements.

The final constituent in the interview design process is that of interpreting the data gathered during the interview process. During this final phase the researcher must make "sense" out of what was just uncovered and compile the data into sections or groups of information, also known as themes or codes (Creswell, 2003, 2007). These themes or codes are consistent phrases, expressions or ideas that were common among the research participants (Kvale, 2007). How the researcher formulates themes or codes can vary. Many researchers suggest the need to employ a third party consultant who can review codes or themes in order to determine their quality and effectiveness based on an independent evaluation of the

interview transcripts (Creswell, 2007). This helps to alleviate researcher bias and eliminates the possibility of over-analyzing data. . In this study an eclectic approach was taken to analyzing the narratives, including formulating themes and codes and the employment of a third party to examine the data.

3.3.2 Methodology of translating the CTRS-R: S

This section addresses the methodologies employed in investigating sub-objective (2): translation of the CTRS-R: S into Arabic.

According to the ITC guidelines, and as discussed in section 2.22, an important step in test adaptation is the selection of more than one competent translator. Hambleton *et al.* (2005) recommended the use of translators dominant in the target language, so that translations are natural and effective. They added that studies of bilingualism have demonstrated that it is easier to recognize a word in a source language and to effectively remember the corresponding meaning in the target language than vice versa. Accordingly, the translation team working on the translation of the CTRS-R: S involved seven members who were native speakers of the target language, knowledgeable of the source language, the construct and the culture (More information regarding the qualities of the translators is included in Appendix 3, Competency and Qualifications of the Translators) .

The CTRS-R: S was translated into Arabic using the backward translation design that was explained and discussed in section 2.22. This design has been used by many researchers involved in adapting the teacher, the parent or the self-report forms of the Conners' Rating Scales to other languages (Pal *et al.*, 1999; Kolakowski *et al.*, 1997; Al Awad and Sonuga-Barke, 2002; Luk *et al.*, 1988; Dereboy *et al.*, 2007).

The seven members of the translation team were divided into task groups, as follows.

1. One pair of translators was involved in translating the CTRS-R: S to Arabic (target language).

2. Another pair of translators was involved in back-translating the tentative Arabic version of the CTRS-R: S to English (source language).
3. Two coordinators and were responsible for judging the equivalence of the two versions produced and resolving translation-related difficulties.
4. One translator acted as a mediator and dealt with the problematic sections, mainly when there were multiple or fundamental disagreements between translators.

Throughout the translation process the coordinators and the researcher, or the researcher alone when the coordinators were absent, recorded the attitudes of the translators, the difficulties encountered and the rationale for the solutions reached in writing. These notes, along with other challenges encountered during the process of translation, will be presented, analyzed and discussed in Chapter 4.

The process of translation may be summarized as follows.

1. Two translators independently translated the items from the original to the target language (Arabic).
2. A reconciliation meeting followed the completion of the initial translations to discuss inconsistencies. The coordinators compared the translations, following the ITC guidelines. Care was taken to choose situations, vocabulary and expressions that adapted easily across language groups and cultures. When there were differences, the coordinators resolved them through discussions with the translators, sometimes substituting a few words to capitulate a temporary forward translation. In the case of multiple or fundamental disagreements, the third translator was invited to mediate and deal with the problematic sections. Following from this, a temporary translated version of the CTRS-R: S was produced.
3. Once a final translation into the target language was agreed upon, the second pair of translators back-translated that version into the source language (English). Quality control discussions were conducted among the translators, the coordinators, the third translator and the researcher. Revisions were made accordingly. Judgments were made about the

equivalence of the original CTRS-R: S and the back-translated version, and in some cases inconsistencies were corrected. Then the coordinators compared both versions (original CTRS-R: S and the back-translated one) one more time. Where agreement could not be reached, the back-translation process was repeated until the back-translated version of the CTRS-R: S was sufficiently similar to the original scale. Finally, a temporary version was then assumed ready to proceed to pilot testing.

3.3.3 Conducting a pilot-testing

In order to investigate level one sub-objective 2a — identifying potential problems in translation — a small pilot test was carried out.

Among the ITC guidelines is the recommendation that adapted tests should be pilot-tested before being field-tested on a larger sample. The aim of the small-scale pilot test is to identify and solve any potential problems in translation (e.g. wording that is confusing or difficult to understand), bearing in mind not to change the meaning but to express it clearly. Ultimately, the pilot study assesses the plainness of the translation and tests any translation alternatives that have not been resolved by the translators. This practice has been used by many researchers in the field of test adaptation studies (see, for example, Hambleton and Kanjee, 1995; Hambleton, 2001; van de Vijver and Poortinga, 2002; Sireci *et al.*, 2006; van de Vijver and Leung, 1997; Stansfield, 2003). Pilot tests have also been common in studies that adapted the CTRS-R: S and other similar tools to other languages (Pal *et al.*, 1999; Kolakowski *et al.*, 1997; Al Awad and Sonuga-Barke, 2002; Luk *et al.*, 1988; Dereboy *et al.*, 2007).

Van de Vijver and Poortinga (2002) recommended that pilot samples range from 14 to 25 participants, who are adequately representative of those for whom the intended scale was designed in terms of their socio-demographic characteristics (gender, age, education, language, etc.). Consequently, the adapted CTRS-R: S was piloted on a volunteered convenient sample of primary and secondary teachers (n=15), who were asked to complete

the adapted CTRS-R: S and, when possible, to “think aloud” to the researcher about the meaning of each item. Following the thinking aloud strategies, structured interviews (four questions) were administered to uncover any ambiguity in the translated version (*see* section 3.3.1 and Appendix 4).

The above processes resulted in the production of an adapted version of the CTRS-R: S that was ready to be pilot-tested on a larger sample (*see* Appendix 7, The Adapted CTRS-R: S).

3.3.4 Establishing empirical equivalence

In order to investigate level one sub-objective 2c — establishing empirical equivalence between the original CTRS- R: S and the adapted one — the pilot sample (teachers, n=15), who were bilingual participants of equal proficiency, rated the original and the adapted Arabic CTRS-R: S. Their scores were then correlated using Pearson product moment correlation.

3.3.5 Methodology for establishing the psychometric properties of the adapted CTRS-R: S

In order to investigate sub-objectives (3), (4), (5) and level one sub-objectives 3a, 3b, 4a, 4b, and 5a — which address developing the psychometric properties of the adapted CTRS-R: S, developing normative data, providing interpretive guidelines and examining the reliability and validity of the adapted CTRS-R: S — a survey approach was used. What follows is a critical discussion of the survey approach, including its merits and limitations and how these were addressed by the researcher. Then, it illustrates the selection of the sample for the survey followed by exhibiting the processes engaged in developing the normative data, reliability and validity for the adapted CTRS-R: S.

3.3.6 Survey

The Survey is essentially a research technique in which information is gathered from a sample of people using a questionnaire as the standard method of data collection. This is

based on communication with a representative number of individuals from a specific or random group using a combination of open and closed questions (Zikmund, 2003). Accordingly, the questionnaire used in this study is the adapted CTRS-R: S with the sample representing the teachers as (n=823).

A survey was judged to be the most appropriate research method for investigating the aforementioned objectives because it enabled the researcher to collect primary data, i.e. data gathered and assembled specifically for the research project at hand easily. Surveys provide quick, inexpensive, efficient and accurate means of assessing information about the target population.

Accordingly, using the tool of the survey seemed to be the most feasible and practical method to collect a large volume of primary data. The fact that the data collected required validating, verifying and recording before analysis, was a necessary prerequisite and accounted even more for the use of a Software package, such as the Statistical Package for Social Sciences, which lends itself to quantitative analysis. Moreover, reliability and validity concerns lie at the heart of establishing the psychometric properties of the adapted CTRS-R: S as with any authentication process. This can be achieved to a greater extent by the collection of data based on appropriate theories and hypotheses, followed by the application of suitable descriptive extrapolation and inferential statistical methods. Given the large number in the sample, (n=823), this approach proved the most useful and efficient to describe the characteristics of a large population. No other method of data collection offers this same overall general capability (Zikmund, 2003). Consequently, very large samples are negotiable, making the results statistically significant, even when analyzing multiple independent and extraneous variables. Therefore, a high level of reliability is easy to obtain by presenting all the subjects with a standardized stimulus (Creswell, 2003), namely in this case, the adapted CTRS-R: S. Closely related to ensuring reliability, is this degree of standardization that must be strictly adhered to. Since standardization is a prerequisite for making measurement more precise by enforcing uniform definitions upon participants, it therefore ensures that similar data can be collected from groups, then interpreted comparatively in an inter-group study (Zikmund, 2003). In conclusion, reliability and validity concerns, when addressed within parameters of a large representative sample (n=823), can be adequately met through this use of surveys.

Despite their advantages, a number of errors are associated with their usage. Some of the most important errors are respondent error and unconscious misrepresentation (Zikmund, 2003). What follows is a brief discussion of these errors and how these were remedied by the researcher.

1. ***Respondent error*** refers to the tendency of the respondents to give truthful answers. If respondents cooperate and give truthful answers, a survey will likely accomplish its goal. If these conditions are not met, the respondents may fail to respond or pose error (Morisson, 2002). If no response errors were unavoidable for certain items, the score was adjusted by using the formula indicated in the CTRS-R: S manual (*see* section 3.3.6.3). Zikmund (2003) noted that no response errors are most acute in mail and internet surveys. This study did not use any of the aforementioned methods. Instead, the researcher met with the teachers, instructed them on filling out the adapted CTRS-R: S and then returned a week later to collect the rating scales. None of the teachers refused to cooperate, but some did take more time to complete the rating scales than others. However, such an action cannot seriously bias survey data.
2. ***Response bias*** is another error that is associated with the respondent. Zikmund (2003) indicated that response bias will most likely occur when respondents tend to answer in a certain direction, that is when they consciously or unconsciously misrepresent the truth out of fear of jeopardizing their positions. Hence, they deliberately falsify their responses (Cohen, 2000). In this study, teachers were not reluctant to admit their true perceptions due to political reasons or to safeguard their jobs because it was made clear to all of them that their ratings would only be used to establish the psychometric and normative properties of the adapted CTRS-R: S, rather than to diagnose any of their students. In other words, they were aware that their ratings would not result in any negative outcome for their supervisors nor place them in a less desirable situation.

3. ***Unconscious misrepresentation*** is another potential source of error. It occurs when a respondent gives an inaccurate response or a biased answer because of the ambiguity associated with the question format, or content, or some other stimulus (Zikmund, 2003). Unconscious misrepresentation was reduced to the minimum in this study due to the rigor achieved during the accurate and meticulous translation process. For example, the instructions on the adapted CTRS-R: S were made clear. Ambiguous items were reduced further by the pilot study and by the administration of the structured interviews with the pilot test sample. Finally, the researcher ensured that the teachers understood precisely what was expected from them and instructed them on how to complete the adapted CTRS-R: S.

Further to discussing the survey approach, it is reasonable to describe the normative sample, administration and scoring procedures which were all part of conducting the survey. Then it will be demonstrated how access to the research setting was performed while retaining rigor. Finally the methodologies involved in developing the normative data, as well as the reliability and validity of the adapted CTRS-R: S, will be discussed.

3.3.6.1 Sample

In response to the ITC guidelines, the samples used for test validation and norming must be of adequate size and must be sufficiently representative to substantiate validity statements, establish appropriate norms and support conclusions regarding the use of the instrument for the intended purpose. Other studies that adapted the CTRS-R: S or other similar tools (for a review see Kolakowski *et al.*, 1997; Al Awad and Sonuga-Barke, 2002; Luk *et al.*, 1988; Dereboy *et al.*, 2007; O’Leary *et al.*, 1985; Brito, 1987) employed large representative samples for their standardization and validation of the adapted instruments (*see* Table 2.10). The sample size involved in these studies ranged from 300 to 1,068. Moreover, Hambleton *et al.* (2005) recommended that the individuals in the norming and validation samples should also be representative of the group for which the test is intended in terms of age, experience and background.

Accordingly, the researcher identified and prepared a sampling reference of all mixed schools that have enrolment in all grade levels (nursery till secondary), based on the list provided by the Ministry of Education (2005). Cluster sampling would be the most feasible and convenient method for the present study, particularly given that public schools did not meet the criterion of having enrolment in all grade levels and therefore were excluded. Cluster sampling would also be less time-consuming and less costly. Cluster sampling is a sampling technique whereby the entire population is divided into groups, or clusters, and a random sample of these clusters is selected. This sampling technique is used when “natural” groupings are evident in a statistical population. The total population is divided into these groups (or clusters) and a sample of the groups is selected. Then the required information is collected from the elements within each selected group. This may be done for every element in these groups or a sub-sample of elements may be selected within each of these groups (Burton *et al.*, 2005).

In view of the above, the researcher used the available sampling reference to identify all of the private schools in Greater Beirut, based on the list provided by the Ministry of Education (2005). The results of this sampling revealed that 108 schools, with an enrolment of 83,000 students, met the criterion. The researcher used the compiled list to randomly select 10% of the selected schools, based on the Zikmund’s (2003) recommendation that selecting 10% of the total population should enable the researcher to draw meaningful conclusions and then to generalize results. Accordingly, eleven mixed schools were selected that included all grade levels (nursery through secondary).

Similarly, 10% of the total number of students (83,000) revealed in the sampling reference was selected. The standardization sample included 823 students enrolled in mixed private schools from the Greater Beirut area. The researcher randomly selected from each grade level a representative and equal number. Subject-sampling procedures were applied in an equal manner across the eleven schools and 75 students were selected from each school. A list of names in each grade level (15 different grade levels) was obtained from each school, and then five students were selected randomly from each grade. The 75 subjects were categorized according to five age level groups: 3–5 years; 6–8 years; 9–11 years; 12–14 years; and 15–1 years). Table 3.4 summarizes the breakdown of sample by age and gender.

Table 3.4 Frequencies (f) and Percentages (%) of Different Age Groups by Gender

Age	Gender				Total	
	<u>Male</u>		<u>Female</u>			
	<u>F</u>	<u>%</u>	<u>F</u>	<u>%</u>	<u>F</u>	<u>%</u>
3-5 years	91	19.1%	80	23.1%	171	20.8%
6-8 years	95	20.0%	67	19.3%	162	19.7%
9-11 years	101	21.2%	73	21.0%	174	21.1%
12-14 years	104	21.8%	52	15.0%	156	19.0%
15-17 years	85	17.9%	75	21.6%	160	19.4%
Total	476	100%	347	100%	823	100%

3.3.6.2 Access to the research setting: What procedures were undertaken by the researcher to collect the data for the survey?

Access to the research setting was guided by two steps.

Step 1: Contacting schools

First, the schools selected for the standardization were contacted. Then, letters were sent requesting cooperation and providing a brief description of the purpose of the study. (A copy of the letter is provided in Appendix 9) .The researcher visited the selected schools and met with the principals or directors. Another meeting was scheduled with the teachers to inform them of the purpose of the study, methods and intended possible uses of the research. The researcher then asked for their cooperation to participate in the study and instructed them on how to fill in the adapted CTRS-R: S. Finally, confidentiality and anonymity issues were discussed.

Step 2: Administering the adapted CTRS-R: S

A matter of central importance to the test administration is the presence of any validity-threatening factors. Hence, standardized procedures under which the test is to be validated

and normed must be ensured as much as possible (Allalouf, 2003). Hambleton *et al.* (2005) noted that researchers need to anticipate and avoid problems associated with test administration procedures. For that reason, the researcher tried to anticipate the types of problems that could be expected and took appropriate action to remedy these. To some extent, problems associated with test administration procedures were dealt with during the test translation processes. For example, the translation process was sensitive to a number of factors related to the stimulus materials, response materials and response modes.

In accordance with the ITC guidelines and the recommendations set by Hambleton *et al.* (2005) the researcher, who was drawn from the culture and possessed measurement expertise, ensured consistent test administration procedures so as to establish valid inferences, remained unobtrusive and gave explicit directions to the teachers, as described in the CTRS-R: S manual (Conners, 1997). However, teachers were encouraged to comment on the students' behaviour and actions over the past month and to preferably complete the scale in one sitting.

The researcher's next step was to ensure that the subjects should be rated by teachers who are familiar with the child/adolescent. Usually, after elementary school, students will have several teachers (often for each subject of study). Hence, the teacher who was most familiar with the child should be the primary respondent (Conners, 1997).

3.3.6.3 Scoring procedures

The scoring of the scale is according to a four-point Likert scale, ranging from 0 as never and 3 as always, with 2 and 1 indicating often and little, respectively. If blank items were unavoidable, the score was adjusted by using the formula indicated in the manual to avoid underestimation of raw scores and T-scores (Conners, 1997). To compensate for zeros, the obtained raw score was multiplied by the total number of items on the scale, and then divided by the total number of items that had responses. For example, suppose a respondent obtained a raw score of 8, but answered only 4 of 5 items on a particular subscale. The score may be adjusted by multiplying the obtained raw score (8) by the number of items (5)

on the full subscale ($8 \times 5 = 40$). The obtained result should then be divided by the number of items that had responses (4) to get the adjusted raw score ($40 \div 4$) of 10 (Conners, 1997).

3.3.7 Development of norms and interpretive guidelines for the adapted CTRS-R

In order to investigate level one sub-objective 3a — developing the normative data for the adapted CTRS-R — raw scores were converted to percentile ranks to provide norms (in the form of percentiles) for the five age groups separately for females and males for the 4 subscales namely: (1) Oppositional (5 items); (2) Cognitive problems (5 items); (3) Hyperactivity (7 items); (4) ADHD Index (12 items).

In order to investigate level one sub-objective 3b — providing interpretive guidelines for practitioners — T-scores were also calculated from raw scores, such that each scale will have the same mean: $X=50$ and $SD=10$. This will enhance comparing each obtained score to the same reference value. Accordingly, interpretive guidelines for practitioners were calculated in the form of T-scores to allow comparison of subscales scores and to identify areas of strength and concern.

3.3.8 Examining the reliability adapted CTRS-R

Robson (2003) indicated that reliability is a necessary but insufficient condition for validity. Although valid procedures are always reliable, reliable procedures are not necessarily always valid. In terms of reliability, the researcher needs to guarantee that the test is sufficiently reliable to permit stable estimates of individual ability. The researcher should ensure that the reliability coefficients are sufficiently high to warrant the use of the test as a basis for making decisions concerning individual students. Moreover, a clinically useful scale should have acceptable levels of reliability both over time and among raters (O'Neil *et al.*, 2004).

Internal reliability or consistency refers to the degree to which all items on a test consistently measure the same construct (Robson, 2003). Since the internal consistency of any test is a function of both the quality of the test's items and the reliability of the respondent, it should be measured with the Cronbach's alpha coefficient, which is an overall summary coefficient. Total reliability alpha coefficients should usually range between 0.7 and 0.8 or 0.9 (Gray, 1992; O'Neil *et al.*, 2004).

In a similar vein, fundamental to the evaluation of any instrument is the degree to which test scores are free from various sources of measurement error and are consistent from one occasion to another. Sources of measurement errors, which include fatigue, nervousness, content sampling, answering mistakes, misinterpretation of instructions and guessing, will always contribute to an individual's score and make the reliability of the test lower. Ratings taken by an individual at one point in time should correlate significantly with those taken by the same individual on the same scale at some point in the relatively immediate future. This is known as test-retest reliability (O'Neil *et al.*, 2004). According to O'Neil *et al.* (2004), test-retest reliability coefficients should range between 0.7 and 0.9.

Given the above, investigating level one sub-objective 4a — assuring the internal consistency and stability of the adapted CTRS-R — was performed by computing an alpha coefficient for each of the four subscales and for the total scale. Similarly, investigating level one sub-objective 4b — examining the stability of adapted CTRS-R — was achieved by computing the test-retest reliability coefficient (Pearson product moment correlation) for a sample of 20 children over 6–8 weeks.

3.3.9 Examining the validity of the adapted CTRS-R

If conceived that no major challenges were encountered during the process of test translation, then we would be able to state that content validity is somehow established. This would be based on the assumption that content validity was already established in the original CTRS-R: S (Conners, 1997). Furthermore, no substantial changes were made during the process of test translation and other confusing challenging issues were resolved

by the team of translators, according to the ITC guidelines. In view of that, it was decided to examine evidence only for construct validity and discriminant validity.

The construct measured in this study, ADHD, has been defined and it was evident that, to a certain extent and based on the studies reviewed, it exists in a similar fashion in the target culture, Lebanon, in terms of prevalence, co-morbidities and differences in its nature and manifestations across age and gender (*see* sections 2.11 and 2.9). Consequently, further evidence in support of construct validity should be established by investigating whether there are significant effects between or namely whether ADHD differs across age and gender, based on the teachers' ratings (n=823) of the adapted CTRS-R: S.

Given the above, examining level one sub-objective 4a — establishing the construct validity of the adapted CTRS-R: S — a series of two-way ANOVAs (gender by age) was performed. Two-way ANOVAs should gauge the impact of two factors (ADHD and age; ADHD and gender) and provide information on the interaction between these two factors. This statistical design is economical and provides more information from the same amount of work or data entered. For this reason, ANOVAs are useful in comparing two, three or more means, thus allowing us to look at interactions between many factors (Zikmund, 2003).

In addition to the necessity of establishing construct validity, Barkley emphasized that before any rating scale is considered or reviewed for use with ADHD cases, it must be able to show that it can discriminate ADHD groups from normal and non-ADHD clinical samples (Barkley, 1990, 2006). Specifically, it should be able to demonstrate clinical utility. For this reason, the researcher needs to evaluate the scale's ability in providing scores to differentiate between an ADHD group from a control group without a diagnosed attention or conduct problem.

Accordingly, level one sub-objective 5b — investigating the discriminant validity of the adapted Arabic CTRS-R: S — was performed by examining the differences in performances on the adapted CTRS-R: S between two contrasted groups: ADHD and non-ADHD. To achieve this operationally, the researcher randomly selected two contrasted

groups. The first group consisted of a clinical sample of 15 children (11 males and 4 females) referred because of reported problems with inattention, hyperactivity and/or impulsivity by one of the psychiatrists that the researcher interviewed. A second (non-ADHD) group consisted of 15 children who were selected randomly from one of the schools selected for the survey. The non-ADHD group was similar to the ADHD sample on the basis of age and gender. A t-test analysis was used to compare the means of the two contrasted groups.

To sum up, the methodologies for investigating the sub-objectives and level one sub-objectives of the study were illustrated and justified. What follows is the most important prerequisite of this study, dealing with ethical concerns.

3.4 ETHICAL ISSUES

Ethical issues may be problematic in some research designs and can obstruct the performance of the study (Cohen *et al.*, 2000). Before conducting the study, the researcher prepared a proposal in which the objectives, research questions and research design were illustrated and then sought approval of this proposal from the Doctor of Education program board at the University of Leicester. The researcher was aware of potential ethical issues that could appear at every stage of the research process.

A number of general ethical issues were associated with interviews, the first data-collection tool in this study. Interviews are considered penetrating devices, which require significant protection for the participant (Walker, 1993). To abide by appropriate research and ethical practices (Mason, 2002), the participants gave informed written consent (*see* Appendix 10).

With respect to the survey, the second collection tool in this study, Sturman (1999) indicated that the negotiation between the researcher and the researched may take the form of an official contract or may involve discussions concerning the content of written reports. Mason (2002) also notes that some ethical issues, such as informed consent, anonymity and confidentiality, can be anticipated in advance; however, some issues, such as interpretation of results, require the researchers to make intellectual and practical decisions on the spot. It

is important to be prepared for the range of possible ethical issues that might arise and to consider possible responses to participants.

Accordingly, the researcher attended to the principle of voluntary participation (Gray, 1992), which requires that participants should not be coerced into participating in research. Harm to research participants was avoided. Participants were fully informed about the purpose and the intended possible uses of the research, and about what their participation in the research would entail.

In case of the school-teachers who completed the adapted CTRS-R: S, the researcher obtained the consent from the school directors. In order to protect the privacy of research participants, namely the psychiatrists, the teachers and the students, confidentiality was guaranteed. They were ensured that identifying information would not be made available to anyone not directly involved in the study. The researcher was careful to remove any detail that would show the identity of the psychiatrists when using the documents provided by them. Finally, a stricter standard recommended by Mason (2002) and Denscombe (2002) was also applied, which is anonymity, essentially meaning that the participants remain anonymous.

3.5 CHAPTER SUMMARY

The purpose of this study is to adapt the CTRS-R: S so that it can serve as a valid assessment tool for use with Lebanese nationals. It also aims to shed light on the presentation of ADHD in the Lebanese context by studying the findings generated from the application of the adapted scale on a sample of Lebanese students. These two broad aims were translated into five operational, observable objectives, which are illustrated in Figure 2.3.

Once the topic of the study was chosen, the next step in designing the content was to select a paradigm (Creswell, 1994). It was essential to the study to discuss the two dominating

paradigms. Briefly, advocates of quantitative methods argue that only by using statistical measures can the social sciences become truly scientific (Zikmund, 2003). Advocates of qualitative methods argue that quantitative methods tend to obscure the reality of the social phenomena under study because they underestimate or neglect the non-measurable factors, which may be the most important. The modern tendency (and, in reality, the majority tendency throughout the history of social science) is to use mixed-methods research. The latter is formally defined here as the class of research where the researcher mixes or combines quantitative and qualitative research techniques, methods, approaches, concepts or languages into a single study.

The aim and guiding principle is that research approaches should be mixed in ways that offer the best opportunities for answering important research questions. Most importantly, it helps in deciding which action to take next when one is attempting to understand real-world phenomena, including psychological, social and educational phenomena. The methodological processes employed by this study were discussed and justified *per* objective and in a chronological technique (see Table 3.3). According to the technique of mixed methods research, qualitative methods, in the form of interviews, were used to investigate how ADHD is assessed in Lebanon, while quantitative methods, in the form of a survey, were used to establish the psychometric properties of the adapted CTRS-R: S, including normative data, reliability and validity.

The translation team translated the CTRS-R: S using one of the most popular designs: the backward translation design. Seven translators were selected whose credentials met the ITC recommendations. Potential problems in translation and revisions were employed through conducting a small-scale pilot study and administering structured interviews.

The normative data for the CTRS-R: S was based on a large, random cluster sample of 823 teachers, who rated their students using the adapted CTRS-R: S. The researcher followed a convenient and standardized procedure to access the research setting. Hence, statistical studies included reporting norms for a representative sample in the form of percentile ranks for five age groups (separated by gender). Following from this, standard scores (expressed as T-scores) were reported, with interpretive guidelines for practitioners.

In accordance with the sound principles of evaluation, test scores should be free from various sources of measurement error and should be consistent from one occasion to another. In view of that, internal consistency of the scale was examined for each of the four sub-scales and for the total scale by computing an alpha coefficient for each of the four subscales and for the total scale. Similarly, stability over time was determined by computing the test-retest reliability coefficient for a sample of 20 children over 6–8 weeks.

Evidence for construct validity was also demonstrated by conducting a series of two-way ANOVAS (gender by age group). Two-way ANOVAs should gauge the impact of two factors (ADHD and age; ADHD and gender) and provide information on the interaction between these two factors. The discriminant validity or clinical utility of the adapted CTRS-R: S was evaluated by using t-test analysis to compare the performances of ADHD and non-ADHD students. Finally, the general ethical issues that were associated with interviews and a survey were discussed, including the principle of voluntary participation, confidentiality and anonymity.

Taken altogether, the information contained in this chapter is the cornerstone of the entire study. It is upon the methodology that the validity of this study rests, which is why great care was taken to design the most thorough and most reliable rating scale adaptation possible. The discussion of the translation process is extremely interesting and highlights many important issues that future studies must take note of and build from. The researcher and the translation team were aware of the pioneering nature of this study, being the first of its kind in Lebanon. They researcher was also careful to design and set out as detailed a methodology as possible in order to be able to present the results confidently and in doing so make a genuine and important contribution to knowledge on ADHD in Lebanon.

CHAPTER 4

FINDINGS AND DISCUSSION

This chapter aims to present and discuss the obtained results in relation to existing international studies, to other local studies and to similar studies that adapted the same or similar rating scales. The mode of analysis is also illustrated by objective or by a cluster of interrelated objectives. Similarities and differences are noted and discussed, with a view to identifying if there is anything distinctive about the Lebanese experience of ADHD. Finally, the implications of these results are discussed and their application to practice.

The study's findings can be classified into four themes: 1. assessment of ADHD in Lebanon; 2. the translation process; 3. the psychometric properties of the adapted CTRS-R: S; 4. the reliability and validity of the adapted CTRS-R: S.

4.1 RESULTS AND DISCUSSION OF SUB-OBJECTIVE 1

Sub-objective 1: Investigate how ADHD is assessed in Lebanon.

To answer sub-objective 1, qualitative data were collected and analyzed by administering two standardized, open-ended interviews with two well-known psychiatrists. A literature review was also conducted and two studies addressing the above objective were located, one by Fayyad *et al.* (2007) and the other by Cordahi *et al.* (2002). The underlying premise for administering these interviews and reviewing the local studies was to investigate the role of rating scales with respect to the diagnosis of ADHD, in order to find out whether adapted or imported rating scales were employed and to gain some details as to how rating scales were adapted to the Lebanese settings.

First, the analysis of the narratives from the standardized, open-ended interviews generated six themes that may be summarized as the following:

1. **ADHD Cases:** both psychiatrists revealed that ADHD was the most common disorder they encountered in their practice. They commonly saw four to five ADHD patients per day. The ratio of occurrence is greater in males; specifically, males tend to be more disruptive than females.
2. **Referral:** most of the patients came in with their parents, while others were referred by schools or by psychologists who couldn't prescribe medications.
3. **Adaptation Details:** one psychiatrist administers an imported teacher rating scale (TRS), whereas the other sends to the child's school an Arabic (Figure 4.1) and an English TRS (Figure 4.2). The Arabic TRS has not been adapted, but was simply translated into Arabic. They both stated that no statistical studies were available for their TRS. They usually send the TRS about three to four weeks after the start of the academic year. Figure 4.3 shows the TRS that is used by the second psychiatrist. No further information about scoring the TRS administered by both psychiatrists was provided.
4. **Diagnosis and follow-up:** briefly, both psychiatrists follow similar procedures in diagnosing ADHD, but the instruments used are different. Both psychiatrists administer interviews with the parents and then with the child and his/her parents together. No interviews were conducted with the child's teachers. As a matter of fact, both psychiatrists admitted that access to the teachers was very difficult due to their busy schedules. As a result, contact with teachers was achieved only through completing either or both teacher rating scales and the daily report cards. Moreover, both of the psychiatrists pointed that they did not follow any standardized interview schedules. Additionally, they did not administer any parent rating scales or self-report forms.

Subsequent to administering the interviews, one of the psychiatrists administers a psychological test, namely the Continuous Performance Test (*see* Figure 4.4). He then

sends TRS to the child's school. On the other hand, the second psychiatrist does not administer any psychological tests and uses a different TRS.

5. **Medications:** both psychiatrists prescribe medications, such as Ritalin and Adderall, but they differ in monitoring the efficacy of the medications. The first psychiatrist monitors medication efficacy through administering the TRS after four to five weeks. Figure 4.5 shows a letter, addressed to the school psychologist, asking the teachers to fill out the TRS for monitoring purposes. However, the psychiatrist admitted that rarely are the TRS filled out the second time they are administered. The second psychiatrist, on the other hand, monitors the efficacy of the medications through Daily Report Cards that are filled out by the child's teachers on a daily basis (*see* Figure 4.6).

6. **Interventions:** both of the psychiatrists provide interventions, but these are rarely followed in all schools, except in some where, they have special resource rooms or special classes. Special classes are classes with a very small classroom setting, accommodating a maximum of twelve students. The resource room provides intensive, small group remedial instructional services in a pull-out system. Group sizes vary from two to about five students. The resource rooms are usually staffed by teachers who have studied special education. As a matter of fact, one of the psychiatrists employs a full-time psychologist who deals with academic aspects and who administers psychological tests, such as the WISC (IQ Test) and the CPT.

Figure 4.1 Behaviour and attention rating scale in the Arabic language

Behavior and Attention Rating Scale
مقياس السلوك و التركيز
 Adapted to Arabic by [redacted]
 (Beirut, Lebanon; 1997)

[redacted]
 [redacted]
 [redacted]

التاريخ		المعايير		اسم التلميذ / التلميذة
التوقيت في النهار		مادة التعليم		الصف
ضع دائرة حول الرقم الذي يطابق وصف التلميذ / التلميذة خلال آخر أسبوعين.				
كثيرا	بعضا	قليل	كلا	
3	2	1	0	1. كثير الحركة او الحوصلة في المكان
3	2	1	0	2. لديه صعوبة في البقاء جالسا في مكان واحد
3	2	1	0	3. متصرف الفم، يتكلم بسرعة
3	2	1	0	4. لديه صعوبة بالنظر لدور في المجموعة
3	2	1	0	5. يتسرع بالاجابة قبل انتهاء السؤال
3	2	1	0	6. صعوبة في اتباع او تطبيق التعليمات
3	2	1	0	7. صعوبة في المثابرة في التركيز
3	2	1	0	8. يتنقل من عمل في آخر دون ان ينتهي
3	2	1	0	9. صعوبة في اللعب بهدوء/كثير الضجة
3	2	1	0	10. يتكلم باستمرار او بفترة
3	2	1	0	11. يقطع او يتدخل بالمعيت او اصائل غيره
3	2	1	0	12. يبدو وكأنه لا يستمع ولا ينتبه لشرح او حديث
3	2	1	0	13. يملك أغراضه بسهولة
3	2	1	0	14. متهور/ يقوم بأصائل دون تقييم العواقب

3	2	1	0	15. يشرذ او يفرق في أكثره
3	2	1	0	16. قليل الاعتناء بترتيب دفتاره
3	2	1	0	17. يبدأ عمل ولا ينتهي
3	2	1	0	18. سريع الانتهاء او الإثارة

3	2	1	0	19. سريع القوران او الغضب
3	2	1	0	20. منقلب المزاج او يبتكي بسهولة
3	2	1	0	21. كليل المتاح او حزين
3	2	1	0	22. يتعدى على رفاقه في سبيل الاذى
3	2	1	0	23. أبحث ضررا او تشويها في ممتلكات غيره عن صد
- هلا تلاحظون فارقا في السلوك أو التركيز بين فترة الصباح وفترة الظهر؟				
ملاحظات:				
Comments:				

References: Items 1 to 14 are taken from Du Paul and Barkley ADHD Rating Scale, 1990
 Items 15 to 18 are taken from Barkley Child Attention Profile, 1990
 Items 19 to 23 are taken from Conner's ADHD Rating Scale, 1989

Figure 4.2 Behaviour and attention rating scale in the English language

Behavior and Attention Rating Scale

مقياس السلوك والانتباه

Adapted by: J. [redacted]
(Beirut, Lebanon, 1998)

Tel: 961-1-449499

Student's name: _____ Completed by: _____ Date: _____

Class: _____ Subject: _____ Hour: _____

Please circle the number which best describes the child in the last 2 weeks:

	Not at all	Just a little	Pretty Much	Very Much
1- Often fidgets or squirms in seat	0	1	2	3
2- Has difficulty remaining seated	0	1	2	3
3- Is easily distracted	0	1	2	3
4- Has difficulty awaiting turn in groups	0	1	2	3
5- Often blurts out answers to questions	0	1	2	3
6- Has difficulty following instructions	0	1	2	3
7- Has difficulty sustaining attention	0	1	2	3
8- Often shifts from one uncompleted activity to another	0	1	2	3
9- Has difficulty playing quietly	0	1	2	3
10- Often talks excessively	0	1	2	3
11- Often interrupts or intrudes on others	0	1	2	3
12- Often does not seem to listen	0	1	2	3
13- Often loses things necessary for tasks	0	1	2	3
14- Often engages in physically dangerous activities without considering consequences	0	1	2	3
15- Daydreams or gets lost in his/her thoughts	0	1	2	3
16- Messy work	0	1	2	3
17- Fails to finish things he/she starts	0	1	2	3
18- Excitable, impulsive	0	1	2	3
19- Temper outbursts (explosive and unpredictable behavior)	0	1	2	3
20- Mood changes quickly/cries easily	0	1	2	3
21- Appears sad	0	1	2	3
22- Hurts others deliberately	0	1	2	3
23- Damages or destroys others' property deliberately.	0	1	2	3

- Do you notice a difference in the child's attention or behavior between morning and afternoon hours?

Please comment: _____

References: Items 1 to 14 are taken from De Paul and Barkley ADHD Rating Scale, 1990
Items 15 to 18 are taken from Barkley Child Attention Profile, 1990
Items 19 to 23 are taken from Conner's ADHD Rating Scale, 1989

Figure 4.3 Copy of the rating scale used by the second psychiatrist

Attention-Deficit Hyperactivity Disorder

ADHD RATING SCALE

Child's Name [Handwritten Name] Age Grade 1

Completed by [Handwritten Name]

Circle the number in the one column which best describes the child.

	Not at all 0	Just a little 1	Pretty much 2	Very much 3
1. Often fidgets or squirms in seat.			(2)	
2. Has difficulty remaining seated.	0	(1)	2	3
3. Is easily distracted.	0	1	(2)	3
4. Has difficulty awaiting turn in groups.	0	1	(2)	(3)
5. Often blurts out answers to questions.	0	1	2	(3)
6. Has difficulty following instructions.	0	1	2	(3)
7. Has difficulty sustaining attention to tasks.	0	1	(2)	3
8. Often shifts from one un-completed activity to another.	0	1	(2)	3
9. Has difficulty playing quietly.	0	1	(2)	3
10. Often talks excessively.	0	1	(2)	3
11. Often interrupts or intrudes on others.	0	1	(2)	3
12. Often does not seem to listen.	0	1	(2)	3
13. Often loses things necessary for tasks.	0	(1)	2	3
14. Often engages in physically dangerous activities without considering consequences.	0	1	(2)	4

SCORING INSTRUCTIONS:

Parent Ratings	Teacher Ratings
Total score: Sum items 1-14	Total score: Sum items 1-14
Inattention-Hyperactivity: Sum items 1-3, 6-8, 12-14	Inattention-Hyperactivity: Sum items 1-3, 6-8, 12, 13.
Impulsivity-Hyperactivity: Sum items 1, 2, 4, 5, 9-11, 14.	Impulsivity-Hyperactivity: Sum items 1, 2, 4, 5, 9-11, 14.

ga

From "Parent and Teacher Ratings of ADHD Symptoms: Psychometric Properties in a Community Based Sample" by G. P. DuPaul, 1991, *Journal of Clinical Child Psychology*, 20, pp. 245-253. Copyright 1991 by Lawrence Erlbaum Associates, Inc. Reprinted by permission.

Figure 4.4 Cover Report Sheet for the Continuous Performance Test for One of the Patients

SAINT GEORGE
HOSPITAL
SAINT GEORGE



SAINT GEORGE
HOSPITAL
SAINT GEORGE

CONNERS CONTINUOUS PERFORMANCE TEST
Multi-Health Systems Inc.

Report For: [REDACTED]
Patient/Subject #: 249
Birthdate (mmddyy): 12/20/87
Sex: F
Age: 11
Medication Type: none
Medication Amount: 00
Test #: 1
Tested (mmddyy): 03/10/99
Paradigm: STANDARD
Test Time: min: 14 sec: 10 ms: 520

[REDACTED]
[Signature]

Figure 4.5 A copy of the letter addressed by the psychiatrist to the school psychologist, asking the teachers to fill out the rating scales for the patient

Dear Mrs. Anton,

Child & Adolescent Psychia

نارنا وارني continues to make progress
and her attention span has greatly improved.
This progress is likely to continue and there
is a very good chance that ^{she} will make up what she
missed over the summer. Please ask each of
her teachers to fill out a copy of the enclosed
questionnaire so we can compare them to baseline.
Thank you.

CHILD & ADOLESCENT PSYCHIATRY
AMERICAN BOARD OF
PSYCHIATRY & NEUROLOGY

Figure 4.6 Copy of the daily report cards used by the second psychiatrist to monitor the efficacy of the treatment

GI

Daily Report Card

Name: ~~Haytham~~ Date: 8-11-2001

Period/Subject	Targeted Behaviors			Teacher
	On task	Respecting	compliance with rules	
1. French	1 2 3 ④	1 2 3 ④	1 2 3 ④	Khostdar
2. Math	1 2 ③ 4	1 2 ③ 4	1 2 ③ 4	Azan
3. Bible	① 2 3 4	1 2 ③ 4	1 2 ③ ④	Tahmeel
4. _____	1 2 3 4	1 2 3 4	1 2 3 4	
5. PE	1 ② 3 4	1 2 ③ 4	1 ② 3 4	D
6. Eng.	1 2 ③ 4	1 2 ③ 4	1 2 ③ 4	Ghaleh
7. Eng.	① 2 3 4	① 2 3 4	① 2 3 4	Ghaleh

Note: ratings indicate-(1) Poor; (2) Fair; (3) Good; (4) Excellent

* Check teachers about homework.
- Make sure he writes the agenda

refused to write in agenda
said he didn't want to study but wanted to play some video thing.
- Dictation He tried to write it but he pulled it away with force.

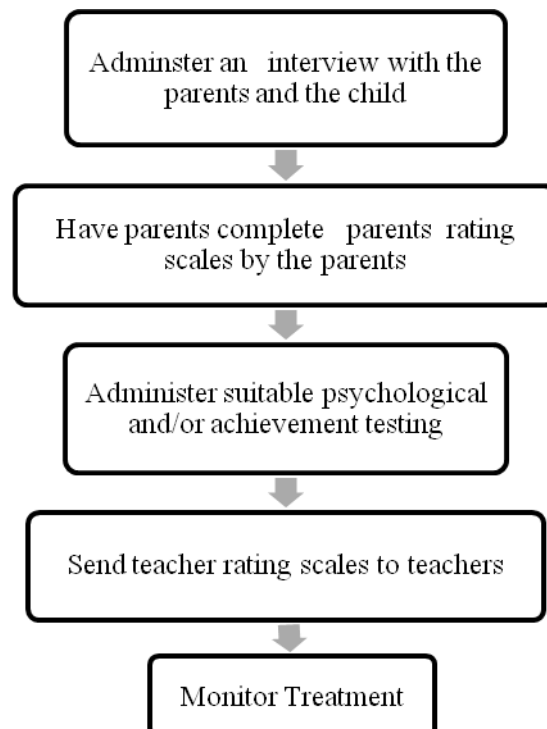
The narratives were discussed briefly. It would be useful now to present the findings from the second minor data-collection process pertaining to investigating how ADHD is assessed in Lebanon. This will be done by reviewing the assessment procedures illustrated in two local studies by Fayyad *et al.* (2007) and Cordahi *et al.* (2002). Basically, the authors have employed imported standardized tools to investigate the prevalence of ADHD in Lebanon. These tools are summarized in Table 4.1.

Table 4.1 Summary of the instruments used in the local studies for the diagnosis of ADHD

Instruments used in Lebanese local studies	Abbreviations
WHO Composite International Diagnostic Interview version 3	CIDI
World Health Organization-Disability Assessment Schedule	WHODAS
The Diagnostic Interview for Children and Adolescent-Revised	DICA-R
Conners' Parent Rating Scale	CPRS

Further to presenting the findings generated from investigating sub-objective 1, it is now reasonable to relate them to the literature review discussed in Chapter 2. The assessment procedures described by the two psychiatrists are similar in principle to the traditional diagnostic procedures discussed in section 2.16 and illustrated in Figure 4.7.

Figure 4.7 Traditional assessment procedures



Though the procedures resemble the traditional assessment procedures indicated by authorities in the field, the assessment tools employed are not in line with the recommendations of some researchers.

First, we discuss the mode of interviews used by the participants to gather data about their patients. For one thing, the psychiatrists do not follow any specific format or a standardized interview schedule when interviewing the parents and children. Barkley (2006) states that following a standardized interview format increases the reliability of the results. A structured interview, such as the Diagnostic Interview Schedule for children (Shaffer *et al.*, 2000) or the diagnostic Interview for Children and Adolescents (Reich, 1997), provides the most reliable method for gathering information about existing symptoms of psychopathology in both externalizing and internalizing domains. Hence, the results produced by the participants may have low reliability.

Secondly, we address the rating scales used by the psychiatrists to gather perceptions about their patients. Rating scales have become one of the essential elements in the evaluation and diagnosis of children with behaviour problems (Barkley, 1998). Though clinicians and researchers consider the use of reliable and valid teacher-completed rating scales as standard practice for the diagnosis and treatment of ADHD (American Academy of Child and Adolescent Psychiatry, 1997; American Academy of Pediatrics, 2000; Mattison *et al.*, 2003), there are many essential requirements that are crucial considerations prior to using them.

The rating scales used by the participants were not adapted to the Lebanese setting. As illustrated in Figure 4.2, the rating scale is thought to be adapted. However, it was adapted by the psychiatrists themselves rather than competent translators and no studies were made regarding that adaptation process. Such an approach can lead to faulty conclusions and serious errors because the first step of the translation process, according to the ITC guidelines, is the involvement of more than one competent translator in order to provide valuable negotiations about the clarity of the translation (Hambleton *et al.*, 2005). Simply translating a test from one language to another does not guarantee score comparability across the languages involved. A careless approach to test adaptation leads to a false belief

that score differences between samples or populations can be interpreted as if they are real. Language translation is a necessary but insufficient prerequisite to safely and confidently use the test (Sierci *et al.*, 2006). As Hymes (1970) states, particular differences in linguistic habits go together with specific differences in thought and behaviour, making it impossible to separate language from culture, which means consideration of language alone will likely prove insufficient.

In addition to language, there are several other factors that must be taken into account if scores that have been adapted for use in multiple languages and cultures are to be interpreted meaningfully (Weeks *et al.*, 2007). Moreover, factors impacting the ability of a test-user to draw valid interpretations include: test administration conditions, curricula, educational policies, examinee motivation, economic status, standard of living, cultural values, unfamiliar test formats, test anxiety and test speediness (Hambleton and Kanjee, 1995).

Furthermore, the psychometric properties of the scales themselves have not been established. This entails establishing the reliability, validity and normative properties of the scale. Specifically, the internal consistency of the scale, or the degree to which all items consistently measure the same construct, is highly violated. This is because the items constituting the scale are taken from three different instruments (*see* Figure 4.1). This does not guarantee item equivalence and causes serious threats to the reliability and validity of the scale (Nitko and Brookhart, 2010). Similarly, the rating scale used by the second psychiatrist (*see* Figure 4.3) was not adapted, but was used as an imported instrument. Using an imported scale raises a lot of challenging issues. Van de Vijver (2008) points out that a recurring theme in multicultural research is the question of the extent to which instruments developed in Western countries can be applied in different cultural contexts.

In addition to the adaptation controversies associated with the rating scales used by the psychiatrists, it might be the case that they do not meet all of the essential requirements for rating scales (*see* discussion in Chapter 2, section 2.20).

Barkley (2006) states that a clinically useful scale should meet certain standards other than the fact that some expert in the field has created or recommended it (*see* section 2.20). Some of the psychometric properties that Barkley mentioned relate to “face validity”, that is, its content should reflect the construct of interest. The fact that items have been selected from reliable rating scales does not guarantee validity. This “cut and paste” process, as with the rating scales used by the first participant, weakens “face validity”. Another psychometric requirement of rating scales is “discriminant validity”. In other words, does the scale discriminate between samples of subjects that are known to have more or less of this particular behaviour or symptom? Given that both scales used by both psychiatrists lacked statistical studies, this means that “discriminant validity” was surely not tested.

In a similar vein, Barkley (2006) adds that rating scales should also have acceptable levels of reliability both over time and between raters. Reliability was not established for both scales, which indicates that the reliability of the scales is poor and therefore so is validity. These prerequisites are in line with the views of many other researchers in the field. (For a review, see Martin *et al.*, 1986; Herndon, 2006; Ohan *et al.*, 2003; Edelbrock and Rancurello, 1985; Naglieria *et al.*, 2005; Rowe and Rowe, 1997.)

With respect to discussing the local studies conducted by Fayyad *et al.* (2007) and Cordahi *et al.* (2002), these studies were fully described in section 2.18, and the assessment tools were summarized in table 4.1. Therefore, only reference to discussing their assessment procedures will be mentioned here.

Despite the significance and contributions of these studies, they have been challenged on some grounds. For one thing, their methodologies suggest that no instruments adapted to the Lebanese culture and language groups were employed. This means that their conclusions are based on the measurements of imported instruments, whose reliability and validity have not been investigated with respect to the Lebanese sample. This raises significant questions, such as:

1. Which norms were used to establish the statistical deviance of their subjects?
2. To what extent were the subjects involved proficient in English?

The first challenging question was addressed through the argument posed by Barkley (2006), which was discussed thoroughly above. The second question, regarding the language proficiency of the participants employed in the local studies and the consequences of not assessing their language entry level or their ability to complete the assessment tools (CPRS or the WHODAS) used in the local study, shall be examined below.

Van de Vijver and Tanzer (1997) and Stansfield (2003) emphasize that prior to using an imported assessment tool, evidence should be provided that item content and stimulus materials are familiar to the intended population. Any test that proves easier or more difficult to read or understand because of the specific content or language differences may introduce an additional source of bias. Having said this, it might be the case that the results or scores derived from these imported tools could have been biased because the sample used for standardization of the imported tools and then the norms themselves from which the scores were based, on cannot be confidently applied for the ADHD diagnosis of the Lebanese participants.

The key point to be made here is that the sample used to establish and validate the imported tools is not identical to the Lebanese population in terms of socio-demographic variables, and that as a result, the scores cannot be assumed to be equivalent across cultures. A relevant example by Puhan and Gierl (2006) illustrating this point is the extent of familiarity with particular item formats. For example, in the United States, selected response questions such as multiple-choice questions have been used extensively in assessment (though that practice has been changing in the last ten years). In cross-cultural studies, it cannot be assumed that everyone is as familiar with multiple-choice items as American students. Nationalities that follow the British system of education, for example, place greater emphasis on essays and short answer questions. Thus, students from these countries are placed at a possible disadvantage as compared to their American counterparts. When constructed response formats, such as essay questions, are emphasized or serve as the dominant mode of assessment, persons with more experience with selected response formats, such as multiple-choice items, will be placed at a disadvantage. The relationship of this example to the local studies suggests that it might be the case that the Lebanese

participants might have not been familiar with rating scales in the case of the CPRS. It might also be the case that the language skills of the parents completing the CPRS were beyond the accepted level to comprehend items, such as those illustrated in Table 4.2.

Table 4.2 Sample items appearing on the CPRS

No. as it corresponds on the CPRS	Item content
32	Restless in the “squirmy sense”
44.	Has rituals that he/she must go through
70	Spiteful or vindictive
72	Feels inferior to others
79	Easily distracted by extraneous stimuli
80	Blurts out answers to questions before the question have been completed.

Moreover, the researchers in the above studies did not consider how the specific socio-cultural and ecological contexts of the populations might have affected the performance of the Lebanese participants and the tools used to measure the prevalence of ADHD. Such issues have been the concern of many cross-cultural researchers (For a review see Weeks *et al.*, 2007; Wang *et al.*, 2006; Sireci *et al.*, 2006; Berry *et al.*, 1992; Poortinga, 1995; van de Vijver, 2008; van de Vijver and Tanzer, 1997). For example, van de Vijver (2008) pointed out that when researchers use instruments created for a different culture and language groups, the different socio-cultural and ecological contexts of the populations, which affect performance on the test, should not be ignored. This is because participants’ performances differ across developing and developed nations, or mainly industrialized and rural societies. These differences may be attributed to a lack of access to resources (rather than a lack of ability), or a reflection of the quality of educational services available. Other factors that could prove relevant include educational policies, expenditure on education, curricula, access to schooling, class sizes, availability of proper equipment and facilities, home language vs. language of instruction, teacher qualifications, political climate of assessment, literacy rate, etc. The implications of the observations made by van de Vijver (2008) for the

local studies suggest that informants may not be, for example, familiar with rating scales, or with the four-point likert scale used in the CPRS, one of the tools used by the local studies. Therefore, to enhance the meaning and utility of deriving conclusions from imported instruments and to avoid the derivation of uninformed and faulty conclusions about the subjects involved, it is imperative for researchers to carefully adapt the instruments before choosing them for a particular study.

Moreover, Sireci *et al.* (2006) and Berry *et al.* (1992) warned against assuming that the behavioural manifestations and interpretations of constructs, which is ADHD in this case, are the same across cultures. Therefore, the tools used by the local studies have been specifically developed for constructs existing in the Western world, which may differ markedly from the Lebanese culture. Sireci *et al.* (2006) add that construct validity evidence must be compiled in each population where the test will be used otherwise the resulting scores can prove to be extremely misleading. The local studies did not mention whether construct validity had been established prior to using the imported tools. They might have investigated the construct without putting it in words. However, without a specific reference, it seems safe to assume a limitation regarding their usage of tools, which had not been validated with respect to the target population (Lebanese participants).

4.2 RESULTS AND DISCUSSION OF THE SUB-OBJECTIVES 2 AND LEVEL ONE SUB-OBJECTIVE 2A AND 2B

Sub-objective 2: Translate the CTRS–R: S according to the ITC guidelines.

Level one sub-objective 2a: Identify potential problems in translation.

Level one sub-objective 2b: Review and revise ambiguous items following the pilot test.

Results for the level one sub-objectives 2a and 2b will be combined under one section because of their relevance and derivation from sub-objective 2, translating the CTRS–R: S.

To answer sub-objective 2, the CTRS–R: S was translated according to the ITC guidelines. Inconsistencies during the translation processes were resolved using logical methods, specifically the backward translation design. Level one sub-objective 2a was answered

through a pilot test using the adapted CTRS-R: S with a volunteered convenient sample of teachers (n=15), whereas level one sub-objective 2b was answered by administering a structured interview with the pilot sample, mainly to unfold ambiguous items and revise them.

The translation of the CTRS-R: S, the pilot study processes and administration of structured interviews were all fully detailed in section 3.3.2 and section 3.3.3 respectively. The findings and challenging issues pertaining to the aforementioned objectives may be summarized as follows.

1. *Dialect*: The issue of spoken vs. classic Arabic was confusing when translating item 27 “Excitable, Impulsive”. In Lebanon, when we refer to terms such as *excitable* and *impulsive*, we usually use spoken Arabic and say that the student is “a devil”, which essentially means reckless or out of control. Consequently, the first pair of translators used the spoken Arabic and translated the item as “devil”, which is totally inappropriate to include on a rating scale or to be used with teachers due to the negative connotations associated with this term. The coordinators insisted that classical Arabic instead of spoken Arabic should be used to translate item 27 because Arabic teachers who read Arabic literature might encounter these words, but others might be unfamiliar with them. However, back-translating this item (devil) using classical Arabic would be “Satan”, which is again an unacceptable translation.

This problem was finally resolved with the help of the third translator, who inserted the adjective “very” and then back-translated item 27, “Excitable, Impulsive” as “very naughty”.

2. *Finding equivalent terms*: Another difficult issue was finding equivalent terms for Item 7, “is always on the go, acts as if driven by a motor”. In line with the ITC guidelines and the recommendations of Hambleton *et al.* (2005), the coordinators resorted to the use of frequency lists of words, but this was not very helpful. Translators then resorted to “Decentering”, which is sometimes recommended when

certain words or expressions do not exist in the target language (Arabic). Decentering involves making revisions to the source language test so that equivalent material can be used in both the source and target language versions. However, such a strategy is most effective when the source language test is under development at the same time as the target language version (Hambleton *et al.*, 2005; Casillas and Robbins, 2005).

When none of the above strategies seemed useful, the coordinators and the first pair of translators translated item 7 as “ready”. The literal meaning of “ready” shows that the student is *ready* to carry out any activity requested by his teacher, i.e. compliance to teachers’ comments rather than over-activity. As a result, an adverb “always” was added to the verb to show the *disturbing* frequency of such an action. The final translation of item 7, “is always on the go, acts as if driven by a motor”, was “always ready”.

3. *Inserting vowel pointing*: The most complicated issue was the question of whether or not “vowel pointing” should be retained, an issue raised by one of the coordinators. This difficulty was highlighted in the pilot test. All of the participants were annoyed by the vowel pointing, which they said “...hindered the flow of reading the items ... the last thing we would want to feel is as if we are reading a comprehension passage at school, or feel as if our reading skills [pronunciation] are under evaluation.” Their suggestions were taken into consideration after agreeing with the translating team only to keep “double consonants” (see items 27 and 28 on the adapted CTRS-R: S in Appendix 7).
4. *Syntax of the Arabic language*: Other associated problems were related to the syntax of the Arabic language. Arabic has two different verb forms: masculine and feminine. To avoid any bias in the language towards any gender, the formal dual approach of masculine versus feminine was applied to all items. This essentially means that two items instead of one would describe the behaviours on the adapted CTRS-R: S: one for masculine and the other for feminine. This meant that the final number of items on the adapted CTRS-R: S would be 56 instead of 28. The

translators' rationale for this dual approach, as recorded in the coordinators' and the researcher's reports, was that some items (e.g. 16 and 17) in the original CTRS-R: S included "he/she" (16. Only pays attention to things *he/she* is really interested in, 17. Has difficulty waiting *his/her* turn).

The coordinators, as well as the third translator, disapproved of this approach because it means some items would include more than one behaviour, which would double the number of words, not to mention the problem of redundancy. The same concern was raised by the teachers during the interviews, where they indicated that it was a little confusing. As a result, the absolute present tense verb form (third-person singular), which applies to all situations, persons and numbers irrespective of singularity and plurality, masculinity or femininity, was the most practical to apply. Moreover, Arabic language has no gender third-person singular pronoun: as a semitic language, it employs the pronoun *he* to replace *it* in all of its functions, whether this applies to abstract ideas or to things referred to as "masculine". On the other hand, *she* is employed in other instances when either the concept or the concrete thing is referred to as "feminine". It is worth mentioning that "masculine" and "feminine" in this context are purely linguistic and not related to any inherent quality of sexual type.

5. *Using negative words:* During the translation process, the coordinators were reluctant to use negative words in certain items, but sometimes this was needed to express the desired behaviour. Any such concern indicated by the second translator was to be confirmed or disconfirmed through the pilot test and the structured interviews.

The narratives of the interviews with the pilot-test sample revealed that items that started with negative words were confusing for six teachers, who indicated that Item 9, "Cannot stay still", does not always happen in a real classroom setting despite the over-activity of a student. However, none was able to suggest any alternative wording. The researcher was mindful of this concern and reminded the teachers that the behaviours appearing on the scale were rated on a four-point scale. Accordingly,

because of its flexibility the teachers were more satisfied with the Likert rating, from 0 as “never” and 3 as “always”, with 2 and 1 indicating “often” and “little”, respectively.

When reconciling with the translation team, instructions were made more explicit and, most importantly, an example illustrating how to use the CTRS-R: S was added to cater to teachers who might not be familiar with rating scales.

Although the findings generated during the translation process are self-explanatory, the implications of these findings are significant and therefore will be discussed within the framework of the ITC guidelines, with reference to the work of other researchers who were involved in test adaptations.

Having presented the results for level one sub-objectives 2a and 2b, it is now worth discussing them.

The first point of discussion is the concern regarding dialect. Hambleton *et al.* (2005) noted that the problem of dialects within a language can become a threat to the validity of adapted tests. This problem should be resolved and used in the selection of translators. They added that Frequency counts of words can be valuable in producing valid adaptations. In general, it is best to translate words and expressions using words and expressions with approximately the same frequencies in the two languages. One additional problem is that these frequency lists of words and expressions are not always available. This is again the reason for preferring translators who are familiar with both of the cultures involved, not just the languages.

The implications of the challenges posed during the process of translation, it is imperative that researchers consider linguistic and cultural differences when adapting tests. This relates mostly to the language used in the directions and items themselves (Weeks *et al.*, 2007). It is also essential to ensure that the vocabulary used for test translation is comparable in terms of the levels of difficulty of words, readability, grammar usage, writing style and punctuation. Moreover, evidence should provide that the choice of testing techniques, item

formats, test conventions and procedures are familiar to all intended populations. Specific formats (e.g. multiple-choice, essay) and certain conventions and procedures in giving instructions and presenting test items may not be equally familiar to all populations. Conventions and procedures range from language use in test rubrics, layout and use of graphics, and presentation mode (e.g. paper and pencil, computer) (Byrne and Campbell, 1999).

Given that test scores could carry significant consequences for test takers, this could be of serious concern and hence fairness to the populations for whom adaptations of the tests are intended, need to be ensured. This is particularly the case in high stakes testing where other forms of assessment are not afforded equal footing. Therefore, it is essential that due diligence is used to maintain a level of fairness in the adaptation and interpretation of results. To arrive at an equitable or fair decision, it is only sensible for the target population to be familiar with all the existing potential formats, conventions and procedures. This requirement may demand extensive practice materials, to reduce bias stemming from unfamiliarity with some aspects of the assessment process and equal opportunity issues (Heo *et al.*, 2008). Van de Vijver and Poortinga (2002) provide an example of an adapted test that includes *units* that are less familiar to the target population or others that require different mathematical operations. Certain stimulus material such as diagrams, tables, figures, famous landmarks may not be equally familiar to all sections of the test population, therefore systematic safeguards should be implemented, both linguistic and psychological, to improve the accuracy of the translation process. For that reason, extreme care is needed to ensure an equivalence of meaning in questions, tasks and rating scales in different languages and cultures. Consequently, this process requires a committee of moderators and overseers to ensure the appropriateness of valid assessment and accountability of quality interpretation for all key stakeholders.

4.3 RESULTS AND DISCUSSION OF LEVEL ONE SUB-OBJECTIVE 2C

Level one sub-objective 2c: Establish empirical equivalence between the original CTRS-R: S and the adapted one.

To answer level one sub-objective 2c, the pilot sample (n=15), who were bilingual speakers of equal proficiency, rated the original and adapted Arabic CTRS-R: S. Their scores were then correlated using a Pearson product moment correlation. A coefficient of $r = 0.76$ was observed.

This result quantifies the strength as well as direction of the relationship between the variables, the translation and the ratings. It should add evidence as to the reliability and validity of the Arabic CTRS-R: S, but more verification will be needed from the statistical analysis yielded through the survey before the adapted CTRS-R: S can be used with confidence.

4.4 RESULTS FOR SUB-OBJECTIVE 3 AND LEVEL ONE SUB-OBJECTIVE 3A AND 3B

Sub objective-3: Establish the psychometric properties of the adapted Arabic CTRS-R: S.

Level one sub-objective 3a: Develop norms for the adapted Arabic CTRS-R: S.

Level one sub-objective 3b: Provide interpretive guidelines for practitioners.

These stated objectives will be analyzed and discussed simultaneously because they are closely connected.

First, to answer the above sub-objectives and level one sub-objectives, quantitative data was collected through survey. Norms were reported for the CTRS-R: S sample in the form of percentile ranks for each age group (3–17 in three-year intervals) and by gender for the four subscales. Percentiles derived empirically from the normative data by age and gender are shown in Appendix 11. In order to achieve level one sub-objective 3b, standard scores in the form of T scores were calculated from raw scores to provide interpretive guidelines for practitioners. These are illustrated in Table 4.3.

Table 4.3 Interpretive guidelines for T-scores and percentiles

T-score	Percentile	Guideline
70+	98+	Markedly Atypical (Indicates significant problem)
66-70	95-98	Moderately Atypical (Indicate significant Problem)
61-65	86-94	Mildly Atypical (Possible significant problem)
56-60	74-85	Slightly Atypical (Borderline: Should raise concern)
45-55	27-73	Average (Typical score: Should not raise concern)
40-44	16-26	Slightly Atypical (Low scores are good: Not a Concern)
35-39	6-15	Mildly Atypical (Low scores are good: Not a Concern)
30-34	2-5	Moderately Atypical (Low scores are good: Not a Concern)
< 30	< 2	Markedly Atypical (Low scores are good: Not a Concern)

We must first shed light on the results obtained from a practical point of view, beginning with the percentile ranks. The development of percentiles is extremely helpful to express the percentage of individuals in the normative group who scored lower than the respondent. So, for example, if a boy named Adam scored at the 90th percentile on the Cognitive problems/Inattention subscale, then Adam's score on the Cognitive problems/Inattention subscale was higher than 90% of other boys his age. The percentile places Adam with more cognitive problems than a large percentage of other boys his age, which indicates the possibility of a clinically significant cognitive problem (Conners, 1997; Conners *et al.*, 1988). In general, higher T-scores (and raw scores) are associated with a greater number and /or frequency of reported problems. T-scores of 65 and above are usually taken to indicate a clinically significant problem.

Secondly, we must address the significance of interpretive guidelines. Raw scores are of limited value on their own. T-scores, on the other hand, enable the practitioner to put the adapted CTRS-R: S raw scores into the context of the general population. Moreover, T-scores allow practitioners to identify areas of strength and concerns, to compare subscales scores and to establish the statistical deviance of a child. For example, 19 as a raw score would mean nothing, but 19 converted to a T-score would be equivalent to 70, which places

the child well above average and clinically significant. In general, higher T-scores (and raw scores) are associated with a greater number and/or frequency of reported problems. T-scores of 65 and above are usually taken to indicate a clinically significant problem.

To clarify the significance of the above two statistical measures further, we must examine them in relation to the research studies discussed in Chapter 2. In the first instance, we shall discuss and compare the norms developed in this study for the adapted CTRS-R: S (presented in the form of percentiles). It is indicated that the adapted CTRS-R: S norms are higher for both genders and for each age level than the original CTRS-R: S norms by Conners (1997). Similar comparable results were reported by El-Hassan (1985) in a study to establish Greater Beirut norms for the old CTRS (Conners, 1969), where the Lebanese CTRS norms for both sexes and for each grade level were higher when compared to American norms collected by Saigh (1984) and a recent Cypriot study (Eliopoulos, 1984). In considering the cross-cultural data, it is suggested that the higher Lebanese CTRS-R: S scores may be attributed to the unstable and stressful conditions that Lebanese children have endured for the past years.

This is not in line, however, with the study by Polanczyk *et al.* (2007), who conducted a systematic review and metaregression analysis on the prevalence of ADHD worldwide. They reported lower ADHD prevalence rates in Africa and the Middle East than in North America. Their findings should be understood in the context of some limitations because age and gender were not included in the final metaregression. Similarly, the Sudanese norms, which were developed by Al-Awad and Sonuga-Brake (2002) in their study to validate the Conners' Teachers and Parents' Rating Scales in Sudan, were reported as lower than North American norms.

These results are in line with studies of the same purpose, however Reisfeld *et al.* (1997) conducted a study to validate the CPRS (Conners, 1997) to Hebrew and reported that the percentile ranks produced were higher than the original CPRS. Furthermore, the interpretive guidelines generated by the Reisfeld study yielded similar guidelines, where they also indicated that T-scores of 65 or more indicated a significant clinical problem.

This means that the results of the normative data are in line with the results of scholarly articles addressing the same purposes and therefore they are, to a certain extent, potentially accurate and appropriate.

4.5 RESULTS FOR SUB-OBJECTIVE 4 AND LEVEL ONE SUB-OBJECTIVES 4A AND 4B

Sub-objective 4: Establish the reliability of the adapted Arabic CTRS-R: S.

Level one sub-objectives 4a: Assure the consistency of the adapted Arabic CTRS-R: S.

Level one sub-objectives 4b: Examine the stability of the adapted Arabic CTRS-R: S.

The analysis and discussion of these objectives will be integrated into one section because they all serve the greater objective: to examine the reliability of the adapted CTRS-R: S.

To answer level one sub-objective 4a, quantitative data was gathered through computing Cronbach's alpha coefficient for each of the four subscales and for the total adapted CTRS-R: S. The internal consistency of the total scale was 0.823. The reliability coefficients of different subscales ranged between 0.781 and 0.823. The internal reliability coefficients for the adapted CTRS-R: S and its four subscales are reported in Table 4.4.

Table 4.4 Means (M), standard deviations (SD) and coefficient alpha for the adapted CTRS-R: S subscales

CTRS-R: S Subscales	Mean	Std. Deviation	Cronbach's Alpha
Oppositional	2.62	2.995	0.821
Hyperactivity	4.89	3.990	0.781
Cognitive Problems: Inattentive	3.80	3.424	0.822
ADHD Index	9.30	7.817	0.687
Total scale CTRS-R: S	20.08	15.473	0.823

Similarly, in order to answer level one sub-objective 4b, quantitative data was gathered by computing the test-retest reliability coefficients (Pearson product moment correlation) over a 6–8 week interval for adapted CTRS-R: S. Test-retest correlation coefficient (n=20) of the total adapted CTRS-R: S scale was 0.93. The test-retest correlation coefficients for the four subscales ranged between 0.81 and 0.92. The results are presented in Table 4.5.

Table 4.5 Test-retest reliability coefficients (6–8 weeks) for the adapted CTRS-R: S

Scale	<u>α</u>
CTRS-R:S	0.93
Oppositional	0.86
Cognitive Problems / Inattention	0.92
Hyperactivity	0.83
ADHD Index	0.81

The reliability indices illustrated above are in line with what was discussed in Chapter 3, section 3.3.8, where it was mentioned that internal reliability, or consistency coefficients, should range from 0.7 to 0.8/0.9 and that test-retest reliability coefficients should range between 0.7 and 0.9 (Gray, 1992; O’Neil *et al.*, 2004). To sum up, the reliability indices for the adapted CTRS-R: S ranged from 0.68 to 0.93, indicating that the adapted CTRS-R: S is, to a certain extent, a reliable assessment tool.

Though the above results suggest that an accurate, reliable assessment of teacher perceptions of children’s misbehaviour can be obtained through using the adapted CTRS-R: S, further evidence is needed to increase their rigour to the extent to which they compare positively to similar studies that aimed to validate the CTRS-R: S, or to other similar tools to another culture, which were discussed in Chapter 2, section 2.23. The related studies were detailed and discussed in Chapter 2, so here we shall simply summarize and discuss the results.

Table 4.6 Summary of similar studies and their reliability indices

Author/Year	Purpose of the study	Ranges of reliability indices
Al-Awad and Sonuga-Brake (2002)	Adapted the CTRS-R: S for Sudan	0.67–0.91
Brito (1987)	Adapted the Conners' Abbreviated (10-item) Teacher Rating Scale for Brazil	0.71–0.89
Christiansen <i>et al.</i> (in press)	Validated the Conners' Adult ADHD Rating Scales to German	0.71–0.91
Conners <i>et al.</i> (1988)	Investigated the factor structure, reliability and criterion validity of the CTRS-R: S	0.75–0.93
Dereboy <i>et al.</i> (2007)	Adapted the CTRS-R: S to Turkish	0.78–0.89
Ghanizadeh (2008)	Adapted the CTRS-R: S to suit Iran in order to investigate the prevalence of ADHD in school-age children of Shiraz	0.85–0.92
Kolakowski <i>et al.</i> (1997)	Adapted the CTRS-R: S to Polish	0.65–0.93
Luk <i>et al.</i> (1988)	Validated the CTRS-R: S in Hong Kong	0.72–0.92
O'Leary <i>et al.</i> (1985)	Adapted the CTRS-R: S for Italy	0.68–0.88
Reisfeld <i>et al.</i> (1997)	Adapted the Conners' Adult ADHD Rating Scales and the Parent Rating Scale Revised to Hebrew and Russian in order to assess neurobehavioural and cognitive performances of children exposed to low-dose radiation in the Chernobyl accident	0.81–0.90
Pal <i>et al.</i> (1999)	Validated the CTRS-R: S for use in a study of anti-epileptic drug side-effects	0.88–0.98
Strehl <i>et al.</i> (2006)	Adapted the CTRS-R: S to German for the purpose of investigating the effects of self- regulation of slow cortical potentials for children with ADHD	0.81–0.94
Vaisman <i>et al.</i> (2008)	Adapted the Conners' Parent Rating Scale Revised to Hebrew in order to investigate the correlation between changes in blood fatty acid composition and visual sustained attention performance in children with inattention	0.85–0.92

To sum up, the reliability indices of the studies in Table 4.6 ranged from 0.59 to 0.93, which is close to the range of the reliability indices of the adapted CTRS-R: S (from 0.77 to 0.95). This should provide further evidence for the stability and consistency of the scores over time. The reliability coefficients were sufficiently high to warrant the use of the test as a basis for making decisions concerning individual students. What increases the reliability

of the scale and makes it a clinically useful one are the acceptable levels of reliability over time. The latter condition is crucial when measuring a construct such as ADHD, where the evaluation process should yield scores that are free from various sources of measurement error and that are consistent from one occasion to another. Fundamental to the evaluation of any instrument is the degree to which test scores are free from various sources (Gray, 1992; O'Neil *et al.*, 2004). In view of that, it is suggested that the adapted CTRS-R: S is sufficiently reliable to permit stable estimates of individual ability.

4.6 RESULTS OF SUB-OBJECTIVE 5 AND LEVEL ONE SUB-OBJECTIVE 5A

Sub-objective 5: Investigate the validity of the adapted Arabic CTRS-R: S.

Level one sub-objective 5a: Examine the construct validity of the adapted Arabic CTRS-R: S.

To answer sub-objective 5, level one sub-objectives 5a and 5b had to be developed. We shall examine these in turn; sub-objective 5b is addressed in section 4.7. To answer all of the validity-related objectives, quantitative data was gathered. Specifically to answer level one sub-objective 5a, a series of two-way ANOVAs (gender by age) were conducted to examine gender and age effects in performances as based on teachers' ratings (n=823) of the adapted CTRS-R: S on the four subscales.

The results may be summarized as follows.

- 1. Oppositional subscale:** A gender effect was evident on the Oppositional subscale ($F=19.969$, $p<0.05$), where ratings were higher for males, in addition to age effects ($F=3.415$, $p<0.05$). Multiple comparisons revealed that ratings for 12–14 and 15–17-year-olds were higher.
- 2. Hyperactivity subscale:** Similarly, a gender effect was evident on the Hyperactivity subscale, where ratings were higher for males ($F=68.283$, $p<0.05$). No age effect was evident.

3. Cognitive Problems/Inattention subscale: With respect to the Cognitive Problems/Inattention subscale, a gender effect was also evident where ratings were higher for males ($F=14.119$, $p<0.05$). A main age effect was found as well ($F=2.896$, $p<0.05$). Multiple comparisons revealed that ratings were higher for 16–17-year-olds.

4. ADHD index: Finally, gender effects were also evident on the ADHD index subscale, where ratings were higher for females ($F=43.18$ $p<0.05$). A main age effect was also noted ($F=2.176$, $p<0.1$), where multiple comparisons revealed that ratings were higher for 15–17-year-olds.

In summation, significant gender effects were evident on most subscales. Teacher ratings were higher for males on all subscales except for the ADHD Index. Significant age effects were also evident on all the subscales except for the Hyperactivity subscale. Table 4.7 summarizes the age and gender effects evident on the CTRS-R: S subscales.

Table 4.7 Summary of the gender and age effects on the CTRS-R: S subscales

Gender and Age Effects		Subscales of the Adapted CTRS-R: S			
		Oppositional	Hyperactivity	Cognitive Problems/Inattention	ADHD Index
Gender Effects	Higher ratings for males	✓	✓	✓	
	Higher ratings for females				✓
Age Effects	Higher ratings for older groups (12–17)	✓ 12–14 & 15–17	No age effects	✓ 16–17	✓ 15–17

Discussion of the above findings will be guided by the following questions:

1. To what extent are the findings generated in this study in line with the studies reviewed in Chapter 2?
2. To what extent are these evident in local and other Arab studies?

Each finding will now be discussed in turn.

1. *Significant gender effects in favour of males were evident on three out of four subscales.*
As pointed out earlier, teachers' ratings were higher for males on three out of four subscales. This relates to the presentation of ADHD across gender, which was fully discussed in section 2.10.

As mentioned in Chapter 2, the percentage of ADHD prevalence is three to seven times greater among males than among females (Thorell and Rydell, 2008). In fact, boys are three times more likely to have ADHD than girls, and five to nine times more likely than girls to be seen in clinical samples (Barkley, 1990).

So we must ask whether the above results are in line with other researchers who have adapted the same or similar scales. If these results are in line with scholarly articles, then we would be able to say that they are valid and that the studies' findings were significant.

Al-Awad and Sonuga-Brake (2002) reported gender differences on two of the four subscales in their study to validate the CTRS-R: S. This is also in line with Brito's study (1987), which reported higher scores in favour of males in his study to develop the normative data for the adapted Brazilian Conners' Abbreviated (10-item) Teacher Rating Scale (CATRS-10) (Conners, 1997). Waschbusch and Willoughby (2007) reported similar results in their study, which aimed to examine psychometric properties of the CTRS. Similarly, Ghanizadeh (2008) noted similar results in his study to investigate the prevalence of ADHD in school-age children of Shiraz.

Are these results in line with studies addressing the same questions in Lebanon or other neighbouring Arab countries (which were also discussed in section 2.11). Despite the

scarce literature about ADHD in the Arab countries, the results were in line with the study by Farah *et al.*(2009), which reviewed epidemiological studies conducted between 1996 and 2008 on ADHD in Arab countries (Egypt, Ghaza, Qatar, UAE, Lebanon, Muscat and Saudi Arabia) and reported that ADHD was more common in boys in all the Arab studies.

This means we can safely say that the profiles of these results are in line with the literature reviewed in Chapter 2, and other similar studies. In view of that they are valid and were worth being conducted.

2. *Significant gender effects in favour of females were evident on the ADHD index.*

Higher ratings in favor of females were evident on the ADHD index; it is crucial to discuss this anomalous finding. The present literature confirms that girls are under-diagnosed. In the book, *Understanding Girls with AD/HD*, Kathleen G. Nadeau states that “there are many girls left undiagnosed because their symptoms look different”, because “girls are less rebellious, less defiant, generally less “difficult” than boys.”

Moreover, girls with ADHD are more likely to have only attention problems, which can lead to difficulty in school but not to class disruption. Similarly, Thorell and Rydell (2008) state that ADHD/ADD in girls is as serious a condition and has a comparably large negative impact on a girl’s functioning and adjustment as it does in boys. The same finding was also evident in Arab settings. A study by Al-Eapen *et al.* (2004) that aimed to investigate the rate of ADHD in the UAE reported a higher rate of girls with DSM-IV disorders, but the numbers of subjects with ADHD in their study was too low to allow for meaningful examination of gender distribution. These conflicting findings should raise awareness about under-diagnosing girls having ADHD.

3. *Significant gender and age effects in favour of males and older groups were evident on the oppositional subscale.*

These findings confirm the review of studies in Chapter 2 about the associated co-morbidities with ADHD, which was briefly discussed in section 2.6. Briefly, the

results imply that a true co-morbidity between oppositional defiant disorder and ADHD exists (Barkley, 1989). Similar findings were reported by Conners *et al.* (1998) in a study to establish factor structure, reliability and criterion validity for the Revised Conners' Teacher Rating Scale: Long Version – CTRS-R: L (Conners, 1997). In their study, males were also rated higher on oppositional factors. Similarly, such results were confirmed in local studies, such as that conducted by Fayyad *et al.* (2001) in Lebanon, which showed that ADHD in a clinical sample of children and adolescents was often co-morbid with one other psychiatric disorder.

The high scores on the oppositional subscale are in line with studies indicating that males tend to be rated higher on externalizing factors (conduct, aggression), while girls are rated higher on internalizing factors (anxiety, depression) (Graetz *et al.*, 2006; Szatmari *et al.*, 1989; Diamantopoulou, 2005; Barkley, 1992). The same results were confirmed by research conducted in Lebanese settings, where Lebanese males tended to show more externalizing symptoms (aggression) than females (El-Hassan, 1985; Day and Ghandour, 1984; Saigh, 1984). In conclusion, there is agreement among specialists that the normative trend among males is to express a far greater amount of externalizing symptoms than females. Hence, the co-morbidity evident with the increase of scores on the oppositional subscale and in males more than females are in line with what was discussed in Chapter 2, as well as with other local studies. Accordingly, they resemble the international profile representing the ADHD construct.

4. Significant age effects in favour of older groups were evident on three out of four subscales.

As illustrated in Table 4.7 multiple comparisons revealed that ratings for groups of 12–14-year-olds and 15–17-year-olds were higher, except on the hyperactivity subscale. The age-related findings in this study are in line with the developmental course and nature of ADHD as discussed in Chapter 2, section 2.12. ADHD persists into adulthood and follows a developmental path. The developmental course of ADHD indicates that difficulties related to ADHD in adolescence continue, but that the nature, manifestation, expression and type of ADHD symptomatology change

with increasing or decreasing age (Thorell and Rydell, 2008). Moreover, Cumyn *et al.* (2007) found that 70–80% of children with ADHD are likely to continue to display symptoms related to ADHD to an extent inappropriate for their age group. As indicated, the adolescent years of individuals with ADHD may be some of the most difficult. Unfortunately, their antisocial conduct becomes a strong predictor of adolescent substance abuse, where they are likely to face difficulties in achievement in their occupational settings or while working independently of supervision (Gualtieri *et al.*, 2006). The implication of these results should raise awareness that the diagnosis and management of ADHD within the biopsychosocial perspective should be advocated (*see* section 2.13).

These results are also positively associated with similar studies that investigated the psychometric properties of the CTRS-R: S. For example, significant age effects were evident in the psychometric properties of the English version of the CTRS-R: S (Conners, 1997). Furthermore, Conners *et al.* (1997) established the factor structure, reliability, the validity and diagnostic sensitivity for the Conners'/Wells' Adolescent Self Report (CASS) for assessment of adolescent psychopathology and ADHD symptoms, and reported an increase of scores with age on all scales. Hence, age effects in the studies discussed show an increase in the level of symptomatology with increasing age.

5. *Significant gender and age effects in favour of males and older groups were evident on cognitive/inattention subscale.*

These findings are in agreement with the research findings discussed in Chapter 2, section 2.12. Basically, the manifestation of ADHD in adolescence is a problem of memory, learning and inattention rather than disruptive behaviour. These findings also agree with the notion that ADHD children continue to display problems with academic achievement and problem-solving during adolescence. ADHD children repeat more school grades and perform poorly in academic subjects during adolescent years (Smoot *et al.*, 2007). Moreover, studies on the cognitive style of ADHD adolescents also affirm the findings on the cognitive problem/inattention in the present study. ADHD adolescents, as compared with adolescents in the normal population, showed that they

were more impulsive and field-dependent, were more inclined to respond without thinking and were more easily distracted (Greshon, 2002).

With respect to the significant age findings on the ADHD index subscale, where older subjects scored higher than younger ones, these findings are in agreement with the emotional disturbances associated with ADHD. This finding could be attributed to the social and academic burden placed on these children in the factory-schooling model (*see* discussion on the biopsychosocial paradigm: Cooper, 2008; Cooper and Jacobs, 2011). While children in the age group of 15–17 years are adjusting to the ongoing demands of school, they may become more anxious and introverted. In addition, the internalizing states of depression and anxiety are less likely to be apparent to teachers and guardians as children become more independent and self-managing, and thus more reluctant to display their anxiety (Kunwar *et al.*, 2007). Despite the fact that no local studies were found displaying the same results, this fact does not underestimate the value of the finding.

6. *Significant gender effects in favour of males were evident on the hyperactivity subscale.*

As discussed in Chapter 2, section 2.4, the restlessness is in line with numerous scientific studies using objective measures of activity level, which attest to complaints that children with ADHD are more active, restless and fidgety than other children in the normal population. These behaviours are evident throughout the day and even during sleep. Such behaviours are most common in low stimulation and boring situations, which again brings us to the biopsychosocial perspective of understanding that ADHD-related symptoms are most common in rigid situations that inhibit rather than exploit the characteristics associated with ADHD (Cooper, 2008; Hughes and Cooper and, 2007).

Finally, the focal implication of this finding is that the more we understand about the biological and psychological correlates of ADHD, the better placed we will be to provide educational environments that avoid exacerbating difficulties that children may experience and that promote their optimal educational engagement (Cooper, 2008). As evident from the results, and as discussed previously in section 2.13, it might be the case

that the symptoms associated with ADHD are triggered only when the biological characteristics interact with environmental factors, which in turns renders dysfunctional the cognitive patterns that flow from the biological make-up. Cooper (2008) noted that when environments prioritize self-regulation, sedentary behaviour, passive as opposed to active approaches to learning and social conformity over individualism, the cognitive characteristics associated with ADHD become problematic. This helps to explain why ADHD is most strongly associated with the school years, where success often equates with obedience and conformity.

Having said this, we should not divert our attention from the important process of converting a biopsychosocial account of ADHD into pedagogical and other interventions. The biopsychosocial perspective draws a stark picture of the major alternatives facing educators when confronted with students who experience difficulties in engaging effectively in schools. Educational interventions that are developed within the biopsychosocial perspective of ADHD will, in some circumstances, rule out the need for medication (Cooper and Jacobs, 2011).

As a final point, we cannot end this discussion without attributing a quantity of credit to the ITC guidelines, which led to these statistical studies being conducted in the first place. If we had not investigated the psychometric properties of the scale, we would have been unable to judge the confidence of the adapted scale. Though the findings indicate that valid and reliable results have been associated with the adapted CTRS-R: S, *the opposite is also true*. That is, if the results have proved to be unreliable and if, for example, the reliability indices were low and no documented associations have been found with the gender and age effects, the researcher in this case could revise perhaps the translation process, recruit different translators, etc. It might be the case that there was a flaw with one of the research designs. Accordingly, this would imply that employing large samples with the data-collection designs would allow for stable statistical information (Casillas and Robbins, 2005). Moreover, it follows from the above results that researchers should apply appropriate statistical techniques to identify problematic components or aspects of the test that may be inadequate to one or more of the intended populations. Statistical techniques provide useful information for

assessing the reliability and validity of the adapted tests. These techniques should be used to supplement logical techniques (forward-backward translation designs) as they are able to identify reliability and hence validity issues that went unresolved by the translation team. Another advantage is that statistical techniques elicit information directly from the participants, within the context of an actual test administration, and are thus extremely useful for identifying items that might pose problems in practice. In similar vein, researchers should provide information on the evaluation of validity in all target populations for whom the adapted versions are intended (Stansfield, 2003; Heo *et al.*, 2008).

The results show evidence that, in accordance with the ITC guidelines and the findings of Hambleton *et al.* (2005), the behavioural manifestations and interpretations of the constructs vary considerably across cultures. This is why construct validity evidence must be compiled in each population where the test will be used (Wang *et al.*, 2006). Given the challenges evident in the administration of the adapted CTRS-R: S, it should be emphasized that test administrators should be aware of the potential problems associated with test administration procedures and hence prepare appropriate materials and instructions. For this reason, knowledge of the culture and language of the target group is mandatory during the process of test adaptation so as not to moderate the validity of the inferences drawn from the scores. For example, had the test administrator of the CTRS-R: S not been drawn from the culture, she would have been unable to recognize the subtle messages contained in the pilot sample.

4.7 RESULTS AND DISCUSSION OF LEVEL ONE SUB-OBJECTIVE 5B

Level one sub-objective 5b: Investigate the discriminant validity of the adapted Arabic CTRS-R: S.

To answer level one sub-objective 5b, quantitative data was gathered by examining the differences in performances on the adapted CTRS-R: S between two contrasted groups: non-ADHD vs. ADHD clinically referred. T-test analysis was conducted to compare the means of the two groups.

A series of t-tests revealed that there were significant differences between the two groups on the total scale ($t = -4.636$, $p < 0.01$). Moreover, there were significant differences in favour of the clinically referred samples on the Cognitive Problems subscale ($t = 3.012$, $p < 0.05$). Table 4.8 summarizes the means, standard deviations and t-test measures of both groups on the adapted CTRS-R: S.

Table 4.8 Means (M), standard deviations (SD) and t-test for the referred and non-referred groups

	Non-referred		Referred		
CTRS-R: S subscales	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>t</u>
ADHD Index	12.50	7.82	16.27	8.24	-1.32
Cognitive Problems /Inattention	5.23	4.34	11.30	5.49	- 3.01*
Hyperactivity subscale	6.13	4.33	8.03	5.29	-1.0
Oppositional	5.07	4.26	3.23	4.33	0.78
Total score	53.03	27.71	131.3	60.96	-4.636**

* significance at $p < 0.05$

** significance at $p < 0.01$

Evidence for construct validity was established through the findings of the gender x age analysis of variance. Accordingly, the final evidence to construct validity was established through demonstrating the discriminant validity of the adapted scale. The series of t-tests showed statistically significant differences between the scores of two contrasting groups of children: ADHD and non-ADHD. This implies that the adapted CTRS-R: S discriminates between relevant groups.

Similar results, as discussed in section 2.21, were also evident. For example, several studies have documented the efficacy of the CTRS-R: S in differentiating between distinct diagnostic groups, such as hyperactive and normal children, learning disabled and regular education students, boys referred to juvenile court and a normal control group, and behaviour disordered and non-special education students (Conners, 1997). Moreover, as

discussed, the CTRS-R: S has been used to establish convergent validity for other ADHD scales and other measures of externalizing behaviours (Merrell *et al.*, 2001). It has also helped to examine differences in psychosocial impairment between girls with and without ADHD (Rucklidge and Tannock, 2001).

4.8 CHAPTER SUMMARY

This chapter presented and discussed the results of this study, which were obtained by working within the chosen conceptual framework, i.e. the biopsychosocial perspective and the ITC guidelines for test adaptation. The results were specifically compared to the international review of literature in Chapter 2, to other local studies and to similar studies that adapted the same or similar rating scales. The mode of presentation and the analysis were carried out chronologically by objective or by a cluster of inter-related objectives. Finally, the implications of these results and their application to practice were examined and

The narratives of the structured interviews with the two nominated psychiatrists revealed that referral of ADHD cases, prevalence and adaptation details of rating scales were similar in both cases. They differed in monitoring treatments and interventions. The type of interview employed by the psychiatrists when assessing patients with ADHD was not standardized, which might threaten the reliability of the results arrived at. Furthermore, the rating scales used by the psychiatrists might have yielded erroneous results since they were neither validated nor adapted to the Lebanese settings.

Given the paucity of literature available on the subject of the assessment of ADHD in Lebanon, two local studies investigating the prevalence of ADHD in Lebanon were analyzed and compared to one of the conceptual frameworks of this study, i.e. the ITC guidelines. It was highlighted that despite the significance and the contributions of these studies, their methodologies suggested that they did not employ instruments adapted to the Lebanese culture and language groups. Accordingly, their conclusions are based on the

measurements of imported instruments, whose reliability and validity have not been investigated with respect to the Lebanese sample. This raises significant questions, such as which norms were used to establish the statistical deviance of their participants, in addition to other concerns related to the English proficiency of the participants and their ability to complete the assessment tools used by the authors (e.g. CPRS).

The translation-related findings and the challenges resolved by the team of translators proved how essential it was to adapt the ITC guidelines, which was one of the conceptual cornerstones of this study. These challenges ranged from dialect and syntax of the Arabic language to the insertion of vowel pointing and finding equivalent terms. During the translation process, it became evident that researchers should take into account linguistic and cultural differences, including formats, conventions and directions that may lead the adapted test to be biased. In relation to the translation processes, empirical equivalence between the original CTRS-R: S and the adapted one was established through the acceptable correlation coefficient ($r=0.76$).

The normative sample of the adapted CTRS-R: S was developed in the form of percentile ranks for each age group (3–17 in three-year intervals) and by gender for the four subscales. Standard scores in the form of T-scores were calculated from raw scores to provide interpretive guidelines for practitioners. It was indicated that the adapted CTRS-R: S norms are higher for both genders and for each age level than the original CTRS-R: S norms. This might be attributed to the unstable and stressful conditions that Lebanese children have endured in recent times when the country was in the grip of civil war.

It was shown to be the case that internal reliability and test-retest reliability figures for the CTRS-R: S meet all standards of test excellence found in any reasonable methodology text. Evidence for construct validity was established through the findings of the gender \times age analysis of variance. In line with the reported literature on the prevalence of ADHD across gender, significant gender findings in favour of males were evident on almost all subscales, except the ADHD Index subscale, in which no significance gender differences were found. According to the developmental course of ADHD in the expression and type of symptomatology, significant age findings were evident on subscales showing memory and

learning problems (e.g. Cognitive Problems/Inattention) rather than on those showing disruptive behaviours (e.g. Hyperactivity). This confirms the conclusion of researchers that as the person grows older, ADHD becomes a problem of memory and learning rather than of disruptive behaviour (Hyperactivity). The final evidence to construct validity was established through demonstrating the discriminant validity of the adapted scale. A series of t-tests showed statistically significant differences between the scores of two contrasting groups of children (ADHD and non-ADHD). This implies that the adapted CTRS-R: S demonstrates acceptable clinical utility.

The psychometric properties of the adapted scale, both in terms of reliability and validity, would indicate that the adapted CTRS-R: S can be used for the assessment of ADHD. However, the CTRS-R: S can also have a much broader scope because it contains subscales for the assessment of conduct problems, cognitive problems, emotional problems and anxiety problems.

In summation, then, the results generated by this study provide evidence of the potential utility of the adapted version of the CTRS-R: S, but with an emphasis on the conclusion that accurate adaptations should be made to imported tests prior to applying them to a new population.

CHAPTER 5

CONCLUSION

In this concluding chapter the results obtained by this study are collated to produce general conclusions about the subject of ADHD. The focus is on revisiting the main objectives of this study, then summarizing the original knowledge that emerged from the research. Finally, we shall examine the important applications of this study for new directions in future research, make recommendations based on the findings and provide guidelines for how to improve the quality of adapted rating scales.

5.1 SUMMARY OF THE STUDY

The primary goal of this study was to adapt the CTRS-R: S to make it suitable for use with Lebanese nationals. However, through the findings stemming from the administration of the adapted CTRS-R: S to a sample of Lebanese students, the study also revealed new information about the presentation of ADHD in Lebanon.

The conceptual framework chosen to guide this work was twofold: the biopsychosocial perspective of ADHD and the ITC guidelines for adapting tests. In terms of the practical framework, the pragmatic paradigm, or mixed methods research, was adopted to allow a full investigation of the objectives and sub-objectives identified. In tandem with this, ethical concerns were addressed by employing the principles of voluntary participation, confidentiality and anonymity. We shall briefly set out each element in turn.

The advocates of the **biopsychosocial model** of ADHD indicate that the disorder is influenced by both biology and the social environment. They argue that ADHD is “socially constructed” (Purdie *et al.*, 2002; Cooper, 1997a), but that certain individuals, by virtue of

their biological inheritance and social circumstances, are more prone than others to being constructed as “disordered” in this way (Cooper, 1997b).

The **ITC guidelines** may be summarized as a cluster of judgmental and statistical methods and procedures for adapting tests, with special focus on procedures for identifying poorly adapted items, reducing threatening sources of bias occurring in the adaptation process and thereby increasing the total validity of adapted tests.

The **pragmatic paradigm** is the philosophical basis that underlies mixed methods research. It allows for both quantitative and qualitative methods to be employed in a single research study, giving a wider spectrum of knowledge and understanding of the subject. According to this paradigm, best practice means using whichever philosophical or methodological approach best fits for the particular research problem at issue (Creswell, 1994; 2003). It is, in other words, a tailormade approach to research, which was important for an issue as complex, multilayered and individual as ADHD.

The subject of both the conceptual and practical approaches was, of course, ADHD, the disorder under investigation in this study. Attention Deficit Hyperactivity Disorder is a diagnosis of the American Psychiatric Association (APA, 1994) and subjects with ADHD are commonly observed to have chronic difficulties with inattention and/or impulsivity/hyperactivity. They are believed to display these characteristics early in life and to a degree that is excessive and inappropriate for their age or developmental level, and also across a variety of situations that tax their capacity to pay attention, restrain their movement, inhibit their impulses or regulate their behaviours relative to rules, time and the future (Barkley, 2006). These symptoms interfere with a person’s family life and peer relations, as well as with their social functioning and education. In the specific case of Lebanon, there are presently no diagnostic criteria for assessment of ADHD and other behavioural disorders.

The causes of ADHD are not yet fully known. Tannock (1998) identified three major areas of theoretical exploration of the disorder:

1. Cognitive research

2. Neurobiological research
3. Genetic research

For example, cognitive research has tended to focus increasingly on impulsiveness as the significant feature of the disorder. Specifically, they emphasize that the fundamental problem is a dysfunctional response inhibition system. Barkley (1997) on the other hand, suggests an integrated model that connects neurologically based problems of response inhibition to adverse effects in four major “executive functions”. The family environment may also be significant in the development of ADHD, including factors such as, parenting skills, disorderly home environments, marital disagreements, maternal mental health and paternal personality factors. The implication here is that evidence from studies about the causes of ADHD create a compelling argument for ADHD as a biopsychosocial phenomenon. It also provides a sound base for recommending a multi-modal approach to intervention, combining medical, psychosocial and educational dimensions.

The National Institute of Mental Health (NIMH) estimates that in the United States between 3% and 5% of preschool and school-age children have ADHD, which means approximately two million children live with the disorder (Barkley, 2006). In the UK, this figure is estimated at between 3% and 9% of school-aged children and young people (NICE, 2008), with males outnumbering females by a ratio of 3/4:1 (Sharkey and Fitzgerald, 2007; Tannock, 1998). These estimates make ADHD the most prevalent of childhood behavioural disorders (Greenhill, 1998).

The developmental course of ADHD usually begins between the ages of 3 and 4 years, though some children show evidence of the disorder in early infancy, and others not until the ages of 5 or 6 years (Anastopoulos, 1999). The APA diagnostic criteria require the presence of symptoms before the age of 7 years (Cooper, 2008). It also commonly co-occurs with other serious behavioural disorders, such as Conduct Disorder and Oppositional Defiant Disorder (McArdle, 2007), and emotional disorders (such as anxiety and depression) (Barkley, 1998).

The symptoms of ADHD are persistent into adulthood, and studies have found that in adults the symptoms tend to be associated with serious relationship problems, marital breakdown, employment difficulties (Hinshaw, 1994) and crime/imprisonment (Farrington, 1990; Weiss and Hechtman, 1993; Young, 2007). Not surprisingly, school students with ADHD often have serious educational difficulties and under-perform academically, experiencing greatly reduced opportunities for entry into or success in higher education and associated problems with securing and maintaining employment (Kirley, 2007; Barkley, 1998).

In the wider public sphere, ADHD remains a controversial topic. Some commentators have dismissed as a medical construct that simply individualizes educational failure and disruptive behaviour (e.g., Lloyd and Norris, 1999; Skidmore, 2004; Slee, 1995). The effect of such individualization, it is argued, is to divert attention away from the roles that schools and teachers may play (intentionally or unintentionally) in the construction of learning and behavioural problems, and to allow educators to release themselves of their responsibility to provide appropriate educational opportunities to at-risk students.

This negative reaction is based on a number of erroneous assumptions. The first is that it is essential to choose between bio-medical and environmental explanations of learning difficulties because they are mutually incompatible. This view, ignores the most recent understanding of; (a) the relationship between biological and environmental factors in human development, (b) recent research in scientific and educational literature on ADHD. At worst, this portrayal of ADHD reflects a willful misrepresentation of the topic that is likely to hinder the development and dissemination of well informed and effective educational interventions, that would benefit many school students directly, and influence the development of educational practice in ways that would enhance student learning outcomes.

A major conclusion that is drawn from this discussion is that educationalists who deride recent research into ADHD are therefore acting on a misconception and are not only hindering the development of effective interventions for ADHD, they are also failing to exploit the educational potential of a bio-psychosocial perspective, that is likely to go well beyond the issue of responding to ADHD in schools. More worrying is the possibility that

an extreme and entrenched position on one side of the argument might lead to reciprocal entrenchment on the other. In this case, if that were to happen, then we might expect to see even more children being medicated without appropriate educational intervention being provided, which is to be avoided at all costs.

The key implication of this biopsychosocial perspective for education is that the more we understand about the biological and psychological correlates of ADHD, and similar conditions, the better placed we will be to provide educational environments that avoid exacerbating difficulties that children may experience and that promote instead their optimal educational engagement.

This is why it is so important and helpful to examine ADHD within the framework provided by the bio-psychosocial model. This approach reveals and encourages the concept of effective educational interventions, effective because they actually exploit the characteristics of ADHD rather than seek to inhibit them. This would also seem to be good educational practice and also be socially inclusive within the context-sensitive school community.

In a recent meta-analysis of interventions for ADHD, Purdie *et al.* (2002) found that educational interventions were the most effective methods in producing positive cognitive outcomes. In the main, students with ADHD will perform well in classroom environments that acknowledge and accommodate the involuntary difficulties they may have with:

- regulating their attention;
- motor activity;
- tendency towards impulsiveness.

In what is a very inspiring and hopeful outcome, educational interventions targeting the aforementioned difficulties were found to be second only to medication in achieving improvements in behaviour and superior to medication in producing improvements in social functioning.

In an attempt to work with and help children with behavioral disorders, like ADHD, a large number of rating scales have been crafted over the years. Many clinicians and researchers consider the use of reliable and valid teacher-completed rating scales as standard practice for the diagnosis and treatment of ADHD (American Academy of Child and Adolescent Psychiatry, 1997; American Academy of Pediatrics, 2000; Mattison, *et al.*, 2003). Rating scales are known to possess some advantages over other measures, including their capacity to capitalize on the judgments and observations of persons who are highly familiar with the child's or adolescent's behaviour, such as parents or teachers. Despite their measurement problems, such as bias of response and error variance, when combined with other measurements, these instruments should prove to be particularly useful in assessing children who have attention problems and hyperactivity.

For the purpose of this study, of course, all of this information needs to be applied in the Lebanese setting. Most, if not all, rating scales are available in different languages, but with few references to the Arabic language. They are generally developed on Western standards, too, and are not expected to yield equivalent mean scores across population groups. So why isn't a new rating scale developed specific to the Lebanese setting? The problem is that developing a new rating scale test would likely be costly, time-consuming and some items might be less efficient.

In view of the difficulty in creating new local tools, it becomes clear that there is a pressing need to select and adapt the available tools. In the absence of a rating scale adapted to suit the Lebanese culture, professionals are urged to adapt a valid and reliable instrument.

Accordingly, this study adapted the CTRS-R: S, according to the parameters established by the ITC guidelines. The CTRS-R: S was specifically chosen for its excellent psychometric properties and its wide use and application in research.

As a starting-point for this work, a review of literature was attempted. It quickly became apparent that there was no literature available, so a qualitative search for the profile of assessment of ADHD in Lebanon was initiated. This was achieved through standardized

open-ended interviews with two psychiatrists, followed by an analysis of the assessment procedures in two local studies.

Once the profile was in place, the ITC guidelines were then employed to translate and adapt the CTRS-R: S. Briefly, a team of seven competent translators, whose characteristics closely matched the requirements of the ITC guidelines, translated the CTRS-R: S using one of the most popular designs: the backward translation design. This involves two translators adapting the CTRS-R: S from the source language to the target language, after which a second pair of translators judges the equivalence of the two versions of the scales. This showed what revisions needed to be made and what problems needed to be solved.

To ensure the validity of the judgments about the equivalence of the two versions, a sample of respondents provided the translators with their interpretation of the scale. In addition, in a small pilot test participants completed the CTRS-R: S while thinking aloud. The researcher then interviewed the participants about translation-related issues. The translation process involved an empirical design as well, whereby bilingual participants of equal proficiency marked the CTRS-R: S according to a counter-balanced design (Arabic–English, English–Arabic). In this way, ability differences in participant characteristics were controlled, and then the ratings from these forms were correlated. To further support the validity of the translation, and in accordance with the ITC guidelines, the entire translation team judged the suitability of the sub-scale items to the Lebanese culture and environment. For example, care was taken to choose situations, vocabulary and expressions that adapted easily across the target language groups and cultures.

A survey approach was used to establish the normative properties of the adapted CTRS-R: S, based on the responses of a randomly selected sample of 823 Lebanese teachers who rated their students. This entailed establishing the internal consistency of the adapted Arabic CTRS-R: S and its test-retest reliability over a six- to eight-week interval. The construct validity of the adapted CTRS-R: S was established through the findings of the gender \times age analysis of variance. The final evidence to construct validity was established through demonstrating the discriminant validity of the adapted scale. A series of T-tests

was used to examine the differences in performance on the adapted CTRS-R: S between two contrasted groups: non-ADHD vs. ADHD clinically referred.

Norms were also reported for the total score and for the four subscales by gender for five different age groups (3–17 years old). Interpretive guidelines for practitioners in the form of T-scores were also developed to guide practitioners in the interpretation of the scores, specifically to show areas of strengths and concern.

5.2 SUMMARY AND DISCUSSION OF DATA

The narratives of the interviews conducted with the two psychiatrists revealed that the scales employed in their assessment procedures had not been adapted to the Lebanese setting. Where an adapted scale had been used, it was found that the adaptation process did not fulfil the requirements of the ITC guidelines. This fact alone should justify the carrying out of this study. Similarly, the analysis and critique of the two local studies revealed that their methodologies pointed to the fact that no instruments adapted to the Lebanese culture and language groups had been employed. This means the conclusions of those studies are based on the measurements of imported instruments, whose reliability and validity have not been investigated with respect to the Lebanese sample. Accordingly, the interview narratives and the analysis of the two studies raise important concerns as to the reliability and validity of the conclusions made either by the psychiatrists or by the authors of the local studies.

The translation-related findings and the challenges (e.g. dialect, vowel point insertion) resolved by the team of translators revealed the importance of following standardized and well-researched guidelines for adapting tests, such as the ITC guidelines. Throughout the translation process, it became evident that test-adaptation studies should consider both linguistic and cultural differences, including formats, conventions and directions that may render the adapted test biased. In relation to the translation processes, empirical equivalence between the original CTRS-R: S and the adapted one was established through the acceptable correlation coefficient ($r=0.76$).

As with the original CTRS-R: S, the internal consistency reliabilities of the Lebanese adapted version are high and suggest that an accurate, reliable assessment of teacher perceptions of children's misbehaviour can be obtained with the use of the adapted scale. Internal consistency coefficients were similar for the original CTRS-R: S and for the adapted one, ranging from 0.77 to 0.95 for the former and from 0.781 to 0.823 for the latter. The repeated, six-week test-retest reliability coefficients for the adapted scale, ranging between 0.81 and 0.93, provided further evidence for the stability and consistency of the scores over time. The reliability results also conform with results obtained from other, similar studies. One discrepancy should be noted, however. It was indicated that the adapted CTRS-R: S norms are higher for both genders and for each age level than the original CTRS-R: S norms. It is reasonable to suggest that this could be attributed to the civil war that has blighted the lives of Lebanese children in recent times.

The analysis of variance results were in line with the reported literature on the prevalence and expression of ADHD across gender and age. Specifically, significant gender findings in favour of males were evident on almost all subscales except the ADHD Index subscale, in which no significance gender differences were found. Furthermore, significant age findings were evident on subscales showing memory and learning problems (e.g. Cognitive Problems/Inattention) rather than on those showing disruptive behaviours (e.g. Hyperactivity). This confirms the conclusion of researchers that as a person ages, ADHD becomes a problem of memory and learning rather than of disruptive behaviour (Hyperactivity). Finally, the clinical utility of the adapted CTRS-R: S was established through the results of the T-tests, which revealed statistically significant differences between the scores of two contrasting groups of children, i.e. ADHD versus non-ADHD.

In summation, the psychometric properties of the adapted scale, both in terms of reliability and validity, indicate that the adapted CTRS-R: S can be used for the assessment of ADHD. The results generated by this study provide evidence of the potential utility of the adapted version of the CTRS-R: S. That evidence comes with a coda, however, that accurate adaptations should be made to imported tests prior to applying them to a new population.

5.3 THE CONTRIBUTION MADE BY THIS STUDY

Although evidence has accumulated in support of early identification and intervention for children who are at risk of developing ADHD, the professionals in Lebanon who must supply this information and intervention face many challenges. These challenges relate primarily to the need for and unavailability of a valid, reliable, inexpensive and easy way to administer a norm-referenced rating scale that could be used to establish the statistical deviance of child behaviour ratings. Such a scale should also permit multi-modal assessment and should take into consideration the cultural characteristics of Lebanese children/adolescents. The availability of such a scale could be of huge value to Lebanese epidemiologists in as much as it would provide a basic index of childhood psychopathology. It could also help teachers and psychologists to judge the efficacy of their interventions on the basis of the scale's scores. Finally, it would also be of benefit to clinicians in deciding when treatment is necessary, effective or should be terminated.

This study addressed a theoretical problem by proposing steps to apply empirical and qualitative designs to tests used in different cultures and languages in order to avoid sources of errors and invalidity arising from the test-adaptation process. The adaptation processes engaged in during this study were devised with the aim of being sufficient to make the CTRS-R: S suitable for use for clinical and research purposes. As a result, this study provides practitioners with a valid and reliable assessment tool. It will also serve as a guide for subsequent studies, where researchers could replicate its steps on the same instrument or another valid one. After all, it is the first study of its kind in Lebanon and therefore is pioneering a new approach to children with ADHD, their treatment and education.

It is the researcher's hope that this study will serve as a launch pad for subsequent studies in the Lebanese settings. Any subsequent studies dealing with adapting instruments for assessment of ADHD will need to establish convergent and divergent validity. This will be accessible now that researchers can use the CTRS-R: S to assess whether the instruments

they are studying correlate with other measures believed to measure the same construct, or what is known as convergent validity.

5.4 LIMITATIONS OF THIS STUDY

It is the case that there remains a limitation to this study with regard to validity. This limitation is attributed to the assumption affirmed by Sireci *et al.* (2006), who state that the validity of an instrument rests upon the weight of accumulated evidence from a number of validity studies, using different methodologies. There is no absolute way of knowing that a particular instrument actually measures a construct, since the construct can never be measured perfectly. Therefore, in support of construct validity, the user will still need to investigate whether the CTRS-R: S correlates with other measures believed to measure the same construct, or what is known as convergent validity. In addition, the user must ensure that the scale does not correlate with scales purported to measure different constructs, or what is known as divergent validity. The above two practices are, unfortunately, unfeasible for this study because of the absence of any other adapted and valid instruments in the Lebanese settings. To illustrate the problem, consider the question of divergent validity. In order to investigate divergent validity, the user would need to confirm that the scale does not correlate with scales that measure, for example, parents' perceptions as based on the consistent previous reports that parents and teachers perceive the same children and adolescents quite differently. Therefore, to be able to investigate divergent validity, the user would need an instrument that measures parents' perceptions. Access to a valid, reliable and, most importantly, an adapted instrument in accordance with the recent technical guidelines for test adaptation cannot be achieved because it is not present in the Lebanese settings.

A second limitation that must be noted relates to the manner in which data were collected. Teachers filled out forms on several children at the same time, whereas in typical clinical use the teacher rates one child of interest at a time.

5.5 RECOMMENDATIONS FOR FUTURE RESEARCH

As the concept of ADHD is likely to change as research continues, it is hoped that refinements and improvements in the conceptualization of ADHD will continue to shape future improvements for the adapted CTRS-R: S. The researcher would like to recommend future research on the adapted CTRS-R: S in the following areas.

1. Conducting factorial validity studies and examining the inter-correlations between the subscales to see if they meet theoretical expectations. Inter-correlations should also be examined for males and females separately, to ascertain if the same factorial framework fits both sexes.
2. Establishing convergent and divergent validity by correlating the scores of the adapted CTRS-R: S with measures believed to measure the same construct and with scales purported to measure different constructs, respectively.
3. Translating and adapting the Conners' Parent Rating Scale to establish a more comprehensive assessment of children with ADHD.

It is the researcher's hope that this study has set out the importance of investigating, understanding and improving the lives of children with ADHD. It is a difficult disorder to live with, creating, as it does, disharmony in home life, at school and among peer groups. If society dismisses the disorder, as some commentators have done, it will dismiss these children and abandon them to an isolated existence where their behaviour presents a huge obstacle to health, achievement and happiness. Studies such as this show that well-informed, behaviour-sensitive interventions can make a huge difference to these children's lives. This is why this study, and the ones that will hopefully follow from it, can make a real difference in the lives of its subjects.

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APPENDICES

Appendix 1

Conners Teacher Rating Scale Revised: Short Form

Child's Name: _____ Birth date: ____/____/____ <div style="text-align: center;">Month Day Year</div>	Gender: M F (Circle One) Age: _____ School _____ Grade: _____ Today's Date ____/____/____ <div style="text-align: center;">Month Day Year</div>
Teacher's Name: _____	

Instructions: Below are a number of common problems that children have in school. Please rate each item according to how much of a problem it has been in the last month. For each item, ask yourself "How much of a problem has this been in the last month?", and circle the best answer for each one. If none, not at all, seldom, or very infrequently, you would circle 0. If very much true, or it occurs very often or frequently, you would circle 3. You would circle 1 or 2 for ratings in between. Please respond to all items.	NOT TRUE At All (Never, Seldom)	JUST A LITTLE TRUE (Occasionally)	PRETTY MUCH TRUE (Often, Quite A Bit)	VERY MUCH TRUE (Very Often, Very Frequent)
1. Inattentive easily distracted	0	1	2	3
2. Defiant	0	1	2	3
3. Restless in the "squirmy" sense	0	1	2	3
4. Forgets things he/she has already learned	0	1	2	3
5. Disturbs other children	0	1	2	3
6. Actively defies or refuses to comply with adults	0	1	2	3
7. Is always "on the go" or acts as if driven by a motor	0	1	2	3
8. Poor in spelling	0	1	2	3
9. Cannot remain still	0	1	2	3
10. Spiteful or vindictive	0	1	2	3
11. Leaves seat in classroom or in other situations where remaining seated is expected	0	1	2	3
12. Fidgets with hands or feet or squirms in seat	0	1	2	3
13. Not reading up to par	0	1	2	3
14. Short attention span	0	1	2	3
15. Argues with adults	0	1	2	3
16. Only pays attention to things he/she is really interested in	0	1	2	3
17. Has difficulty waiting his/her turn	0	1	2	3
18. Lacks interest in schoolwork	0	1	2	3
19. Distractibility or attention span a problem	0	1	2	3
20. Temper outbursts; explosive, unpredictable behavior	0	1	2	3
21. Runs about or climbs excessively in situations where it is inappropriate	0	1	2	3
22. Poor in arithmetic	0	1	2	3

23. Interrupts or intrudes on others (e.g., butts into others conversations or games)	0	1	2	3
24. Has difficulty playing or engaging in leisure activities quietly	0	1	2	3
25. Fails to finish things he/she starts	0	1	2	3
26. Does not follow through on instructions and fails to finish schoolwork (not due to oppositional behavior or failure to understand instruction)	0	1	2	3
27. Excitable, impulsive	0	1	2	3
28. Restless, always up and on the go	0	1	2	3

Appendix 2

CTRS-R: S Items per Subscale

A. Oppositional (5 Items)

- 2. Defiant
- 6. Actively defies or refuses to comply with adults
- 10. Spiteful or vindictive
- 15. Argues with adults
- 20. Temper outbursts; explosive, unpredictable behavior

B. Hyperactivity (7 Items)

- 3. Restless in the "squirmy "sense
- 7. Is always " on the go" or acts as if driven b y a motor.
- 11. Leaves seat in classroom or in other situations where remaining seated is expected.
- 17. Has difficulty waiting his/her turn
- 21. Runs about or climbs excessively in situations where it is inappropriate.
- 24. Has difficulty playing or engaging in leisure activities quietly.
- 27. Excitable, impulsive

C. Cognitive Problems /Inattention (5 Items)

- 4. Forgets things he/she has already learned
- 8. Poor in spelling
- 13. Not reading up to par
- 18. Lacks interest in schoolwork
- 22. Poor in arithmetic

D. ADHD Index (12 Items)

- 1. Inattentive easily distracted
- 5. Disturbs other children
- 9. Cannot remain still
- 12. Fidgets with hands or feet or squirms in seat
- 14. Short attention span

- 16. Only pays attention to things he/she is really interested in
- 19. Distractibility or attention span a problem
- 23. Interrupts or intrudes on others (e.g., butts into others conversations or games)
- 25. Fails to finish things he/she starts
- 26. Does not follow through on instructions and fails to finish schoolwork (not due to oppositional behavior or failure to understand instruction)
- 27. Excitable, impulsive
- 28. Restless, always up and on the go
- 19. Distractibility or attention span a problem
- 23. Interrupts or intrudes on others (e.g., butts into others conversations or games)
- 25. Fails to finish things he/she starts
- 26. Does not follow through on instructions and fails to finish schoolwork (not due to oppositional behavior or failure to understand instruction)
- 27. Excitable, impulsive
- 28. Restless, always up and on the go
- 26. Does not follow through on instructions and fails to finish schoolwork (not due to oppositional behavior or failure to understand instruction)

Appendix 3

Competency and Qualifications of the Translators

The members on the translation team involved seven members. Their characteristics are listed below:

1. The first pair was involved in the forward translation processes. Both are translators bilingual. Both are knowledgeable of the cultures involved, especially the target one and the construct (ADHD). One has an MA in Educational Psychology and a Teaching Diploma in Special Education. The second teaches the English language to sophomore students at the American University of Science and Technology.

2. The second pair was involved in the back translation processes. Both translators are bilingual. Similarly, they are knowledgeable of the cultures involved. The second translator has a background in Educational Psychology, with an experience as an assistant to a psychiatrist whose major referrals to his clinic were ADHD cases.

3. Two coordinators were selected. The first coordinator has special education background and is an EdD candidate. The second coordinator is a cultural/ linguistic anthropologist, and she is the chairperson of the Humanities department at Notre Dame University. She has been involved in several cultural studies.

4. A third independent translator was invited to mediate in the case of multiple or fundamental disagreements. He is the chairperson of the English and Translation Department at the American University of Science and Technology.

Appendix 4

Structured Interview Agenda

Establishing Rapport and Explaining the Purpose
<p><i>This questionnaire helps psychologists, psychiatrist, and students with special problems, conduct or attention.....</i></p> <p>It has originally been written in English and it is now translated into Arabic, I want to make sure that the translated items on this scale would cause no problems to other teachers who are going to complete it, and sometimes for several times to monitor treatment interventions. For that purpose, I am asking your help. I will ask you first to complete it and preferably while thinking aloud if possible. After that, I will ask you some questions to make sure items were translated in the right way.</p>
The Structured Interview
1. Did you have difficulty rating any of the items, (let's start from number 1) (Probe: can you tell me what was difficult about it)
2. Were any of the items confusing? (Probe: can you tell me what was confusing about them)
3. Have you found any words that were difficult to understand, in terms of student's performance or behavior? (Probe: can you tell me which words were difficult to understand, were the problem related to meaning or was the problem related to rating such behaviors)
4. How would you have written such a phrase?

Appendix 5

Sample of a Participant's Response Sheet (To be completed by the interviewer)

Participants' Reflections	Item #	Comments
1. Difficulty in answering?		
2. Confusing ?		
3. Dissimilarity or variation in behavior		
4. Alternative phrasing?		

Appendix 6

Summary of Participant's Responses by Item

Participants' Reflections	Number of Participant's Answering Yes	Item #	General Comments
1. Difficulty in answering?			
2. Confusing?			
3. Dissimilarity or variation in behavior ?			
4. Alternative phrasing?			

Appendix 7

The Adapted CTRS-R: S

الرجاء تعبئة هذه الاستمارة مع العلم ان اجاباتك ستحفظ بسرية تامة:

اسم المدرّس/ة: اسم المدرسة:

الجنس: ذكر / أنثى اسم التلميذ/ة:

العمر: تاريخ الولادة:

الشهر / اليوم / السنة

توقيت ملء الاستمارة: المرحلة الدراسية (الصف):

تاريخ ملء الاستمارة: (الشهر / اليوم / السنة)

في الاستمارة التالية عبارات تظهر عدداً من المشاكل السلوكية و المسلكية التي نلاحظها في تصرفات التلميذ في المدرسة. ضع دائرة حول

الاجابة المناسبة لكل تصرف قام به التلميذ مراعيًا نسبة تكرار التصرف على مدى شهر. ان علامة صفر تعني عدم حدوث و علامة (1)

تعني ان التصرف قليلاً ما يحدث، و علامة (2) تعني غالباً ما يحدث، و علامة (3) تعني دائماً ما يحدث

على سبيل المثال:

أبداً	قليلاً	غالباً	دائماً	2. يتحدّى الآخرين
0	1	2	3	
أبداً	قليلاً	غالباً	دائماً	
0	1	2	3	1. منصرف الذهن، يلهي بسرعة
0	1	2	3	2. يتحدّى الآخرين
0	1	2	3	3. مرتبك
0	1	2	3	4. ينسى ما تعلّمه
0	1	2	3	5. يُزعج الأولاد الآخرين
0	1	2	3	6. يتحدّى أو يرفض بشدة الانصياع لمطالب الكبار

3	2	1	0	7. في حركة مستمرة طيلة الوقت
3	2	1	0	8. ضعيف في التهجنة
3	2	1	0	9. لا يستطيع ان يبقى هادئاً
3	2	1	0	10. حاقد، انتقامي
3	2	1	0	11. يترك مكانه في الصف أو في المواقف التي تتطلب لجلوس المستمر
3	2	1	0	12. يُحرك يديه و رجليه بعصبية و يتململ في مقعده
3	2	1	0	13. قراءته ضعيفة بالمقارنة مع أقرانه
3	2	1	0	14. مدة التركيز عنده ضعيفة
3	2	1	0	15. يُجادل الكبار
3	2	1	0	16. ينتبه (او يكثرث) للأشياء التي تهمة فقط
3	2	1	0	17. يجد صعوبة في انتظار دوره
3	2	1	0	18. يفتقر الاهتمام بالنشاط المدرسي
3	2	1	0	19. الالهاء و القدرة على التركيز تسبب له مشكلة
3	2	1	0	20. ينفجرُ غاضباً و تصرفاته غير متوقعة
3	2	1	0	21. يجري و يتسلق كثيراً في أمكنة غير مناسبة لذلك
3	2	1	0	22. ضعيف في الحساب
3	2	1	0	23. يقاطع او يتدخل مع الآخرين في مناقشاتهم او ألعابهم
3	2	1	0	24. يجد صعوبة في اللعب او الانشغال بنشاطات ترفيهية بهذوء
3	2	1	0	25. يفشلُ بانهاء المهام التي يبدأها
3	2	1	0	26. لا يتبع التعليمات الى النهاية و يفشل في انهاء واجباته (ليس لأنه سلبي أو لأنه لا يفهم التعليمات)
3	2	1	0	27. يثور بسهولة، متهور
3	2	1	0	28. كثير الحوصلة والحركة، لا يهدأ

Appendix 8

Standardized open ended interview schedule

Establishing rapport and explaining the purpose

As you may know, I am adapting the CTRS-R: S. In my thesis I will need to address the assessment of ADHD in Lebanon and it is difficult to find resources about that. Hence, I am interested in knowing more about ADHD assessment and diagnosis from you. I shall also be interviewing another child psychiatrist. Please note that I shall not mention the name of your institution **(Introduce the informed consent and have them sign it)**.

Standardized open ended interview schedule

1. Do you deal with ADHD patients?
(Probe: How many do you see /day or week?)
2. How are they referred?
(Probe: By school? Parents?)
3. Do you have more males or female patients?
(Probe: do they differ in their behaviors)
4. How do you go about diagnosing? What instruments do you use for diagnosis?
(Probe: Interviews: what type of questions do you usually ask?)
5. Do you administer interviews with the teachers? Do you ask them questions over the phone?
6. Do you use teacher rating scales?
(Probe: Are your scales adapted? Can I have a copy?)

7. Do you have normative data for your teacher rating scales?
8. At what time of the academic year do you usually send the rating scales to the teachers?
9. Do you have rating scales for parents?
(Probe: self-reports?)
10. Do you prescribe medications? Are they effective? How do you monitor the effectiveness of medications?
11. Do you provide any interventions?
(Probe: How do you monitor interventions?)

Appendix 9

Letter Addressed To Schools

تحية طيبة و بعد،

أنا طالبة في قسم دكتوراة في جامعة "Leicester". من ضمن مقتضيات التخرج، أن أقوم بدراسة تهدف الى تطوير معايير "مقياس كونورز" (1997) باللغة العربية بحيث يتناسب و بيئة التلميذ اللبناني. هذا المقياس يختص بقياس سلوك و تركيز التلميذ.

نأمل أن تشمل عينة الدراسة مدرستكم بحيث توافقون على الاستعانة بخبرات بعض أعضاء الهيئة الدراسية في مدرستكم الموقرة. يستلزم ملء الاستمارة 10-15 دقيقة من قبل استاذ او معلمة الصف لعينة من التلامذة مختارة عشوائياً من كل صف.

تفضلوا بقبول فائق الاحترام

تانيا الأغر

Appendix 10

Informed Consent Form

Dear _____,

I am in the process of norming and validating the Revised Form of the Conners' Teacher Rating Scale (CTRS-R: S) under the supervision of Dr. Paul Cooper (School of Education, University of Leicester) as part of my thesis requirement.

The research question embodied in my study addresses early intervention, the difficulties inherent in the assessment of ADHD, and the need for the availability of a practical scale suitable for the Lebanese settings. In light of the above, the CTRS-R: S was adapted to the Lebanese culture. The CTRS-R: S was translated according to one of the most popular designs: the backward translation design that involves a group of translators adapting the CTRS-R: S from the source language to the target language. Then, another group of translators judged the equivalence of the two versions of the scales. Revisions were made and problems identified by the translators were corrected. To ensure the validity of the judgments about the equivalence of the two versions, a sample of respondents provided the translators with their interpretation on the scale. In the empirical design, bilingual participants of equal proficiency subsequently marked the CTRS-R: S according to a counter balanced design (Arabic – English, English – Arabic). In this way, ability differences in participant characteristics were controlled. Then, the ratings from these forms were correlated.

As for the face validity of the adapted CTRS-R: S, both groups of translators that were involved in translating the scale judged the suitability of the sub- scale items to our culture and environment. For example, care was taken to choose situations, vocabulary, and expressions that adapted easily across the target language groups and culture.

The rest of my study aims at developing norms for the total score and for the 4 subscales in terms of percentiles and T- scores by sex and for the different age groups (3 till 17 years old). The study also aims at establishing the reliability of the CTRS-R: S. The instrument's internal consistency as well as its consistency over time will be established for the whole instrument and for each of the 4 sub- scales. Moreover, the construct validity of the instrument will be investigated by examining the differences in performances on the scales between two- contrasted groups. Means and standard deviations for both groups on the adapted CTRS-R: S will be calculated. Then t-test to compare the two means will be calculated to assure the discriminatory effect of the scale.

Accordingly, the involvement of your institution would enhance the achievement of developing the normative properties of the adapted CTRS-R: S. When I write up my report, I will never use names. The only people who will be able to see all the information I collect are my supervisors at the School of Education and me. The University of Leicester has very strict rules that protect the privacy of people who take part in research studies. I will do all I can to make sure that your privacy is respected. If you wish, you may leave the study at any time. Once the study is finished, I would like your permission to publish the study in journals and books and to present it in conferences. You are also entitled to have a copy of the study upon request.

Best regards,
Tania Al Aghar

Dear Tania,

I have read your letter above describing the research project you plan to do. I agree with the project and am willing to take part in (please tick the box ☐)

☐ Interview

☐ Survey

I understand that I can leave the project at any time.

Signed: _____ Date: _____

Appendix 11

Percentiles of the Different Subscales of the Adapted CTRS-R: S by Sex and Age

Percentiles for Females (F) and Males (M) for Different Age Groups for the Oppositional Subscale										
Age Groups										
	3-5		6-8		9-11		12-14		15-17	
PR	M	F	M	F	M	F	M	F	M	F
5										
10										
15									1.00	
20									1.00	
25			1.00						2.00	
30			1.00		1.00		1.00		2.00	0.40
35	1.00		1.00		1.00		1.00		3.00	1.00
40	1.00		2.00		1.00		2.00	1.00	3.00	1.00
45	1.10	1.00	2.00		1.50		2.00	1.35	4.00	1.60
50	2.00	1.00	2.00		2.00		2.00	2.00	5.00	2.00
55	2.00	1.00	3.00	1.00	2.00		3.00	3.00	6.00	2.00
60	2.80	1.80	3.40	1.00	3.00	1.00	3.40	3.00	6.00	3.00
65	3.00	2.00	4.00	1.00	3.00	1.00	4.00	3.95	7.00	3.00
70	4.00	2.00	5.00	1.90	4.00	2.00	5.00	4.10	8.00	4.00
75	4.00	3.00	5.00	2.00	4.00	2.50	5.00	5.00	9.00	5.00
80	5.00	3.00	6.00	2.00	5.00	3.00	6.00	6.40	9.00	5.00
85	6.00	4.00	8.40	3.00	7.00	4.00	8.00	8.00	10.00	6.00
90	7.00	6.00	11.00	4.00	8.00	5.00	10.00	9.00	11.00	8.00
95	8.00	8.60	13.80	6.15	10.00	6.30	11.05	10.85	13.00	9.60
99			16.96		12.90		16.00			

Percentiles for Females (F) and Males (M) for Different Age Groups for the Cognitive Problems / Inattention Subscale										
Age Groups										
	3-5		6-8		9-11		12-14		15-17	
PR	M	F	M	F	M	F	M	F	M	F
5										
10										0.80
15									1.00	1.00
20	1.00						1.00		1.00	2.00
25	1.00		1.00		1.00		2.00	0.75	2.00	2.00
30	2.00		2.00	1.00	2.00	1.00	3.00	1.00	3.00	3.00
35	3.00		2.00	1.95	2.00	1.90	3.00	1.00	4.00	4.00
40	3.00	1.00	3.00	2.80	3.00	2.00	4.00	1.00	4.85	4.20
45	4.00	2.00	4.80	3.65	4.00	3.00	5.00	2.00	6.00	5.00
50	5.00	2.00	6.00	4.00	5.00	3.00	5.00	2.50	7.00	6.00
55	6.00	3.00	7.00	5.00	6.00	4.00	6.00	4.00	7.00	7.00
60	6.80	3.80	8.00	6.00	6.00	4.40	7.00	4.00	8.00	8.00
65	7.00	4.20	8.00	7.00	7.00	6.00	8.00	4.95	9.00	9.00
70	8.00	6.00	9.60	7.90	8.00	7.80	8.30	5.00	9.00	9.60
75	9.00	7.00	10.00	9.00	10.00	9.50	9.25	6.00	10.00	11.00
80	9.40	8.00	13.00	11.00	11.00	10.00	11.00	7.00	11.00	12.00
85	10.00	9.00	15.40	11.45	11.00	11.90	12.15	8.55	12.00	13.00
90	14.20	10.20	17.00	13.30	14.00	13.60	14.00	10.00	13.35	14.00
95	17.10	12.60	19.00	18.15	17.00	14.90	16.05	11.00	15.90	16.00
99			22.96		23.90		23.81		18.90	

Percentiles for Females (F) and Males (M) for Different Age Groups for the Hyperactivity Subscale										
Age Groups										
	3-5		6-8		9-11		12-14		15-17	
PR	M	F	M	F	M	F	M	F	M	F
5	0.90		1.00				1.00			
10	1.00		1.00				1.00		1.00	0.80
15	1.00		2.00	1.00	1.00		2.00		1.00	1.00
20	2.00		2.00	1.00	1.00	1.00	2.00	1.00	1.20	1.60
25	3.00	1.00	3.00	1.00	2.00	1.00	2.00	1.00	2.00	2.00
30	3.40	1.00	3.00	1.00	3.00	1.00	3.00	1.00	2.00	2.00
35	4.00	2.00	3.00	2.00	3.00	1.00	3.00	2.00	3.00	2.00
40	4.00	2.00	4.00	2.00	4.00	1.00	4.00	2.00	3.00	3.00
45	5.00	3.00	5.00	2.00	4.00	2.00	4.00	2.00	4.00	3.00
50	5.00	3.00	5.00	3.00	5.00	2.00	5.00	2.00	4.00	3.00
55	6.00	3.00	5.00	3.00	5.00	2.00	5.00	2.00	5.05	4.00
60	6.00	4.00	7.00	3.00	6.00	2.00	6.00	3.00	6.00	4.00
65	7.00	4.00	7.00	4.00	6.50	3.00	6.00	3.00	7.00	5.00
70	7.60	4.60	8.00	4.00	7.00	3.00	7.00	4.10	8.00	5.00
75	8.00	5.00	9.00	5.00	8.50	3.00	7.00	5.00	8.25	6.00
80	9.00	5.40	10.00	6.00	10.00	4.20	8.00	5.80	9.00	6.40
85	10.30	7.00	11.00	7.00	11.00	5.00	8.00	7.55	9.35	7.80
90	11.00	10.00	13.00	7.30	15.00	7.00	12.00	8.00	10.00	8.20
95	13.00	12.60	16.00	9.00	17.90	9.60	14.00	9.00	12.00	11.00
99			19.00				18.43			

Percentiles for Females (F) and Males (M) for Different Age Groups for the ADHD Index										
Age Groups										
	3-5		6-8		9-11		12-14		15-17	
PR	M	F	M	F	M	F	M	F	M	F
5	1.00		.20				1.00		1.00	
10	2.00		1.40				1.00		2.00	
15	2.00		2.00		1.00		3.00		2.00	
20	3.00	1.00	3.00	1.00	2.00		3.00	1.00	3.20	1.00
25	4.00	1.00	4.00	2.00	2.50	.50	4.00	1.00	4.00	1.00
30	5.00	2.00	5.00	3.00	4.00	1.00	5.00	2.00	4.30	2.00
35	6.00	2.00	6.40	3.95	5.00	2.00	6.00	2.05	5.00	2.00
40	6.00	2.20	7.00	4.80	5.00	2.00	7.00	3.00	7.00	3.00
45	7.10	4.00	8.00	5.00	7.00	3.00	8.00	3.35	8.00	3.00
50	9.00	5.00	9.00	5.50	8.00	3.00	9.00	4.00	10.50	3.00
55	9.00	6.00	10.00	6.00	9.00	4.00	10.00	5.00	11.00	4.00
60	10.8	6.80	11.40	7.00	10.00	6.00	11.00	6.00	13.00	4.00
65	12.00	7.20	12.60	8.00	13.50	7.00	12.00	8.00	15.00	5.00
70	13.00	9.00	15.00	9.00	15.00	8.80	14.00	9.10	15.00	5.00
75	14.00	10.0	17.00	10.00	16.00	10.00	15.00	10.25	17.00	6.00
80	15.40	12.0	20.00	11.00	18.00	11.20	17.20	12.00	17.80	7.00
85	17.00	14.0	23.40	13.00	20.00	12.90	20.00	14.10	20.00	7.00
90	19.00	15.0	26.00	16.00	23.00	15.20	23.10	15.70	21.00	9.00
95	22.00	24.6	30.80	18.30	26.00	19.60	28.05	17.00	25.35	10.00
99			35.96		34.60		33.62			