4
ASQ-3 and ASQ-BR

ASQ-3 is a screening instrument that aims at detecting possible developmental problems in children between one month and five and a half years old (Squires et al., 2009). The objective of each questionnaire is forwarding the child to proper professional care in case of suspicion of delay in some cognitive or motor domain.

In most countries early detection of development disorders is a key element to decrease gaps and provide children with proper healthcare so as to grow properly (Fiester, 2010; Salvia, Ysseldike, & Bolt, 2010). There is plenty of evidence in the literature that daycares and preschools provide children with healthier development as well as better cognitive indicators ahead in life if compared to strictly residential programs – when children are exclusively cared by parents (Lonigan, Burgess, & Anthony, 2000; Nelson, Westhues, & MacLeod, 2003; Thatcher Kantor, Wagner, Torgesen, & Rashotte, 2002). Therefore, it can be assumed that periodical evaluations are recommended to those institutions with three main objectives: (1) identify as early as possible domains in which there may be developmental delay in order to establish psycho-educational strategies of intervention to improve children conditions, (2) identify children with high latent cognitive potential so as to implement psycho-educational strategies to improve their abilities and (3) be the foundation for the improvement of educational programs aiming at better performance. (Brenneman, Stevenson-Boyd, & Frede, 2012; Cipani & Shock, 2011; Fiester, 2010; Leung, Mak, Lau, Cheung, & Lam, 2004; A. J. Reynolds, Temple, & Ou, 2010; Salvia et al., 2010; Verkerk et al., 2011, 2012).

ASQ-3 has been used in several educational programs with periodical evaluations – Head Start in the United States (Vinovskis, 2005); Mohawk in Canada (Dionne, McKinnon, Squires, & Clifford, 2014); Latino do Sul in California, U.S.A. (Melendez, 2012); A-Tempo in Galicia, Spain (Campos, Squires, & Ponte, 2011) and LAUP in Los Angeles, U.S.A. (López, 2013). In Brazil, SME-RJ has implemented the first initiative for an integrated evaluation and intervention program for children enrolled in daycares and preschools, *Primeira Infância Completa* (Pádua, 2011). For that, the first two instruments adopted were ASQ-3 (Filgueiras, 2011; Squires et al., 2009) and Early Childhood Environmental Rating Scale – ECERS (Campos-de-Carvalho & Bhering, 2006; Harms, Clifford, & Cryer, 2009; Harms & Clifford, 1980). The measure adaptation was done through two research groups with different goals: ASQ-3 evaluates global development and tries to identify latent potentials in Rio de Janeiro's children; ECERS carefully evaluates educational programs, environment and teacher-child interaction. The two types of measuring, though different, complement each other.

The instrument is used by parents through the fulfillment of one among 21 possible questionnaires according to the age of the child. The intervals were determined according to empirical evidence found by the authors of the instrument and are based on Piaget and Gesell's development theories, addressed on the last topic. The age categories start at the first month of age, have variable lengths and are designated: 2, 4, 6, 8, 9, 10, 12, 14, 16, 18, 20, 22, 24, 27, 30, 33, 36, 42, 48, 54 and 60 months (Squires et al., 2009). Illustration 1 (IBNeC, 2011), on the next page, shows ASQ-3's age categories.

Illustration 1

Questionnaire	Age range	Interval
2	1 month and 0 day to 2 months and 30 days	2 months
4	3 months and 0 days to 4 months and 30 days	2 months
6	5 months and 0 days to 6 months and 30 days	2 months
9	7 months and 0 days to 8 months and 30 days	2 months
8	9 months and 0 days to 9 months and 30 days	1 month
10	9 months and 0 days to 10 months and 30 days	2 months
12	11 months and 0 days to 12 months and 30 days	2 months
14	13 months and 0 days to 14 months and 30 days	2 months
16	15 months and 0 days to 16 months and 30 days	2 months
18	17 months and 0 days to 18 months and 30 days	2 months
20	19 months and 0 days to 20 months and 30 days	2 months
22	21 months and 0 days to 22 months and 30 days	2 months
24	23 months and 0 days to 24 months and 15 days	2 months
27	24 months and 0 days to 28 months and 15 days	2 months
30	28 months and 0 days to 31 months and 15 days	2 months
33	31 months and 0 days to 34 months and 15 days	3 months
36	34 months and 0 days to 38 months and 30 days	3 months
42	39 months and 0 days to 44 months and 30 days	3 months
48	45 months and 0 days to 50 months and 30 days	4 and 1/2 months
54	51 months and 0 days to 56 months and 30 days	6 months
60	57 months and 0 days to 65 months and 30 days	6 months

ASQ-3-BR age intervals (IBNeC, 2011).

Since children tend to present faster development during the first stages of life and slower development as they get older (Piaget, 1953), questionnaires of older children encompass smaller intervals if compared to questionnaires of younger children. Each age interval evaluated five domains of development: (1) Communication, (2) Gross Motor Coordination, (3) Fine Motor Coordination, (4)

Problem Solving and (5) Personal/Social. According to Filgueiras (2011), that corresponds to one of the largest ranges of age intervals and developmental domains evaluated by a single screening instrument. Table 1 shows the definition of each domain according to Squires et al. (2009).

Table 1. ASQ-3 domains and theoretical definitions for item construction.

ASQ-3 domain:	Definitions (Squires et al., 2009; our translation):
Communication	"Ability to babble, vocalize, speak, listen and understand. Structure and express some thought so that his/her interlocutor understands it. Simple verbal structures, some speech complexity and correct use of plurals, complex and conditional verbal tenses".
Gross Motor Coordination	"Broad bodily movements. Move arms to complete simple tasks as throwing an object or leaning against walls or handrails. Leg and feet coordination for balance and moving,"
Fine Motor Coordination	"Movement and coordination of fingers and fingertips, ability to use tools like knobs, scissors, taps, pencils and pens".
Problem solving	"Respond appropriately to external and internal demands of the environment, such as: taking an object from inside another, handling two pieces of information at the same time, imitating or copying adults, attributing meaning, recognizing and categorizing objects and people."
Personal/Social	"Ability to be independent and relate to other children and adults. Verify if: the child looks for help when needs something, is able to engage in relationships with other people, can identify with elements socially established for his/her individuation, is independent in daily tasks like eating, getting dressed, and cleaning him/herself."

4.1
The importance of good transcultural adaptation

Good psychometric analyses are important not only because of the characteristics of scales. They should comply also with the peculiarities of the culture from which the sample is extracted. The literature offers several reasons in favor of careful adaptation instruments, so that they are not limited to a mere translation (Borsa, Damasio & Banner, 2012). The first reason is the language barrier. Instruments created in languages other than those of the respondents must necessarily be translated. However, how to ensure that the content and meaning of a question remains intact after translation and that respondents really have access to what the original author of the scale meant?

An example of this problem is the translation of ASQ-3's (Squires, Bricker, Twonbly, & Potter, 2009) item "Does your child eat cookies by him/herself?" into the Brazilian Portuguese version as "*A criança come biscoitos sozinha?*" (Filgueiras, 2011). The translation was direct and there was virtually no change in the text but the item showed poor psychometric properties and jeopardized the reliability of the scale it belonged to. One possible explanation for the problem is the difficulty keeping the semantic content identical in both. The term 'cookie' refers to a specific type of sweet pastry in the United States usually baked with chocolate chips, be it homemade or industrially processed. Crackers in American English are commonly considered snacks while homemade cookies are called biscuits. The term 'cookie' (*biscoito*) has a much broader sense in Brazilian Portuguese and refers to "any mass or cluster of spices cooked in the oven" (Holland, 2010). So, the semantic meaning of 'cookie' is different from the meaning of *biscoito* in Brazilian Portuguese. That is an example of variables that can jeopardize internal consistency in a scale.

Borsa et al. (2012) teach that adapted versions should respect not only the fluency of the target language but also: a) linguistic peculiarities, as the example above; b) cultural features – children in northeastern Brazil usually eat with hands or a spoon while children in southern Brazil eat with forks in comparably younger ages; c) contextual particularities – an instrument made for the therapeutic setting is different from one to be applied on a large scale and d) scientific evidence

about the construct being assessed. The latter is of utmost importance when an item or a scale is being adjusted. The item mentioned above (Filgueiras, 2011; Squires et al, 2009) is part of a scale that assesses a construct regarding children's personal and social contexts. According to Squire's definition (Squires et al., 2009), the purpose of that scale is:

> "Presenting topics related to children's independence and their relationships with other children and people. Identify whether: the child seeks help when he/she need something, the child develops relationships with other children, identifies with socially established elements aiming at individuation, shows independence in daily tasks such as eating, dressing and personal cleaning."
>
> (Squires et al., 2009; our translation)

Following her definition, the construct assessed by the item is the child's independence at mealtime: "(...) shows independence in daily tasks, like eating (...)" (Squires et al., 2009). The goal is determining if the child is independent enough to eat an appetizer or some food not considered a meal by him/herself. The literature on child development asserts that very young children are able to quickly learn how to interact with the environment and perform motor activities related to picking up and eating small portions of food, like a cookie (Piaget, 1953; Squires et al, 2009), but not small to the point of being eaten by the child with only one bite. In the latter condition, the child would not show proper management of his/her cognitive and motor functions. Considering the definition of 'biscuit' in Brazilian Portuguese, it may be inferred that a cookie is small enough to be swallowed with one bite by the child. Because of that, the item in Brazilian Portuguese would refer to the same construct as the one in the American version – the child's independence – but ultimately whether the child can chew and/or swallow. That is a possible explanation for the statistical problems of the item in ASQ-BR, *i. e.*, the Brazilian item does not refer to the semantic content of the original construct.

The International Test Commission (ITC, 2010) has met since 1992 to build guidelines for the translation, adaptation and validation of instruments for varied application contexts. The most recent guidelines date back to 2010 and can

be found at the link http://www.intestcom.org/upload/sitefiles/40.pdf (ITC, 2010). ITC highlights that the adaptation must consider the application context. ASQ-3 (Squires et al., 2009) was developed to be responded by parents regarding their children's behavior. ASQ-BR (Filgueiras, Pires, Maissonette, & Landeira-Fernandez, 2013; Filgueiras, 2011) was, in turn, adapted to be used in the context of public municipal daycares and preschools of Rio de Janeiro. The different respondents might be an influential variable regarding items.

Another topic to be taken into consideration is that the Municipal Secretary of Education of Rio de Janeiro (SME-RJ) follows nutritional recommendations by the National Program of School Nutrition (PNAE) according to federal law Nr. 11947 from 16/06/2009 (Brasil, 2009). It states the advertisement of food items in public municipal daycares and preschools in Rio de Janeiro is only allowed according to certain rules – available at the Rio de Janeiro City Hall website (Rio de Janeiro, 2014). PNAE makes no specific reference to 'cookies' in daycare menus and that allows wondering if some teachers understood that *biscoitos* could also refer to 'cookies'. This way some teachers may not have observed the behavior mentioned in the item, what may have increased the chances of the item to have been compromised. Issues regarding adaptation to the context of test application must be carefully evaluated so that scales are properly adapted (Borsa et al., 2012).

4.2
ASQ-3's transcultural adaptation into ASQ-BR

ASQ-3's adaptation to the Brazilian version, ASQ-BR, was made by Filgueiras (2011) and deeper psychometric analyses were published in 2013. The process of transcultural adaption consisted of back translation and evaluation by experts, two of the methods recommended by Borsa et al. (2012). According to Filgueiras (2011), the first step was providing translations by three bilingual independent translators. The versions produced by each translator were evaluated

by the panel of experts according to each construct. No assertion is made in Filgueiras (2011) about concerns of experts regarding the daycare and preschool samples. They just knew who the target audience for ASQ-BR was. That could actually be an indication that not all ITC's recommendations were accomplished during the adaptation process (ITC, 2010).

After the translated version, ASQ was back-translated into English by an independent American translator who was fluent in Portuguese. Afterwards, the final version was evaluated by the panel of experts (all Portuguese-English speakers) who compared the semantic content of the original version to the back-translated one. Filgueiras et al. (2013) inform that a pilot study was performed among 120 children before the final version of the test. Issues regarding adequacy of the items to those children's real context may have arisen though there are no reports of those. Despite that, Filgueiras et al. (2013) state that suggestions of the children's teachers were incorporated into ASQ-BR. That may be seen as evidence that adaptation to the target audience was an important issue during the pilot test.

An important criterion to recognize the quality of a cultural adaptation is the similarity between the statistical results of the original and adapted versions (Borsa et al., 2012). Filgueiras's results (2011, 2013) are quite similar to those of the American sample (Squires et al., 2009) in terms of the reliability measured by Cronbach's alpha. Nevertheless, the descriptive statistics of the Brazilian sample seem to be lower than the American sample's, with a variance ranging from ½ SD – in domain Communication in age interval 6 months – to 1 SD – in domain Personal/Social, age interval 10 months. Despite those data, no conclusion about statistical differences in the descriptive data can be provided, since null hypothesis inferential tests were not performed in order to empirically show some difference in the averages.

The authors informed that the first version of ASQ-BR was successfully adapted, thus with a few psychometric problems in items and scales. Besides such limitation, validity could only be attested regarding ASQ's content – content validity is supposed to be verified by a panel of experts in the instrument's field of knowledge (Cohen & Swerdlik, 2009). None of the other types of validity –

predictive, clinical, convergent and divergent – were observed (Borsa et al., 2012; Pasquali, 2007, 2008). This study agrees with the comment by Filgueiras (2011) about the absence of other types of validity in his study and his recommendation that the other validity types should be verified in further studies on ASQ-BR, though that was not the focus of this dissertation.