Title:

Assessing prosodic skills in five European languages: cross-linguistic differences in typical and atypical populations

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Abstract:

Following demand for a prosody assessment procedure, the test “Profiling Elements of Prosody in Speech-Communication” (PEPS-C), has been translated from English into Spanish, French, Flemish and Norwegian. This provides scope to examine receptive and expressive prosodic ability in Romance (Spanish and French) as well as Germanic (English and Flemish) languages, and includes the possibility of assessing these skills with regard to lexical tone (Norwegian). Cross-linguistic similarities and differences relevant to the translation are considered. Preliminary findings concerning eight-year-old neurotypical children speaking the five languages are reported. The appropriateness of investigating contrastive stress in Romance as well as Germanic languages is considered: results are reported for assessing this skill in Spanish and English speakers and suggest that in Spanish it is acquired much later than in English. We also examine the feasibility of assessing and comparing prosodic disorder in the five languages, using assessments of prosody in Spanish and English speakers with Williams syndrome as an example. We conclude that, with caveats, the original design of the UK test may indicate comparable stages of prosodic development in neurotypical children and is appropriate for the evaluation of prosodic skills for adults and children, both neurotypical and with impairment, in all five languages.

keywords: prosody, intonation, assessment, Romance, Germanic

Background and aims

Prosody may be defined as the effect of variations in pitch, syllable duration and loudness in speech to change the impact of the spoken utterance. Prosodic ability is therefore the capacity to use these variations in the expression and understanding of spoken messages. The prosody test PEPS-C was devised in the absence of a clinically usable procedure for assessing prosodic ability; it has been available to researchers since 2003 and has been fully described in a previous article (Peppé and McCann, 2003): see below for a brief summary.

Different English accent-versions were created to accommodate users speaking other varieties of English. In the original version, the aural stimuli (relevant for receptive tasks only) were spoken in an Edinburgh accent; a subsequent version had stimuli spoken in a UK General (southern British) English accent. Following this, versions were created with stimuli in a North American accent (designed to accommodate both US and Canadian speakers), and a General Australian accent. An unpublished study (Kohn, 2004) showed that stimuli spoken in an unfamiliar accent appears to make no significant difference to receptive task results, so the creation of other accent-versions was considered more as an increase in user-friendliness, so that the stimuli should be in a familiar accent, than for any important linguistic purpose.

The PEPS-C test

Briefly, the test aims to assess the ability of children and adults to understand and to express prosody (i.e. input as well as output mode), both in terms of how communication is affected by prosody in speech (function level processing) and what are the auditory discrimination and voice skills required to do this (form level processing). The prosodic functions assessed include illocutionary force, e.g. questions/statements (Turn end: e.g., *carrots?* versus *carrots.*). Another function is to convey the speaker's affect, attitude or mood,

as in indicating whether food is liked or disliked (Affect: e.g., *carrots* said with enthusiasm or reservation). A third function is the verbal punctuation of phrases (Chunking: e.g. *cream, buns and jam* with a break after the first item or *cream-buns and jam* with no break after the first item; similarly *pink, and green&black socks*, said with a break after the first item, versus *pink&green and black socks* said with no break after the first item). The fourth function is accent placement (Focus or Contrastive Stress: e.g. *I wanted green and BLUE socks* versus *I wanted GREEN and blue socks*, i.e. placing the accent on a different colour; or *The BLACK cow has it* versus *The black COW has it*: either the colour or the animal is accented). The receptive prosodic form tasks use auditory discrimination (same-different tasks) with stimuli as for the receptive function tasks, e.g., *carrots.+ carrots?* (different) versus *carrots? + carrots?* (same). These items were however low-pass filtered so that only the prosody and no lexical information remains, thus testing the ability to hear prosodic differences alone. The expressive prosodic form tasks use imitation, e.g., testees hear the stimulus *carrots?* and are asked to say what they hear and copy the way it is said. They are thus required to produce the forms of prosody needed to produce the meaning differences required in the function tasks: this elicits the testee's prosodic repertoire.

In response to requests from European countries, PEPS-C has been translated into other languages: Spanish, French, Flemish, and Norwegian: the *target* languages. For cross-linguistic comparison of prosodic ability it was desirable to have the different language-versions as similar as possible, but more important that the test should assess the major uses of prosody in the target language, and thus be an ecologically valid test of prosodic ability. These considerations gave rise to the following questions about cross-linguistic prosodic differences and their relevance to prosody test design, which this paper aims to address:

- Do the uses of prosody in the target languages resemble those in English, i.e. are there cross-linguistic functional prosodic differences? This relates to whether the test has valid

goals in languages other than English, and specifically concerns the use of prosody to indicate sentence-type (question versus statement); to signal the speaker's affective state (particularly the expression of liking and disliking food items); to convey phrase boundary in intermediate/minor phrases (the distinction between simple and compound nouns, and groupings of adjectives) and to indicate emphasis by the placement of contrastive stress/accent.

- Are there major uses of prosody in the target language not covered by the four functions? This is relevant to the ecological validity of the test for assessing prosody skills in different languages.
- If used for similar linguistic purposes, do the prosodic exponents (forms) conveying these functions differ in the original and target languages; i.e. are there cross-linguistic differences of prosodic form? For example, is lengthening a primary indicator of phrase boundary? This is relevant to wider theoretical prosody considerations.

In collecting data using the different language versions of PEPS-C, our aims were to find out primarily whether the test would be useful in:

- discovering whether developmental prosodic milestones were similar in each of the target languages to those that have been determined in English-speaking children (e.g. Wells and Peppé, 2001; Cruttenden, 1985).
- determining prosodic deficits in children with communication impairments (e.g. Peppé, McCann, Gibbon, O'Hare and Rutherford, 2007). We compare findings using PEPS-C for investigating prosodic ability in Williams syndrome with prosodic findings using another methodology in the same condition.

Cross-linguistic prosodic functional differences

Translating the test into five different languages revealed that it is feasible to gather data in the format of the original test, i.e. with parallel receptive and expressive tasks, sixteen items per task, binary options for receptive tasks; and in more or less the same four prosodic functions (see below). All the stimuli for the receptive tasks were recorded by speakers of the target language. The recordings were made, as in the English versions, with the stipulation that the items should be of similar difficulty, and that the functions expressed in the stimuli should be considered unambiguous by at least two judges but that prosodic exponents should not be exaggerated. It is not, however, possible to state with certainty that the level of difficulty of the stimuli is the same for listeners in all the language versions.

Discussions with native speakers suggested that in all four of the target languages prosody was important and operated with similar exponents in two of the four functions: sentence-type (question/statement) and intermediate/minor phrasing, at least as used for grouping sock-colours. By contrast, using prosody for the distinction between simple and compound nouns (*cream,buns and jam* versus *cream-buns and jam)* was problematic in the Romance languages (French and Spanish), since compounding is less common in these languages; in French however this was overcome by creating stimuli involving distinctions between double or single ice-cream flavours (e.g. *orange-fraise et pistache* versus *orange, fraise, et pistache*: *orange-and-strawberry, and pistachio* versus *orange, strawberry, and pistachio*) or compass points (*nord, est, et sud* versus *nord-est et sud*: *north, east and south* versus *north-east and south*) and in Spanish by using such non-food items as *barco, pirata, y agua* versus *barco-pirata y agua* (*ship, pirate, and water* versus *pirate-ship and water*).

Accent placement

The variation of accent placement as an indicator of emphasis or focus was expected to be different in the Germanic languages (English, Flemish and Norwegian) and in Romance languages (French and Spanish). This use of accent is common in Germanic languages but less so in Romance languages, where if one element of an utterance requires accent for pragmatic purposes, the order of words is likely to be rearranged so that the element requiring stress comes at the end of the utterance, while the acoustic exponents of accent may also accompany the finally placed element. It is true that in Germanic languages accent also occurs at or near the ends of utterances and is associated with phrase finality, but if the final element requires emphasis it will typically involve greater variation (greater loudness, more lengthening, higher pitch boost). Crucially, in Germanic languages stress can be placed prefinally to focus attention on the element where it occurs, without rearrangement of the word order; in this case, subsequent syllables, including the final one, will be deaccented. Such prefinal accenting is rare in Romance languages, and even when it occurs there will also be sentence accent at the end of the utterance. This suggests that the functions of phrase finality and focus are not as separate in Romance as in Germanic languages. For further discussion of Romance and Germanic use of accent for contrast, see Swerts, 2007. The implications of these characteristics for PEPS-C are treated in the description of the development of the Spanish version of PEPS-C (Martínez-Castilla and Peppé, 2008a), and in a later section of this paper. The use of prefinal variation of accent-placement in the test, however, eliminates the possibility of confusion as to whether accent is being used for phrase finality or focus, and has been retained in the French and Spanish versions of the languages.

Lexical tone

The use of intonation as part of the lexical specification of words occurs in many languages and is thus an important use of prosody. It does not exist in English, but it is a feature of Norwegian and is thus a major use of prosody in a target language that is not covered in the English version of PEPS-C. A separate pair of tasks dealing with receptive and expressive ability in using lexical tones was therefore devised for the Norwegian version.

Cross-linguistic prosodic form differences

Affect

While it was agreed that broadly prosodic parameters such as intonation and voice quality could convey affect (including the expression of feelings about food) in all the target languages, it was expected that the actual exponents might vary from language to language and were probably different from the English ones, and the experiment designed to determine these exponents in Spanish has been previously described (Martínez-Castilla and Peppé, 2008b). For the other languages a trial and error approach with several native speaker listeners was adopted, and it appears that for all the target languages a falling or rising-falling contour covering much of the speaker pitch span conveys positive affect, while a narrow low pitched contour indicates negative affect with regard to food likes and dislikes. It is probable that articulatory setting (e.g. lip spreading) influences the aural impression and contributes to the impression of positive or negative affect. The falling-rising contour which can express negative affect in English does not appear to be common in the target languages.

Accent

As far as accent is concerned, its usual acoustic exponents (extra loudness, length and boosted pitch) appear to be common to all the target languages, although no analysis of this was carried out. For phrase finality, apart from the feature of accent on or near the final element, lengthening of final syllables and pauses were a feature of the delimitation of chunks/groups/phrases in all the target languages. Similarly, questions were distinguished by rising intonation and statements by falls.

Prosody in neurotypical children

Since the translated versions of the test are relatively new, researchers have had little time in which to gather normative data. There was therefore too little data to give any indication of developmental milestones. Additionally, no French data concerning children was available because the French researchers were concerned with gathering adult data.

It was however possible to compare data from 9 UK children, 6 Spanish, 5 Flemish and 5 Norwegian children all aged eight years, using nonparametric statistical calculations since the data being compared is on the whole non-normally distributed, with a bias towards high or ceiling scores. Kruskal-Wallis calculations have been used for global comparisons and Mann-Whitney for pairwise comparison. Out of the six expressive tasks, there was no significant cross-language difference in the mean scores of five: Affect expression, Turn end expression, Chunking expression, Short item imitation and Long item imitation, but differences were significant in the scores on the expression of focus/ contrastive stress, which will be addressed as a separate issue. Of the receptive tasks, there was no significant difference in the Chunking and Short item discrimination tasks, but there were differences on the other tasks: for Turn end reception the global comparison was significant (p=0.009), and pairwise this emerged as

Spanish performance better than Norwegian (p=0.009) and Flemish better than Norwegian (p=0.008). For Affect reception, the global comparison was significantly different (p=0.005), with the Spanish performing better than the UK children (p=0.007) and better than the Flemish (p=0.003). Bonferroni correction for multiple comparisons over four languages suggests that the threshold for significance should be set at 0.05/4, i.e., 0.0083. The better performance of the Spanish children compared to the Norwegian children for Turn end reception was therefore only a tendency. For Long item discrimination, Flemish data were not available, but a global comparison amongst the other three showed a p value of 0.034, with the UK children performing significantly better than the Norwegian children (p=0.015). Bonferroni correction with three languages suggests a significance threshold of 0.05/3, i.e., 0.017.

Intonation as part of lexical specification

Although only eight Norwegian children have completed the test, these range in age from 6;3 to 12;6, and some indication of performance on the tone tasks can be gained. Results for the receptive lexical tone task (understanding which of two pictures is indicated by a word spoken with one of two Norwegian tones) show an improvement in scores, from chance scores at age 6 to ceiling scores in the two oldest children, while in the corresponding expressive task (saying the word indicated by a picture) the youngest children score high and the older children at ceiling.

Focus (contrastive stress)

Data for the focus reception task were available from four nationalities of 8-year-old children: 9 UK, 6 Spanish, 5 Flemish and 5 Norwegian. A global comparison of their performance was highly significant (p<0.001), with the following pairwise comparisons also significant: Spanish better than both the UK and Norwegian children (p=0.003 in both cases)

and better than the Flemish (p=0.005); the Norwegian also better than the Flemish (p=0.007). The good performance of the Spanish children is surprising in view of the fact, noted earlier, that prefinal accenting is not common in Romance languages. In the expressive task (no Flemish data available), the global comparison was also significant (p=0.005), and, as expected, the UK children performed significantly better than the Spanish children (p = 0.013) as did the Norwegian children (p=0.006).

Spanish and UK (Scottish) English

More data were available to compare the developmental trajectory of the acquisition of expressive focus skills in Spanish and UK (Scottish) English. Participants were as follows: age group 7;5-9;4: 11 Spanish, 24 UK; age group 9;5-11;4: 15 Spanish, 28 UK; age group ≥ 17;5: 68 Spanish, 29 UK.

The scores of Spanish-speaking adults and English-speaking adults showed no significant difference. Within languages, there was a highly significant (p< 0.001) difference between the scores of the two age groups of Spanish children, showing improvement with age which continued into adulthood: the Spanish adults (≥ 17;5) showed highly significantly better results (p< 0.001) than the older Spanish children. By contrast, there were no significant differences between the performances of UK children in either age group, nor between UK children and adults: inspection of the scores showed that this was because the youngest UK children were already performing at or near ceiling on this task, suggesting that this skill is acquired very early. Figure 1 shows this comparison.

INSERT FIGURE 1 ABOUT HERE

This suggests that the use of prefinal contrastive accent follows a slower developmental trajectory in Spanish than English children but that in Spanish, eventually, this function is also

acquired. Expressing contrastive focus prefinally, in spite of being a well attested function in Spanish (Zubizarreta, 1998), could therefore represent a more cognitively demanding strategy for Spanish children, and this may have implications for the development of prosodic abilities in other Romance languages.

Impaired populations

PEPS-C was originally developed as a tool to investigate disordered prosody. It has already been used for this purpose in the UK, and research in this area is also being carried out in the USA, Canada and Australia, and beginning in the countries where the new language versions have been developed. Table 1 shows research projects planned or completed.

INSERT TABLE 1 ABOUT HERE

Prosody in Williams syndrome (WS):

Studies of prosody in WS have been carried out using both PEPS-C and various other methods, and also in both Spanish and English speaking populations. This breadth of research has allowed us to compare results to see whether the same conclusions are reached by the different methods and in both populations. This enables us to make decisions about whether prosody in WS varies across languages and whether a translated version of PEPS-C produces comparable results in both the original and the target language.

Expressive affective prosody in WS

The use of affective prosody in the narratives of English children and adolescents with WS has been found to be exaggerated or inappropriate for the context (Reilly, Klima and Bellugi, 1990). Similarly, Setter, Stojanovik, van Ewijk and Moreland (2007) found that, when narrating, children with WS have wider pitch span than controls and are perceived as

emotionally more involved. The use of exaggerated affective prosody in narratives has also been reported in French, Italian and Portuguese individuals with WS (Bernicot, Lacroix and Reilly, 2003; Gonçalves, 2004; Reilly, Bernicot, Vicari, Lacroix and Bellugi, 2005). This suggests that certain prosodic features are characteristic of WS in several languages and cultures, although, as pointed out by Reilly et al. (2005), cultural conventions for conveying emotion vary within these languages: the most obvious manifestation of this might be in the stereotypes of English reserve and understatement as opposed to Italian flamboyance and exuberance. No data using PEPS-C exists for Italians with WS, but we can compare studies using PEPS-C with both English- and Spanish-speaking children with WS, and two studies of English-speaking children with WS, one using PEPS-C and the other not.

Affective prosody in English children: using PEPS-C and other methodologies

Using PEPS-C with children aged between 6;04 and 13;11 (n=14) and control children of a similar age, Stojanovik, Setter and van Ewijk (2007) found prosodic deficits in all PEPS-C tasks ($p < 0.05$ for Affect reception and Affect expression; $p < 0.01$ for Turn end expression; and $p < 0.001$ for Turn end reception, Chunking reception, Chunking expression, Focus reception, Focus expression, Short item imitation, Short item discrimination, Long item discrimination and Long item imitation).

Using other methodology, Plesa-Skwerer, Schofield, Verbalis, Faja and Tager-Flusberg (2007), studied English adolescents and adults with WS and compared them with controls of similar age. They found deficits in understanding linguistic prosody (lexical stress: word pairs with identical segmental content but different meaning depending on the lexical stress); and in recognising the prosody of basic emotions (happy, sad or neutral) from sentences with congruent or incongruent semantic content (deficits for both congruent and incongruent sentences). Expressive affective prosody was not assessed. However, when they filtered out

lexical (segmental) information, they found no deficit for receptive affective prosody and concluded that there was relative preservation of receptive affective prosody. It is somewhat surprising that Plesa-Skwerer et al. did not find significant differences for this task, in view of the fact that it appears to be more cognitively demanding than the PEPS-C form discrimination tasks. Development may account for this difference: Stojanovik et al. were working with children while Plesa-Skwerer et al. were working with adolescents and adults.

Williams syndrome: using PEPS-C with Spanish and English populations

Martínez-Castilla (2009) has examined prosody in Spanish adolescents (aged 12-17) and adults (aged 18-32) with WS and compared them with controls of a similar age: as in the study by Stojanovik et al (2007), prosodic deficits in the WS group were found in all functions and forms. Broadly speaking, the results suggest similar profiles of prosodic deficit in this condition in speakers of both nationalities.

Conclusions

From these preliminary indications, we conclude that it is feasible to construct prosody tests on the lines of the PEPS-C model in Romance and Germanic languages, and possibly in more exotic languages: the preliminary results for the Norwegian lexical tone task suggest that it would be possible to include a similar task for tone languages such as Chinese. Although originally designed with children in mind, the limited trials with adults suggest that it is perfectly feasible to use the test with adult populations.

As to whether the PEPS-C produces results that truly reflect prosodic skills, the comparison of studies using the PEPS-C and a different methodology in individuals with WS

produced some conflicting findings. It was however possible that there was a confounding variable in the age of the participants, so the verdict is inconclusive.

The findings of this paper suggest, however, several questions about the validity of comparing results across languages. As indicated above, it is difficult to know for certain whether stimuli in receptive tasks are really at a comparable level of difficulty in all the target languages. This makes it difficult to know whether, in the cross-language comparisons reported here, differences reflect real dissimilarity in either prosodic ability or the milestones of prosodic development, or whether such differences are an artefact of the translation. However, it is noticeable that in expressive tasks, where there is no stimulus difficulty factor, there were cross-language differences of results in only one task (Focus expression), i.e. in a use of prosody where there is a recognised linguistic difference. This strengthens the case for cross-language similarities in prosodic development; further studies involving more children would indicate whether this is a reliable conclusion.

This leads to the second caveat: the results reported here are based on small numbers of speakers. For the test to be usable as a clinical tool or as a crosslinguistic comparator of prosody, more normative data is required, and it is to be hoped that researchers will continue to collect this.

Moreover, there is the question of the relevance of particular prosodic functions in the target languages. The comparison of the Spanish use of prefinal accent for contrastive purposes suggests that although this reflects a skill that Spanish speakers, or perhaps Romance speakers generally, can eventually achieve, it is not their preferred procedure for expressing focus, and that this task would be best omitted by clinicians wishing to ascertain the state of prosodic skills in a Spanish-speaking child, except as a “hard” task.

The results for English and Spanish children with WS suggest that the PEPS-C results support the findings of previous research that has found crosslinguistic prosodic similarities in this disorder. We therefore also conclude that it is possible to use PEPS-C with children with typical and atypical development and with typical and atypical adult populations. It appears that this assessment is likely to distinguish and quantify the characteristics of prosody disorder both in English and in the languages into which it has been translated so far.

References

Bernicot, J., Lacroix, A., & Reilly, J. (2003). La narration chez les enfants atteints du syndrome de Williams: aspects structuraux et pragmatiques. *Enfance, 3,* 265-281.

Cruttenden, A. (1985) Intonation comprehension in ten-year-olds. *Journal of Child Language, 12,* 643-661.

Gonçalves, O. F. (2004). Funcionamento Cognitivo e produção narrative no síndrome de Williams: Congruência ou dissociação neurocognitiva? *International Journal of Clinical and Health Psychology, 4,* 623-638.

Kohn, M. (2004). Regional accent "interference" in prosodic processing. Unpublished honours project, Queen Margaret University, Edinburgh.

Martínez-Castilla, P. (2009). *Estudio de las habilidades prosódicas y musicales en el síndrome de Williams.* [Studying prosodic and musical abilities in Williams syndrome]. Unpublished doctoral dissertation. Universidad Autónoma de Madrid, Spain.

Martínez-Castilla, P., & Peppé, S. (2008a). Developing a test of prosodic ability for speakers of Iberian Spanish. *Speech Communication, 50 (11-12),* 900-915.

Martínez-Castilla, P. & Peppé, S. (2008b). Intonation features of the expression of emotions in Spanish: preliminary study for a prosody assessment procedure *Clinical Linguistics & Phonetics, 22, (4/5),* 363-370.

Peppé, S., McCann, J., Gibbon, F., O'Hare, A. & Rutherford, M. (2007). Receptive and expressive prosodic ability in children with high-functioning autism. *Journal of Speech Language and Hearing Research, 50, 1015-1028.*

Peppé, S. & McCann, J. (2003). Assessing intonation and prosody in children with atypical language development: the PEPS-C test and the revised version. *Clinical Linguistics & Phonetics, 17(4/5),* 345-354.

Plesa-Skwerer, D., Schofield, C., Verbalis, A., Faja, S., & Tager-Flusberg, H. (2007). Receptive prosody in adolescents and adults with Williams syndrome. *Language and Cognitive Processes, 22,* 247-271.

Reilly, J., Bernicot, J., Vicari, S., Lacroix, A., & Bellugi, U. (2005). Narratives in children with Williams syndrome: A cross-linguistic perspective. In D. Ravid & H. Bat-Zeev Shyldkrot (Eds.), *Perspectives on language and language development: Essays in honor of Ruth A. Berman* (pp. 303-312). Dordrecht, Netherlands: Kluwer.

Reilly, J., Klima, E. S., & Bellugi, U. (1990). Once more with feeling: Affect and language in atypical populations. *Development and Psychopathology, 2,* 367-391.

Setter, J., Stojanovik, V., van Ewijk, L, & Moreland, M. (2007). The production of speech affect in children with Williams syndrome. *Clinical Linguistics and Phonetics, 9,* 659-672.

Stojanovik, V., Setter, J., & van Ewijk, L. (2007). Intonation abilities of children with Williams syndrome: A preliminary investigation. *Journal of Speech, Language and Hearing Research, 50,* 1606-1617.

Swerts, M. (2007). Contrast and accent in Flemish and Romanian. *Journal of Phonetics, 35(3),* 380-397.

Wells, B., Peppé, S. & Goulandris, A. (2004). Intonation development from five to thirteen. *Journal of Child Language, 31,* 749-778

Zubizarreta, M. L. (1998). *Prosody, focus, and word order*. Cambridge: The MIT Press.

Table 1. Projected or completed research worldwide using PEPS-C with atypical populations

Country	Populations	Institution
UK	Autism spectrum conditions	Queen Margaret University, Edinburgh
	Williams syndrome	University of Reading
	Down's syndrome	University of Reading
	Specific language impairment	University College, London
	Musical savants	Goldsmith's College, University of London
	Hearing impairment / cochlear implant	Queen Margaret University, Edinburgh; University of Southampton
	Head injury / neurological insult	University of Bristol
	Dyslexia	University College, London
	Speech-rhythm and reading	University of York
USA	Autism spectrum conditions	University of Oregon
		Columbia University, New York
	Williams syndrome	University of Maryland
	Rhythmic timing in dyslexia	Harvard Graduate School of Education
Canada	Prosody in reading development	Queen's University, Kingston, Ontario

Australia	Autism spectrum conditions	Flinders University, South Australia
	Relationship between prosody and sociocognitive abilities	University of Western Australia
	Childhood apraxia of speech	Macquarie University, Australia
Belgium	Cochlear implant	University of Antwerp
	Autism spectrum conditions	University of Antwerp
France	Autism spectrum conditions with *f*MRI	University of Bordeaux
Norway	Autism spectrum conditions	University of Oslo
Spain	Williams syndrome	Universidad Autónoma de Madrid

Figure 1. Performance of three age-groups of Spanish and UK participants on Focus expressive task