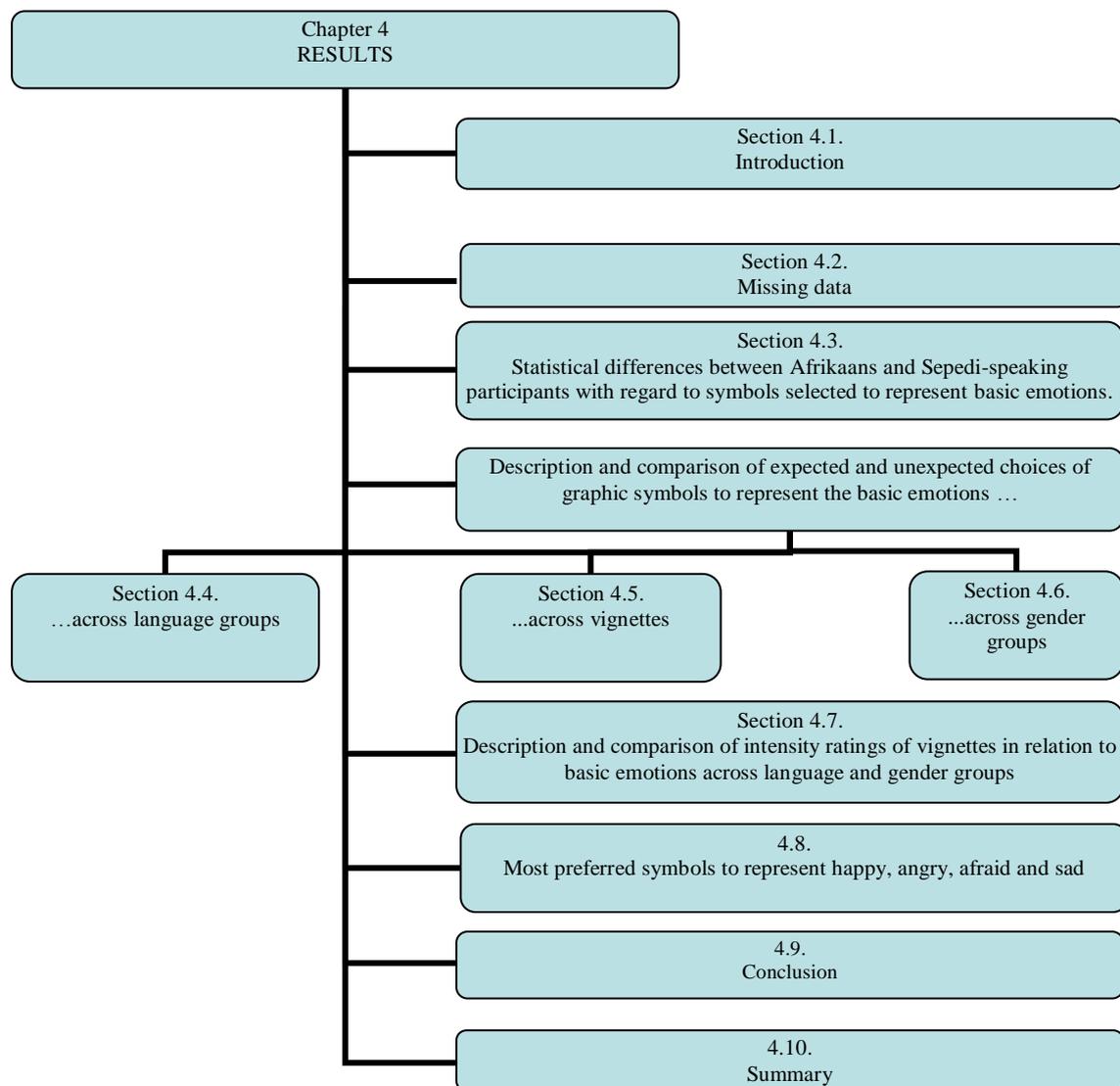


## CHAPTER 4

### RESULTS

#### 4.1. Introduction

In this chapter the results of the study are presented to correspond with the main aim of the study which was to describe and compare Afrikaans and Sepedi speaking grade R children's choice of graphic symbols for depicting four basic emotions, i.e. happy, sad, afraid and angry. Firstly the missing data is briefly discussed. The rest of the chapter focuses on presenting the data in correspondence with the sub-aims stated in Chapter 3. Figure 4.1. gives a schematic representation of the current chapter.



**Figure 4.1. Schematic representation of the contents of Chapter 4.**

#### 4.2. Missing data

From a total of 4 320 possible responses, 8 could not be used in analysis. Table 4.1. presents the missing data with regard to language group and type of data missing.

**Table 4.1. Missing data**

	Missing data: Intensity	Missing data: Symbol	Total
Afrikaans	2	1	3
Sepedi	2	3	5
Total	4	4	8

Data regarding intensity was captured as missing when a participant said a specific intensity, but indicated the other intensity on the intensity scale or when he/she selected both the intensities on the intensity scale. Symbol data was captured as missing if the participant indicated two or more symbols to represent a specific vignette.

#### 4.3. Statistical comparison between Afrikaans and Sepedi speaking participants with regard to expected and unexpected symbols selected to represent basic emotions.

The first sub-aim of the current study was to describe and compare expected and unexpected choices of graphic symbols to represent four basic emotions across language groups. Expected symbols refer to any of the 4 PCS systematically identified to represent a specific basic emotion. Due to the nature of the task the selection of an expected symbol is not more correct than the selection of an unexpected symbol. Unexpected symbols refer to any PCS on the presented overlay which is not one of the expected symbols of the target emotion. The results from the two language groups were analysed and the means statistically compared using t-tests. The results are presented in Table 4.2.

**Table 4.2. Differences between Afrikaans and Sepedi participants with regard to the expected symbols selected to represent basic emotion.**

	Afrikaans participants: Mean (SD)	Sepedi participants: Mean (SD)	p-value T-test
Happy	5.591 (0.844)	3.435 (1.834)	< 0.0001*
Sad	3.159 (1.855)	1.565 (1.148)	< 0.0001*
Afraid	3.273 (1.703)	1.739 (1.421)	< 0.0001*
Angry	5.068 (1.301)	2.000 (1.445)	< 0.0001*

\* if  $p < 0.01$ , then significant at a 1% level

Table 4.2. illustrates the significant difference at a 1% level between the two groups' selection of expected symbols to represent emotions. Afrikaans speaking participants more often chose expected symbols than Sepedi speaking participants to represent different basic emotions.

#### 4.4. Description and comparison of expected and unexpected choices of graphic symbols across the two language groups

Results are presented in terms of participants' selection of expected and unexpected symbols. Expected symbols in this study refer to any of the 4 PCS systematically identified to represent a specific basic emotion. Unexpected symbols in turn refer to any PCS on the presented overlay which is not one of the expected symbols of the target basic emotion. Due to the nature of the task selecting an expected symbol is not more correct than selecting an unexpected symbol. For every emotion there were four possible expected symbols and twelve possible unexpected symbols for participants to select from. The selection process of these sixteen symbols is discussed under Section 3.6.2. in Chapter 3. The expected and most frequently selected unexpected symbols are presented in detailed tables. The remaining unexpected symbols are mentioned under 'remaining unexpected symbols' and are presented in Appendix Y. Participants most frequently selected expected symbols to represent *happy* followed by those for *angry* and *afraid* with expected symbols for *sad* selected least frequently. The results are presented in the order stated above.

##### 4.4.1. Symbols selected to represent happy

Table 4.3. presents the four expected symbols as well as the unexpected symbols selected most frequently by Afrikaans and Sepedi speaking participants to represent *happy*. (The rest of the unexpected symbols are represented in Table 1., Appendix Y).

**Table 4.3. Expected and unexpected symbols selected by Afrikaans and Sepedi speaking participants to represent *happy***

	Expected symbols				Unexpected symbols				
Afrikaans speaking participants	Total selection percentage of expected symbols 93.18%				Total selection percentage of unexpected symbols 6.82%				
Symbols	Respected selection percentages of expected symbols				Respected selection percentages of unexpected symbols				
									
Percentage	45.83%	21.21%	16.67%	9.47%	1.14%, 1.14%, 1.14%	0.76%, 0.76%, 0.76%	Remaining unexpected symbols 1.14%		

	Expected symbols				Unexpected symbols				
Sepedi speaking participants	Total selection percentage of expected symbols 57.45%				Total selection percentage of unexpected symbols 42.54%				
Symbols	Respected selection percentages of expected symbols				Respected selection percentages of unexpected symbols				Remaining unexpected symbols
									24.72%
Percentage	22.18%	14.91%	13.45%	6.91%	4.73%, 4.73%		4.36%	4.00%	

Table 4.3. shows that Afrikaans and Sepedi speaking participants selected one of the expected symbols to represent *happy* with a frequency of 93.18% and 57.25% respectively. The successive order in which the four expected symbols were selected were the same for both language groups' participants, namely symbol 1 [😊], symbol 13 [😄], symbol 5 [😃] and symbol 9 [😁].

Afrikaans speaking participants selected 9 (6.82%) unexpected symbols to represent *happy*, with no apparent pattern. Symbols 2 [😏] (1.14%), 10 [😬] (1.14%) and 11 [😜] (1.14%) were selected most frequently followed by symbols 7 [🙄] (0.76%), 14 [😝] (0.76%) and 15 [😞] (0.76%). The other unexpected symbols were chosen with a frequency of 1.14%.

Sepedi speaking participants made use of all 12 unexpected symbols. The four unexpected symbols selected most frequently by Sepedi speaking participants were symbol 11 [😜] (4.73%), symbol 12 [🙄] (4.73%), symbol 8 [😬] (4.36%) and symbol 2 [😏] (4.00%). The other eight unexpected symbols were selected with a frequency of 24.72% with no apparent pattern.

#### 4.4.2. Symbols selected to represent angry

Table 4.4. presents the four expected symbols as well as the most frequently selected unexpected symbols by Afrikaans and Sepedi speaking participants to represent *angry*. (The rest of the unexpected symbols are represented in Table 2., Appendix Y.)

**Table 4.4. Expected and unexpected symbols selected by Afrikaans and Sepedi speaking participants to represent *angry***

	Expected symbols				Unexpected symbols				
Afrikaans speaking participants	Total selection percentage of expected symbols 84.79%				Total selection percentage of unexpected symbols 15.20%				
Symbols	Respected selection percentages of expected symbols				Respected selection percentages of unexpected symbols				Remaining unexpected symbols
									3.8%
Percentage	51.33%	20.91%	8.37%	4.18%	3.04%	2.28%, 2.28%	1.90%	1.90%	

	Expected symbols				Unexpected symbols					
Sepedi speaking participants	Total selection percentage of expected symbols 33.32%				Total selection percentage of unexpected symbols 66.68%					
Symbols	Respected selection percentages of expected symbols				Respected selection percentages of unexpected symbols					Remaining unexpected symbols
										30.44%
Percentage	10.87%	10.14%	6.88%	5.43%	8.70%	7.97%	7.25%	6.16%	6.16%	

Table 4.4. indicates that Afrikaans speaking participants selected expected symbols 84.79% and unexpected symbols 15.20% to represent *angry*. Sepedi speaking participants selected expected symbols 33.32% to represent *angry* and unexpected symbols 66.68%. The expected symbol selected most by Afrikaans speaking participants to represent angry was symbol 8 [] (51.33%), followed by symbol 4 [] (20.91%), symbol 12 [] (8.37%) and symbol 16 [] (4.18%). In comparison, the Sepedi speaking participants most frequently selected symbol 12 [] (10.87%) to represent *angry*, followed by symbol 8 [] (10.14%), symbol 4 [] (6.88%) and symbol 16 [] (5.43%).

Afrikaans speaking participants used 8 unexpected symbols to represent *angry*, namely symbol 3 [] (3.04%), symbols 6 [] (2.28%) and 11 [] (2.28%) and symbols 7 [] (1.90%) and 10 [] (1.90%). The other three unexpected symbols were selected with a frequency of 3.8%. Sepedi speaking participants used all 12 unexpected symbols to represent *angry*. They selected symbol 3 [] most frequently (8.70%) followed by symbols 10 [] (5.97%), 2 [] (7.25%), 1 [] (6.16%) and 11 [] (6.16%). Sepedi speaking participants selected the other seven unexpected symbols a total of 30.44%, with no apparent pattern.

#### 4.4.3. Symbols selected to represent *afraid*

Table 4.5. presents the four expected symbols as well as the most frequently selected unexpected symbols by Afrikaans and Sepedi speaking participants to represent *afraid*. (The rest of the unexpected symbols are presented in Table 3., Appendix Y.)

**Table 4.5. Expected and unexpected symbols selected by Afrikaans and Sepedi speaking participants to represent afraid**

	Expected symbols				Unexpected symbols				
Afrikaans speaking participants	Total selection percentage of expected symbols 54.55%				Total selection percentage of unexpected symbols 45.47%				
Symbols	Respected selection percentages of expected symbols				Respected selection percentages of unexpected symbols				
									Remaining unexpected symbols
Percentage	17.05%	15.53%	14.39%	7.58%	14.02%	7.58%	6.06%, 6.06%		11.75%
Sepedi speaking participants	Total selection percentage of expected symbols 29.09%				Total selection percentage of unexpected symbols 71.91%				
Symbols	Respected selection percentages of expected symbols				Respected selection percentages of unexpected symbols				
									Remaining unexpected symbols
Percentage	10.55%	8.36%	7.27%	2.91%	10.18%	9.82%	7.27%, 7.27%		36.27%

Afrikaans speaking participants selected expected symbols (54.55%) to represent *afraid*. Symbol 11 [  ] (17.05%) was selected most frequently followed by symbol 7 [  ] (15.53%), symbol 3 [  ] (14.39%) and symbol 15 [  ] (7.58%). Sepedi speaking participants selected expected symbols to represent *afraid* 29.09%; they selected symbol 7 [  ] (10.55%) most frequently followed by symbol 11 [  ] (8.36%), symbol 3 [  ] (7.27%) and symbol 15 [  ] (2.91%).

Afrikaans speaking participants used 10 unexpected symbols to represent *afraid*. They selected symbol 16 [  ] most frequently (14.02%), followed by symbols 14 [  ] (7.58%), 10 [  ] (6.06%) and 12 [  ] (6.06%). They selected the other six unexpected symbols a total of 11.75%. Sepedi speaking participants used all unexpected symbols to represent *afraid*. They selected unexpected symbol 2 [  ] most frequently (10.18%) followed by symbols 16 [  ] (9.82%), 8 [  ] (7.27%) and 16 [  ] (7.27%) to represent *afraid*. The other eight unexpected symbols were selected with a frequency of 36.27%.

#### 4.4.4. Symbols selected to represent *sad*

Table 4.6. present the four expected symbols as well as the most frequently selected unexpected symbols by Afrikaans and Sepedi speaking participants to represent *sad*. (The rest of the unexpected symbols are presented in Table 4., Appendix Y.)

**Table 4.6. Expected and unexpected symbols selected by Afrikaans and Sepedi speaking participants to represent sad**

	Expected symbols				Unexpected symbols				
Afrikaans speaking participants	Total selection percentage of expected symbols 52.65%				Total selection percentage of unexpected symbols 47.35%				
Symbols	Respected selection percentages of expected symbols				Respected selection percentages of unexpected symbols				
									Remaining unexpected symbols
Percentage	20.08%	17.42%	9.85%	5.30%	10.23%, 10.23%, 10.23%		6.82%		9.85%
Sepedi speaking participants	Total selection percentage of expected symbols 26.08%				Total selection percentage of unexpected symbols 73.92%				
Symbols	Respected selection percentages of expected symbols				Respected selection percentages of unexpected symbols				
									Remaining unexpected symbols
Percentage	7.97%	6.88%	6.52%	4.71%	9.78%	8.70%	7.97%	7.16%	39.86%

From Table 4.6. it is evident that Afrikaans speaking participants selected expected symbols 52.65% to represent *sad*, while Sepedi speaking participants selected expected symbols 26.08% to represent *sad*. Afrikaans speaking participants selected symbol 10 [  ] (20.08%) most frequently, followed by symbol 14 [  ] (17.42%), symbol 6 [  ] (9.85%) and symbol 2 [  ] (5.30%). Sepedi speaking participants selected symbol 2 [  ] (7.97%) most frequently, followed by symbols 10 [  ] (6.88%), 14 [  ] (6.52%) and 6 [  ] (4.71%).

Afrikaans speaking participants used 10 unexpected symbols to represent *sad*; symbols 12 [  ] (10.23%), 3 [  ] (10.23%), 16 [  ] (10.23%) most frequently followed by symbol 15 [  ] (6.82%). The other six the unexpected symbols were selected a total of 9.85%. Sepedi speaking participants used all unexpected symbols to represent *sad*; symbols 7 [  ] (9.78%), 8 [  ] (8.70%), 11 [  ] (7.97%) and 16 [  ] (7.16%). The other eight unexpected symbols were used a total of 39.86%.

#### **4.5. Description and comparison of expected and unexpected choices of graphic symbols to represent the basic emotions per vignettes across language groups**

When looking at each vignette separately, there were significant differences between the number of expected and unexpected symbols selected by each language group for all but six vignettes. The results for each vignette are presented in Table 4.7.

**Table 4.7. Differences in number of expected and unexpected symbols selected per vignette with regard to language**

Vignettes	Symbol	Afrikaans participants % (N)	Sepedi participants % (N)	Chi-square p value
HAPPY Vignette 3	Unexpected	9.09 (4)	45.65 (21)	0.0001*
	Expected	90.91(40)	54.35 (25)	
HAPPY Vignette 9	Unexpected	9.09 (4)	45.65 (21)	0.0001*
	Expected	90.91(40)	54.35 (25)	
HAPPY Vignette 10	Unexpected	9.09 (4)	47.83 (22)	< 0.0001*
	Expected	90.91(40)	52.17 (25)	
HAPPY Vignette 15	Unexpected	2.27 (1)	36.96 (17)	< 0.0001*
	Expected	97.73(43)	63.04 (29)	
HAPPY Vignette 19	Unexpected	4.55 (2)	39.13 (18)	< 0.0001*
	Expected	95.45 (42)	60.87 (28)	
HAPPY Vignette 24	Unexpected	6.82 (3)	41.30 (19)	0.0001*
	Expected	93.18 (41)	58.70 (27)	
SAD Vignette 1	Unexpected	59.09 (26)	80.43 (37)	0.0272
	Expected	40.91 (18)	19.57 (9)	
SAD Vignette 2	Unexpected	54.55 (24)	82.61 (38)	0.0040*
	Expected	45.45 (20)	17.39 (8)	
SAD Vignette 5	Unexpected	61.36 (27)	60.87 (28)	0.9617
	Expected	38.64 (17)	39.13 (18)	
SAD Vignette 13	Unexpected	25.00 (11)	69.57 (32)	< 0.0001*
	Expected	75.00 (33)	30.43 (14)	
SAD Vignette 14	Unexpected	50.00 (22)	69.57 (32)	0.0582
	Expected	50.00 (22)	30.43 (14)	
SAD Vignette 16	Unexpected	34.09 (15)	80.43 (37)	< 0.0001*
	Expected	65.91 (29)	19.57 (9)	
AFRAID Vignette 4	Unexpected	45.45 (20)	76.09 (35)	0.0029*
	Expected	54.55 (24)	23.91 (11)	
AFRAID Vignette 6	Unexpected	47.73 (21)	73.91 (34)	0.0109
	Expected	52.27 (23)	26.09 (12)	
AFRAID Vignette 7	Unexpected	56.82 (25)	60.87 (28)	0.6962
	Expected	43.18 (19)	39.13 (18)	
AFRAID Vignette 12	Unexpected	34.09 (15)	69.57 (32)	0.0008*
	Expected	65.91 (29)	30.43 (14)	

Vignettes	Symbol	Afrikaans participants % (N)	Sepedi participants % (N)	Chi-square p value
AFRAID Vignette 17	Unexpected	40.91 (18)	78.26 (36)	0.0003*
	Expected	59.09 (26)	21.74 (10)	
AFRAID Vignette 20	Unexpected	47.73 (21)	67.39 (31)	0.0590
	Expected	52.27 (23)	32.61 (15)	
ANGRY Vignette 8	Unexpected	15.91 (7)	63.04 (29)	< 0.0001*
	Expected	84.09 (37)	36.96 (17)	
ANGRY Vignette 11	Unexpected	4.55 (2)	65.22 (30)	< 0.0001*
	Expected	95.45 (42)	34.78 (16)	
ANGRY Vignette 18	Unexpected	18.18 (8)	69.57 (32)	< 0.0001*
	Expected	81.82 (36)	30.43 (14)	
ANGRY Vignette 21	Unexpected	20.45 (9)	65.22 (30)	< 0.0001*
	Expected	79.55 (35)	34.78 (16)	
ANGRY Vignette 22	Unexpected	15.91 (7)	58.70 (27)	< 0.0001*
	Expected	84.09 (37)	41.30 (19)	
ANGRY Vignette 23	Unexpected	18.18 (8)	78.26 (36)	< 0.0001*
	Expected	81.82 (36)	21.74 (10)	

\* if  $p < 0.01$ , then significant at a 1% level

From Table 4.7. it is evident that there is significant differences in the number expected and unexpected symbols selected by Afrikaans and Sepedi speaking participants for all but vignettes 1, 5 and 14 (sad vignettes), 6, 7 and 20 (afraid vignettes).

#### 4.6. Description and comparison of expected and unexpected choices of graphic symbols to represent the basic emotions across gender groups

Table 4.8. presents the comparison of the means across gender groups with regard to the symbols selected to represent the emotions.

**Table 4.8. Expected symbols selected: Comparison of means across gender groups**

	Male participants Mean (SD)	Female participants Mean (SD)	p-value Separate T
Happy	4.689 (1.550)	4.289 (2.007)	0.293
Sad	2.156 (1.623)	2.533 (1.817)	0.301
Afraid	3.644 (1.944)	3.356 (2.186)	0.510
Angry	2.489 (1.604)	2.489 (1.878)	>0.9999

\* if  $p < 0.01$ , then significant at a 1% level

Table 4.8. illustrates no significant difference between the two gender groups' choices of expected symbols to represent emotions.

#### 4.7. Description and comparison of intensity ratings of vignettes in relation to basic emotions across language and gender groups

To determine whether the perceived intensity of the emotional experience had an influence on the symbols selected, participants were asked to rate the intensity they perceived the vignette to have on a scale of 'just the emotion' or 'very the emotion' before choosing the symbol they thought represented the emotion and the intensity. Table 4.9. presents the comparison of the means across language groups.

**Table 4.9. Intensities selected: Comparison of means across language groups**

	Afrikaans speaking Participants Mean (SD)	Sepedi Speaking participants Mean (SD)	p-value Separate T
Happy	11.432 (0.900)	10.391 (1.584)	0.0003*
Sad	11.068 (1.228)	10.609 (1.483)	0.1124
Afraid	11.273 (1.107)	10.522 (1.629)	0.0121
Angry	11.364 (1.259)	10.870 (1.759)	0.1281

\* if  $p < 0.01$ , then significant at a 1% level

Table 4.9. illustrates that except for a significant difference at the 1% level for happy no significant differences were present between the intensities selected by the different language groups for the other three basic emotions. Table 4.10. presents the means across gender groups.

**Table 4.10. Intensities selected: comparison of means across gender groups**

	Male participants Mean (SD)	Female participants Mean (SD)	p-value Separate T
Happy	10.822 (1.571)	10.978 (1.196)	0.5986
Sad	10.711 (1.502)	10.956 (1.242)	0.4025
Afraid	10.844 (1.476)	10.933 (1.421)	0.7717
Angry	10.933 (1.643)	11.289 (1.440)	0.2780

\* if  $p < 0.01$ , then significant at a 1% level

Table 4.10. illustrates no significant difference between the intensities selected by the different gender groups.

#### 4.8. Most preferred symbols to represent happy, angry, afraid and sad

Table 4.11. presents each emotion with the most preferred symbols selected by Afrikaans- and Sepedi-speaking participants to represent the particular emotion. Preferred symbols can be defined as the symbols participants selected most to represent particular emotions.

**Table 4.11. Symbols preferred most to represent basic emotions**

Emotion	Participants	Most preferred symbols			
Happy	Afrikaans speaking				
		Expected symbol 1 45.83%	Expected symbol 13 21.21%	Expected symbol 5 16.67%	Expected symbol 9 9.47%
	Sepedi speaking				
		Expected symbol 1 22.18%	Expected symbol 13 14.91%	Expected symbol 5 13.45%	Expected symbol 9 6.91%
Angry	Afrikaans speaking				
		Expected symbol 8 51.33%	Expected symbol 4 20.91%	Expected symbol 12 8.37%	Expected symbol 16 4.18%
	Sepedi speaking				
		Expected symbol 12 10.87%	Expected symbol 8 10.14%	Unexpected symbol 3 8.70%	Unexpected symbol 10 7.97%
Afraid	Afrikaans speaking				
		Expected symbol 11 17.05%	Expected symbol 7 15.53%	Expected symbol 3 14.39%	Unexpected symbol 16 14.02%
	Sepedi speaking				
		Expected symbol 7 10.55%	Unexpected symbol 2 10.18%	Unexpected symbol 6 9.82%	Expected symbol 11 8.36%
Sad	Afrikaans speaking			  	
		Expected symbol 10 20.08%	Expected symbol 14 17.42%	Unexpected symbols 3, 12 and 16 10.23% each	
	Sepedi speaking			 	
		Unexpected symbol 7 9.78%	Unexpected symbol 8 8.70%	Expected symbol 2 and unexpected symbol 11 7.97% each	

From Table 4.11. it is clear that both Afrikaans and Sepedi speaking participants selected the four expected symbols (1 [😊], 13 [😄], 5 [🙂] and 9 [😊]) as the most preferred choices to represent *happy*. It is further evident that Afrikaans speaking participants selected the four expected symbols (8 [😡], 4 [😠], 12 [😡] and 16 [😡]) as the most preferred choices to represent *angry*. Sepedi speaking participants selected two expected symbols (12 [😡] and 8 [😡]) as the two most preferred symbols and two unexpected symbols (3 [😡] and 10 [😡]) as the third and fourth most preferred symbols to represent *angry*.

Table 4.11. also indicates that Afrikaans speaking participants selected expected symbols 11 [ 😊 ], 7 [ 😬 ] and 3 [ 😏 ] as the first, second and third most preferred symbols and unexpected symbol 16 [ 😬 ] as the fourth preferred symbol to represent *afraid*. Sepedi speaking participants selected expected symbol 7 [ 😬 ] as the most preferred symbol and unexpected symbols 2 [ 😬 ] and 6 [ 😬 ] as the second and third preferred and expected symbol 11 [ 😬 ] as the fourth preferred symbol to represent *afraid*. Finally Afrikaans speaking participants selected two expected symbols (10 [ 😬 ] and 14 [ 😬 ]) as most and second most preferred symbols and three unexpected symbols (3 [ 😬 ], 12 [ 😬 ] and 16 [ 😬 ]) as combined third preferred symbols to represent *sad*. Sepedi speaking participants selected two unexpected symbols (7 [ 😬 ] and 8 [ 😬 ]) as the most and second most preferred symbols and one expected symbol (2 [ 😬 ]) and one unexpected symbol (11 [ 😬 ]) combined as the third preferred symbols to represent *sad*.

#### 4.9. Conclusion

Results indicated a significant difference between Afrikaans and Sepedi speaking participants with regard to the symbols they selected to represent basic emotions. Results indicated a difference in the symbols the two language groups preferred to represent the four emotions. Analysis of the intensity data revealed a significant difference between the two language groups only for *happy*. No significant differences were observed between the genders with regard to symbols selected, or with regard to intensity data.

#### 4.10. Summary

This chapter presented the results of the study with regard to the main aim i.e. comparing and describing Afrikaans and Sepedi speaking grade R children's choice of graphic symbols when depicting four basic emotions. The results were presented according to the four sub-aims and will be discussed in the next chapter. The missing data were briefly discussed.

## CHAPTER 5

### DISCUSSION

#### 5.1. Introduction

This study largely confirms significant differences between how two groups of children from different language contexts recognize and select graphic symbols representing emotions. The discussion will focus on exploring some factors that could have impacted on these results.

#### 5.2. Choice of expected and unexpected symbols

Significant differences at the 1% level between the expected symbols selected by the different language groups to represent *happy*, *angry*, *afraid* and *sad* were observed (Table 4.2.). These results support the differences observed in studies that investigated different symbol characteristics within different language groups in the South African context (Basson & Alant, 2005; Haupt & Alant, 2002), accentuating the dynamic relationship between language groups and the interpretation of symbols (Bornman, et al., 2009).

It was also further indicated in Tables 4.3 to 4.6 that not only did these two language groups differ in relation to their choices of which graphic symbols represent an emotion, but the range of symbols selected per emotion varied. It was the Sepedi-speaking participants who had the broader range of representations for each emotion which seem to suggest a greater variability in their perception of the symbols representing the emotions. This variability might be indicative of less exposure to graphic symbols representing emotions, hence more uncertainty or inconsistency in the association between graphic symbols and these emotions. The process of visual perception is highly influenced by the cultural and social context within which the individual lives (Alant, 2005) and these cultural differences in the perception of graphic symbols have been recorded (Carter, et al., 2005; Deregowski, 1971; Duncan, et al., 1973; Miller, 1973) and could explain the difference.

Another factor that might have impacted on this difference between the groups is that the Afrikaans-speaking participants, possibly having a stronger literate background might have been more skilled at scanning the overlays in finding the same graphic emotions while the Sepedi-speaking participants tended to be slower and perhaps less critical in their selection of a graphic symbol to represent an emotion. This could be particularly relevant as the

graphic symbols on the overlays for each of the vignettes were randomly presented and hence required that the participant searched through all 16 graphic symbols to find the appropriate symbol each time.

Although the different symbols were classified as expected and unexpected symbols it is important to note that there were no ‘correct’ and ‘incorrect’ answers, since the main aim of the study was to describe and compare the two language groups’ selection of graphic symbols when depicting four basic emotions. Expected symbols in this study refer to any of the 4 PCS systematically identified to represent a specific basic emotion. Unexpected symbols in turn refer to any PCS on the presented overlay which is not one of the expected symbols of the target basic emotion. Due to the nature of the task selecting an expected symbol is not more correct than selecting an unexpected symbol. Overall Afrikaans-speaking participants selected more expected symbols than Sepedi-participants.

Both language groups were more often in agreement regarding expected symbols representing *happy*, followed by *angry*, *afraid* and lastly *sad*. English-speaking participants in another South African study by Visser, et al. (2008) also chose expected symbols in this order. The order of accuracy mostly mentioned in emotion recognition literature is *happy* followed by *sad*, *anger* and *fear* (Denham, & Couchoud, 1990a; b; MacDonald & Kirkpatrick, 1996). Some researchers have found variations regarding the order of *sad*, *anger* and *fear*, but *sad* was never the least accurate (Boyatzis, et al., 1993; Holder & Kirkpatrick, 2001; Walden & Field, 1982).

Landmarks in a child’s development are often used to chart development (Widen & Russell, 2008a), when a child first uses the word *happy* it is said to mark the acquisition of happiness. According to the Differentiation Model which describes children’s acquisition of emotion concepts (Widen & Russell, 2003; 2008a) and is presented in Figure 2.1 in Chapter 2, the first step is the emergence of the label for happy; the next step is the use of two labels, one positive emotion (happy) and one negative emotion, either sad or angry. The next level is the use of three labels with a division in the negative emotions (sad and angry). Finally the words surprised, scared and disgusted are added to the child’s lexicon.

As the acquisition of the label is associated with the acquisition of the concept the Differentiation Model (Widen & Russell, 2003; 2008a) could help to account for why angry symbols were chosen more accurately than sad symbols. It could be that the participants of this particular study developed the concept for anger before they developed the concept for sadness. The model does not give an explanation to why *afraid* symbols were also chosen more accurately than *sad* symbols.

Schematic drawings representing emotions (MacDonald & Kirkpatrick, 1996) consisted of different facial emotional expression based on Ekman and Friesen's (1975) evaluations of facial components of emotional expressions. Of the six emotions used by MacDonald and Kirkpatrick (1996) accuracy was the greatest for *happiness*, followed by *sadness*, *anger*, *disgust*, *fear* and *surprise* (in descending order), indicating that their participants identified the schematic drawing representing sadness easier than the schematic drawings representing anger and fear.

It could be that the participants did not perceive the specific symbols chosen to represent *sad* to be good representations of *sad*. PCS is a symbol set with no logical base for the expansion of vocabulary (Fuller, 1997) and it is uncertain whether any specific structure was used in the development of the PCS to represent the emotions. It is, however, unlikely, because some of the PCS can according to Boardmaker version 6 demo (© 1981-2007 Mayer-Johnson) represent more than one emotion (Appendix H).

As expected both groups was less accurate with later developing emotions i.e. *angry*, *afraid* and *sad* than with the first emotion to develop (*happy*) (Denham, 1989; Camras & Allison, 1985). Unfortunately there is a paucity on South African studies looking at the development of recognition of emotions in South African children and can these results not be compared to South African results.

### **5.3. Most preferred symbols to represent the emotions**

Preferred symbols can be defined as the symbols participants selected to represent a particular emotion. In an attempt to understand why certain symbols were preferred over other symbols to represent *happy*, *angry*, *afraid* and *sad* the features of the more often selected symbols were analyzed.

### 5.3.1. Symbols representing *happy*

Symbol 1 [😊] was the most preferred choice to represent *happy* for both language groups. The facial features of this symbol are an open mouthed smile with raised lip corners, raised eyebrows and large open eyes. This symbol displays extra features in the form of ‘light rays’ around the face. Sullivan and Kirkpatrick (1996) found that children focus on the lower component of the face (the mouth) when interpreting happy facial expressions. According to Kohler, et al., (2004) raised eyebrows and an open mouth are facial features evident in the expression of *happy*. Herba, Landua, Russell, Ecker, and Phillips (2006) found that higher expression intensity was associated with more accurate matching, particularly for the expression of fear, disgust and happiness. The ‘light rays’ around the face could be seen as intensity markers indicating ‘more happy’ than the other symbols.

Symbol 1 [😊] is also distinct from the other expected *happy* symbols, since for instance symbol 13 [😄] does not show raised eyebrows, wide open eyes or ‘light rays’ and symbols 5 [😊] and 9 [😊] do not display raised eyebrows, wide open eyes, an open mouth or ‘light rays’. Symbol 13 [😄] in turn is distinct from symbols 5 [😊] and 9 [😊] in that it does have an open mouth. These distinct features of symbols 1 [😊] and 13 [😄] could explain why they were the most preferred choices in representing *happy*.

### 5.3.2. Symbols representing *angry*

According to literature the facial features presented for *anger* are furrowed eyebrows or lowered eyebrows drawn together, eyes wide open with a tightened lower lid, a nose wrinkle, raised upper and turned lower lips exposing teeth as well as stretched lip corners and a jaw drop or pressed lips (Ekman and Friesen, 1975; Kohler, et al., 2004; Sullivan and Kirkpatrick, 1996). Sullivan and Kirkpatrick (1996) found that children focussed on the upper component when interpreting angry facial expressions. Kirkpatrick and Bell (1996) found that heavy (thick) eyebrows were chosen more frequently for *anger*, *disgust*, *fear*, *sadness* and *surprise* than thin or neutral eyebrows

The expected symbol 8 [😡] was Afrikaans speaking participants’ most preferred choice for representing *angry*. The facial features of symbol 8 [😡] are inner corners of eyebrows lowered, dot eyes, open mouth exposing teeth and stretched lip corners; an extra feature of

steam/smoke coming out of the ears is also present. The facial features also seemed to be drawn together.

What differentiated symbol 8 [🙄] most from the other expected symbols were the eyebrows which appear to be thick, the steam/smoke coming out of the ears and the drawn together facial features. Symbol 4 [😏], selected second most by Afrikaans speaking participants has small eyes with the inner corners of the eyelids lowered and a furrowed mouth. Symbols 12 [😬] and 16 [😬] also had open lips, with stretched lip corners exposing teeth; furthermore, these symbols have wide open eyes. Results seem to indicate that for the Afrikaans speaking participants the thick eyebrows and steam/smoke coming out of the ears carried more weight than the wide open eyes when choosing a preferred symbol to represent *angry*.

Sepedi speaking participants preferred expected symbol 12 [😬] to represent *angry*. Symbol 12's [😬] features can be described as raised eyebrows, wide open eyes, and an open mouth with stretched lip corners (corners turned down) exposing teeth; extra features are raised hair, fists, action indicators and accentuation lines around the eyes and mouth. Their second choice was symbol 8 [🙄]. The features which most distinguished symbol 12 [😬] from the other expected symbols are the extra features. Symbol 3 [😬], an unexpected symbol, was chosen third most by the Sepedi speaking participants. Symbol 3's [😬] features are a frowned forehead, wide open eyes, a down turned mouth and a nose.

### 5.3.3. Symbols representing *afraid*

Facial features of *afraid* expressions are furrowed and raised eyebrows, eyebrows drawn together, eyes wide open, raised upper eye lid, tense lower eyelids, stretched lips/mouth and a dropped jaw (Ekman and Friesen, 1975; Kohler, et al., 2004; Sullivan and Kirkpatrick, 1996).

Expected symbol 11 [😬] was the Afrikaans speaking participants' and the Sepedi-speaking participants' second most preferred choice to represent *afraid*. Symbol features are raised eyebrows, big open eyes and an open mouth (black) with an extra feature of hair standing up on the head. The expected symbol chosen most by Sepedi speaking participants and second most by Afrikaans speaking participants was symbol 7 [😬] with raised eyebrows, big open eyes, an open mouth (dark), a nose and the extra feature of a hand in front of the mouth. The only differences between these two symbols are the nose (symbol 7 [😬]) and the hair

standing up on the head (symbol 11 [👁️]). These two symbols differ from the other expected symbols with regard to the raised eyebrows, very wide open eyes and a dark open mouth. The expected symbols 3 [😬] and 15 [😬] both have stretched lips and symbol 3 [😬] also has open eyes. According to Kirkpatrick and Bell (1996) children focus on eyebrows when identifying fear. It seems that the participants in the study focussed on the raised eyebrows in selecting symbols 11 [👁️] and 7 [👁️] as their top representations of *afraid*.

Unexpected symbols 2 [😬] and 6 [😬] were chosen by Sepedi speaking participants to represent *afraid* over the expected symbols 3 [😬] and 15 [😬]. The two unexpected symbols both have eyebrows, which are absent in symbols 3 [😬] and 15 [😬]. Symbols 2 [😬] and 6 [😬] also have wider open than symbol 15 [😬]. Since Sepedi speaking participants seemed to focus on the upper component in choosing symbols 7 [👁️] and 11 [👁️] as their 1<sup>st</sup> and 2<sup>nd</sup> choice to represent *afraid* the open eyes with eyebrows of the expected *sad* symbols might have lead them to choose these symbols as their 3<sup>rd</sup> and 4<sup>th</sup> choices.

#### 5.3.4. Symbols representing *sad*

According to literature the features for *sad* are inner eyebrows raised and drawn together, furrowed eyebrows, eye lids tight, an opened mouth with upper lip being raised, lip corners stretched and turned down, pulled up chin. Afrikaans speaking participants chose expected symbol 10 [😬] as the most representative symbol for *sad*. Symbol 10's [😬] features are no eyebrows, eyelids turned down, large mouth curved downwards and an extra feature of a tear on the cheek; the features of symbols 14 [😬] which was chosen second most are eyebrows curved down (inner corners raised), big open eyes, an opened mouth with lip corners turned down and an extra feature of a tear on the cheek. Sullivan and Kirkpatrick (1996) found that when identifying *sad*, children focussed on the mouth. The three unexpected choices all had a down turned mouth. What differentiates these symbols from the symbols mostly chosen is the tear on the cheek. It seemed that Afrikaans speaking participants made use of the tear on the cheek to differentiate the symbols representing *sad* when the other symbols also had mouth corners turned down.

Sepedi speaking participants chose the unexpected symbol 7 [  ] to represent *sad* the most. This symbol has none of the sad features; the unexpected symbol 8 [  ] which was chosen second most shows a mouth with stretched lip corners which could look like lips turned down. Expected symbol 2 [  ] was chosen third most, equal to unexpected symbol 11 [  ]; its features are hanging/drooping eyebrows and a small mouth turned downwards. All three the unexpected choices had extra features. It seems as if Sepedi speaking participants were unsure of which symbols could represent *sad* and chose the symbols with extra features.

All of the most preferred symbols (1 [  ], 7 [  ], 8 [  ], 10 [  ], 11 [  ], 12 [  ]) had extra features. This may indicate that the participants in the current study did not only look at the facial features, but at all the features present. It could further be that the extra features drew more attention to the particular symbols. In real life situations when interpreting others emotions and actions the perceiver is almost never exposed to the face only. With developing or choosing symbols to represent emotions clinicians might want to use symbols that also include some of the context.

#### **5.4. Intensity ratings of vignettes in relation to basic emotions across language and gender groups**

The third sub-aim of the current study was to compare and describe the intensity ratings of vignettes in relation to each basic emotion across language and gender groups. The only significant difference found between language groups was in regard *happy*. Sepedi speaking participants selected *happy* more often than their Afrikaans speaking peers who selected *very happy* to describe the intensity of the *happy* vignettes.

According to Wang (2003) the intensity component of emotion situation knowledge is sensitive to cultural influences. In his study American participants assigned higher intensity ratings to emotions than their Chinese counterparts, especially for negative emotions. Participants in the current study did not make use of the opportunity to use intensity. This could indicate that the participants (Afrikaans- and Sepedi-speaking) were unable to indicate gradation of emotions on the measuring instrument (bar graph) used in the study. Whether or not participants in the current study understands the gradation of emotions were beyond the study's scope. It might be necessary to go a step back and see how South African children

interpret gradation of emotion, before trying to see how gradation of emotion concepts influences the selection of symbol representing emotions.

### **5.5. Gender groups**

Several research studies in the field of emotions found gender differences regarding the development of emotions (Boyatzis, et al., 1993; Brown & Dunn, 1996; Denham, et al., 1990; Holder, & Kirkpatrick, 2001), while other studies demonstrated contradictory findings with no apparent gender differences (Bennett, et al., 2005; MacDonald & Kirkpatrick, 1996). Findings of the current study were analyzed taking gender as a potential influence into consideration.

Results indicate no difference between male's and female's perception of the symbols. These results seem to support studies by Bennett, et al. (2005) and MacDonald and Kirkpatrick (1996) where no gender differences were indicated. The study by Bennett, et al. (2005) investigated individual differences in emotion knowledge, while MacDonald and Kirkpatrick (1996) investigated how accurately children recognised facial expressions for emotions using schematic drawings and photographs as stimuli. Kirkpatrick and Bell (1996) mentioned that the gender differences found in some studies investigating emotions are likely to be reflective of method rather than actual differences.

### **5.6. Summary**

This chapter discussed the study's results. Firstly the significant differences at the 1% level between the expected symbols selected by the different language groups to represent basic emotions were discussed. The differences and possible reasons for these differences between the expected and unexpected choices of graphic symbols to represent basic emotions across the language groups were discussed. In a further attempt to explain the symbol choices the different symbols were analysed with regard to different facial features. The possible reasons for the lack of significant differences with regard to the intensities and gender were briefly discussed.

## CHAPTER 6

### CONCLUSIONS, EVALUATIONS AND RECOMMENDATIONS

#### 6.1. Introduction

This chapter contains a summary of the research results, including the conclusions of the study, the clinical implications, evaluation of the study and recommendations for further research.

#### 6.2. Conclusions

The current study was one of several of studies done over the last decade relating to graphic symbols and their use in the South African context (Alant, Life, & Harty, 2005; Basson & Alant, 2005; Bornman, et al., 2009; Haupt & Alant, 2002; Visser, et al, 2008). Studies by Basson and Alant (2005) and Haupt and Alant (2002) could not be compared, because too many variables in these studies differed. Descriptive comparisons of these studies revealed that the differences between the two cultures could be ascribed to the different cultural experiences of the two groups. Current results indicate a significant difference at the 1% level between the Afrikaans and Sepedi speaking participants in the choice of expected symbols to represent *happy*, *angry*, *afraid* and *sad*.

No significant differences in the symbols chosen by the two genders were observed. This is in accordance with some literature which found no gender differences with regard to the development of emotions (Bennett, et al., 2005; MacDonald, & Kirkpatrick, 1996). Results in the current study were inconclusive on the influence of intensity ratings on the participants' choice of symbols.

Results indicated a difference in the symbols the two language groups preferred to represent the four emotions. After an analysis of the symbols with regard to their features it was observed that all of the symbols chosen most as preferred symbols had extra features, questioning the use of only facial expressions when representing emotions. Reliability of the data was ensured by the implementation of different steps during the development of the material, the choice and training of a research assistant, the data collecting process and the recording of data.

### 6.3. Clinical implications

This study has several clinical implications. Firstly when working in a country like South Africa with a heterogeneous population it is important to remember that different individuals' cultural backgrounds have an influence on the way they perceive and interact with different graphic symbols.

Secondly when working with children it is imperative not to assume that they interpret graphic symbols the same way therapists, teachers or the developers of graphic symbols do. This does not mean that graphic symbols cannot be used when working with these populations; it rather means that the individuals might need more instruction or explanation on the graphic symbols than merely the labelling of the graphic symbols.

Practitioners who wish to introduce AAC into schools need to make sure that the teachers or therapists they train to implement and use AAC in the schools understand the above point and that they will not assume that the children they work with will perceive the graphic symbols they same as they do.

As both South African language groups were more accurate with the selection of *angry* and *afraid* than with *sad*, care should be taken on making assumptions on developmental models developed in other countries, according to which *sad* develops almost simultaneously (months before or months after) to *angry* and before *afraid* (Denham, 1989; Camras & Allison, 1985; Wang, 2003; Widen & Russell, 2003; 2008a).

In the development of graphic symbols representing different emotions it might be necessary to use research like Ekman and Friessen (1975); Kohler, et al. (2004) and MacDonald and Kirkpatrick (1997) as the foundation for further developing graphic symbols.

### 6.4. Evaluation of the study

The following are considered strengths of the study:

- All participants understood the four emotions used in the study (this was established by implementing a pre-assessment task that all participants had to pass before taking part in the study).

- The use of a combination of back translation, the committee approach and pre-test procedures (Brislin, 1980; Haupt, 2001; Retief, 1988) in the translation of the material from Afrikaans to Sepedi, ensuring that the differences observed between the two language groups cannot be attributed to possible differences in the material.
- The procedural integrity of the presentation of the protocol to the participants by the researcher (to Afrikaans speaking participants) and of the research assistant (to Sepedi speaking participants) was established. The procedural integrity score for both the Afrikaans and Sepedi speaking participants were 99%.
- The symbols presented on the overlays were randomized for each overlay. This forced the participants to scan all the symbols each time they were presented with an overlay.

The limitations of the study:

- Although the researcher in the current study additionally wanted to investigate a possible link between the intensities of emotions elicited by the vignettes and the choice of symbols to represent the emotions; no such link was observed. The vignettes might not have been sensitive enough to pick up possible differences in intensity. It is also possible that the children were too young to differentiate grading of emotions.
- As the sample size was relatively small ( $n=90$ ), care must be taken when interpreting results. It might not be possible to generalize results to the larger population.

## **6.5. Recommendations for future research**

- A similar study exploring the influence of age on the symbols chosen to determine whether the recognition of the graphic symbols representing emotions increases with age.

- Studies to investigate the grading (from experiencing for example ‘a little angry’ through to ‘very, very, angry’) of emotions to establish at what age South African children are able to successfully grade the emotions they are experiencing.
- Further research to establish a possible link between the intensity of the emotion in a vignette and the choice of vignettes. In such a study great care must be taken to ensure that vignettes are sensitive to changes in intensity. Another possibility would be merely asking participants to indicate, on an overlay with graphic symbols depicting emotions, which symbols shows ‘little angry’, ‘angry’ or ‘very angry’.
- Research to compare visual perception of facial expression and different graphic symbols to investigate how participants perceive graphic symbols from other sets and systems representing emotions, i.e. to see if these findings are related to specific graphic symbols, or if there would be a pattern emerging in comparing different graphic symbol sets e.g. Bliss, etc.
- The study was the first study where results from two different language groups in South Africa were statistically compared. The study can be seen as a preliminary study. As this study showed significant statistical differences between the two language groups, more comparative studies between different language groups are warranted to more clearly understand the nature of the differences that can emerge in different cultural contexts.

## 6.6. Summary

This chapter presented a summary of the main findings in describing South African grade R children’s choice of graphic symbols when depicting *happy*; *sad*; *afraid* and *angry*. Clinical implications, the strengths and weaknesses of the study as well as recommendations for further research were presented.