

their sensory systems when they are overstimulated. Additionally, the proprioceptive input may help modulate their emotional state and decrease over responsiveness to touch (Spira & Kupietzky, 2005). On the other hand, some children may prefer looser garments so that tactile stimulation is avoided. If tactile stimulation is avoided, its influence on their overreactive tactile sensory system is reduced. Within this specific section, both the concepts of sensory overreactivity and sensory underreactivity is noted (Ayres & Tickle, 1980; Dunn, 2006).

“With regards to the tight clothing, I’m in a very big pickle with regards to his pants. Because he has to have his he wants everything to be tight, because he doesn’t like the loose clothing” (P1:180).

“And then we buy bigger sizes to leave a bit more room for, you know, just moving the sleeves around, and tucking it in” (P3:60).

“And then a lot of my kiddies prefer tighter clothing again, because I think the tighter the school shoe, the tighter the leggings or stockings, [it] almost gives them that proprioceptive feeling that counters the light touch” (P5:72). “So, it’s a deep pressure. Because it’s a tight fitting so, it’s a more longer deep pressure that’s calming for the skin instead of a light pressure touch” (P5:76).

“It’s very different with every child, for example, if they have some tactile kids that have a problem with very tight-fitting garments, and then, you know, it’s irrelevant of the fabric and then other kids. If it’s too loose, that’s also a problem” (P9:43).

4.2.3.6 Decorative elements

As mentioned by Royeen (1985), embroidery on clothing is regarded as an irritant. An example of this may be decorative trimming on school uniforms. Many participants expressed that embroidery- usually present in the school crest on a school uniform, its specific backing, and its location (usually on the chest), cause immense discomfort (Figure 4.6). Hard and rough textures against the skin have been proven to cause irritation (Roy *et al.*, 2018; Shin & Gaines, 2017). Participants mentioned that in the case where the school crest was embroidered on the pocket of the garment, thereby preventing the embroidery from touching the skin, no irritation was present.

“I found with my son he had an embroidery on his shirt, and the inside they had that backing and it is itchy. That was a huge irritation, I had to put on a softer backing. Just so he could wear that” (P6:204).

“...the thick embroidery of the crest on the golf shirt. And it’s backing, I agree with the previous person. It’s very irritating. And it’s very hard [against the skin] in that area where the actual logo [is embroidered]” (P3:207).

“[Our school] put the crest on the pocket and then sewed the pocket to the shirt. So that has definitely helped that the back of the embroidery [of the school crest] doesn’t touch the skin” (P2:210).

“So, um, before I made my school jackets last month for the kids, I actually did a lot of research on how to make it less sensitive for them... So, what I asked the embroiders to do, we embroider it on a piece of fabric, then we cut out the school emblem and then we embroider it with one stitch... around the emblem onto the jacket. So, there’s no fabric inside that scratches you or anything” (P7:212).

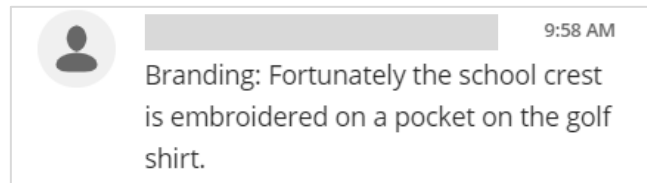


FIGURE 4.6: CHAT-LINE: P2 FOCUS GROUP 1

4.3 CONCLUSION

During the focus group discussions, revision of the transcriptions, the coding as well as the content analysis, it became clear which properties of a typical school uniform may manifest in sensory tactile overreactivity. As explained, these properties have been categorised into three main themes with sub-themes (Figure 4.7). Apart from the three main themes and sub-themes, it came to the fore that other variables of the uniform also have an influence such as the different garment options (e.g., a jacket versus a jersey) and whether the wearing of shoes is mandatory. This was also incorporated into the questionnaire (utilised in the quantitative phase) together with the properties of a school uniform as indicated in Figure 4.7.

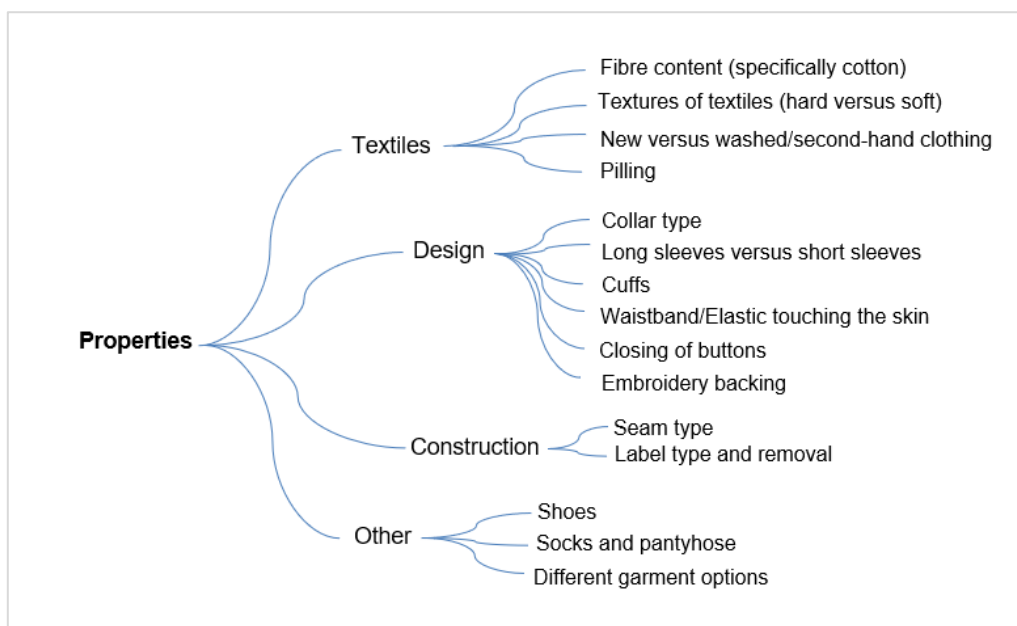


FIGURE 4.7: SCHOOL UNIFORM PROPERTIES INCORPORATED INTO QUESTIONNAIRE

CHAPTER 5

RESEARCH FINDINGS AND ANALYSIS: PHASE 2

5.1 INTRODUCTION

This chapter provides an overview of the results of the data obtained in phase 2, the quantitative phase, and includes demographic characteristics as well as descriptive statistics. In terms of the criteria for this phase of the research study, respondents had to have a child (i.e. parents) that has mild to serve overreactive responses towards light touch input (especially clothing). Furthermore, the child must wear a school uniform to school. Based on the screening criteria, 173 respondents started the questionnaire, only 113 respondents passed the screening questions and only 106 respondents completed the majority of the questionnaire (up to Question 9). Therefore, the final sample size is 106 parents of children with sensory overreactivity.

It is to be noted that the sample size was determined by the inclusion criteria and the limited number of respondents available.

5.2 DEMOGRAPHIC CHARACTERISTICS

The questionnaire included three demographic questions based on age, gender and geographic location. Despite the data pertaining to the geographic location, the data obtained was not based on the actual respondents' demographics, but rather on the demographics of the children. Demographic data served as a useful tool in describing the sample as well as the characteristics of the population that formed part of this study. This also assisted the researcher in comparing the current research to prior literature (Babbie, 2016:132, 176). As mentioned in Chapter 3 Section 3.3.3.2, when a parent had two or more children with overreactive responses towards clothing, they were required to base their answers on the child who experienced the most severe sensory issues. The following section provides an overview of the demographic characteristics of the sample. It also

serves as an appropriate background for the results presented in the remainder of the chapter.

5.2.1 Age

Respondents completed this question based on the age of their child. Age was not a specified prerequisite for participation in the study and respondents indicated the children's age in an open-ended question by submitting the child's year of birth. A summary of the age distribution is presented in Figure 5.1 that presents a bar chart skewed to the right. The majority of the children were thus born between 2012-2015 ($n = 66 / 62.26\%$) i.e. between 6-9 years old. The findings suggest that sensory overreactivity is more prevalent in younger children rather than older children born before 2011 ($n = 12 / 11.32\%$). This reiterates the findings by van Jaarsveld (2014) and Ayres *et al.* (2005) that stated that sensory overreactivity is indeed more problematic in typically developing children-specifically children of four to nine years of age.

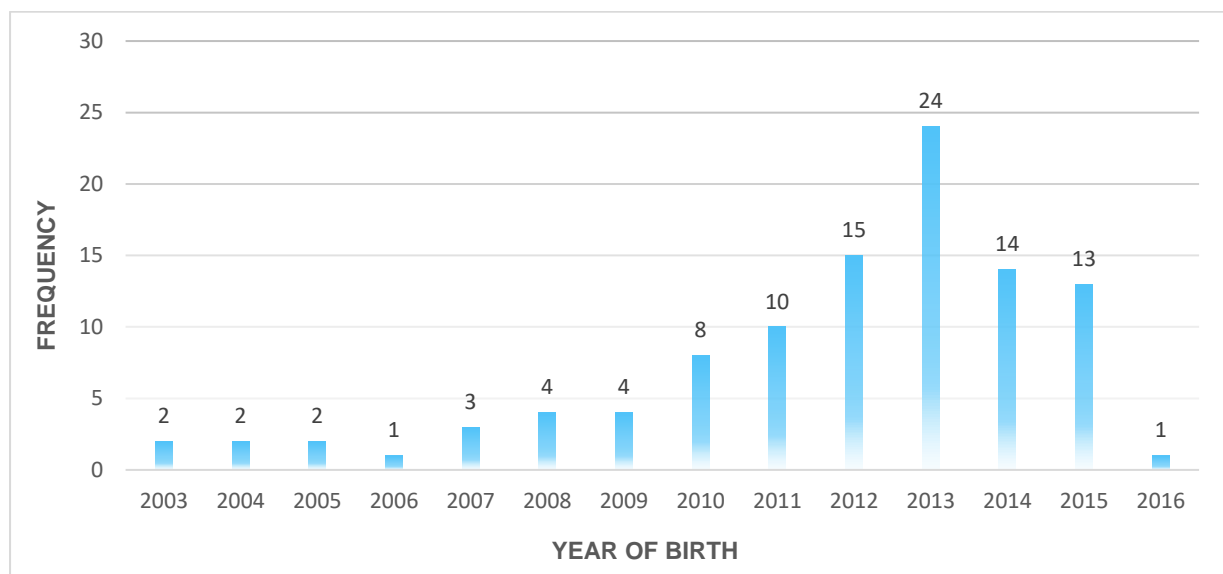


FIGURE 5.1: AGE DISTRIBUTION OF CHILDREN (N = 103; MISSING: n = 3)

Other sensory studies have indicated age distribution according to a three-year educational system or “years in education” in the United Kingdom and Ghana respectively (Blakemore *et al.*, 2006; Opoku, Nketsia, Fianyi & Laryea, 2020). Due to the South African nature of the study, Figure 5.2 represents the age categories of children grouped according to the South African schooling system. The categories include the Foundation Phase (ages 5-9) ($n = 67 / 65.04\%$) Intermediate Phase (ages 10-12) ($n = 12 / 21.35\%$), Senior Phase (ages 13-15) ($n = 8 / 7.76\%$), Further Education and Training (ages 16-18) ($n = 6 / 5.82\%$) and totaled to a sample set of $n = 103$ (Department-of-Higher-Education-and-Training, 2021). This figure suggests that children in the Foundation Phase ($n = 67$) are more prone to experience

sensory overreactive responses as mentioned by van Jaarsveld (2014) and Ayres *et al.* (2005).

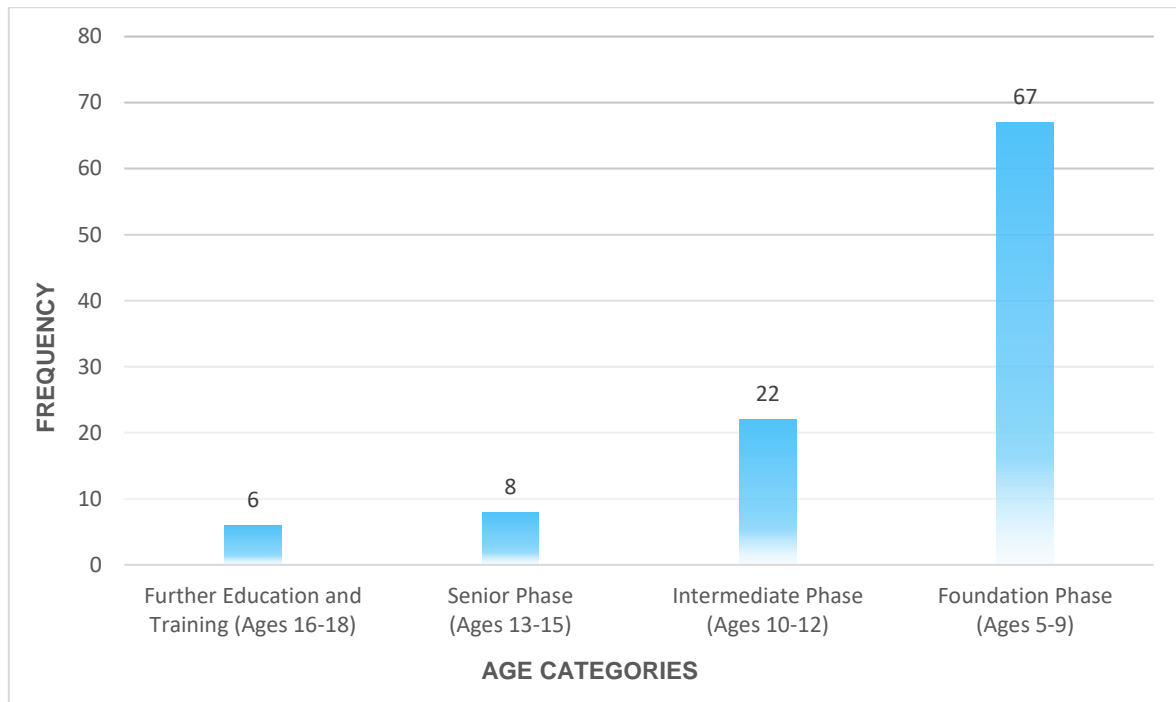


FIGURE 5.2: AGE CATEGORIES OF CHILDREN ACCORDING TO THE SOUTH AFRICAN SCHOOLING SYSTEM (N = 103; MISSING: n = 3)

5.2.2 Gender

The chart represented by Figure 5.3 reflects the number of female (n = 52/49.06%) and male (n = 54/50.9%) children as indicated by respondents. The researcher did not employ quota sampling to control population characteristics such as the age or gender of the children. Therefore, it was purely by chance that the proportion of the sample is similar to the proportion of the population.

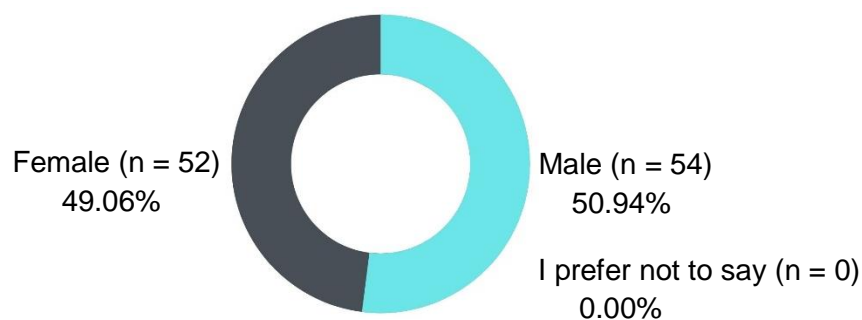


FIGURE 5.3: GENDER DISTRIBUTION (N = 106)

5.2.3 Geographic location

Respondents were recruited nationally across South Africa since an online questionnaire was employed. The questionnaire required respondents to indicate their geographic location through a multiple-choice question whereby they were presented with the option of choosing one of the nine provinces (Eastern Cape, Free State, Gauteng, KwaZulu-Natal, Limpopo, Mpumalanga, Northern Cape, North West and Western Cape). This also served as a screening question to ensure that all the respondents reside in South Africa. As indicated in Figure 5.4, the majority of respondents resided in Gauteng ($n = 54/50.94\%$) and the Western Cape ($n = 21/19.81\%$) respectively. This could be partly attributed to the fact that the majority of SI certified occupational therapists practice within these two provinces (SAISI, 2021). Electronic links to the questionnaire were distributed via Whatsapp, Facebook, and email to various occupational therapists within South Africa who had potential access to Sensory Integration certified OT's. These occupational therapists distributed it further to parents by means of snowball sampling.

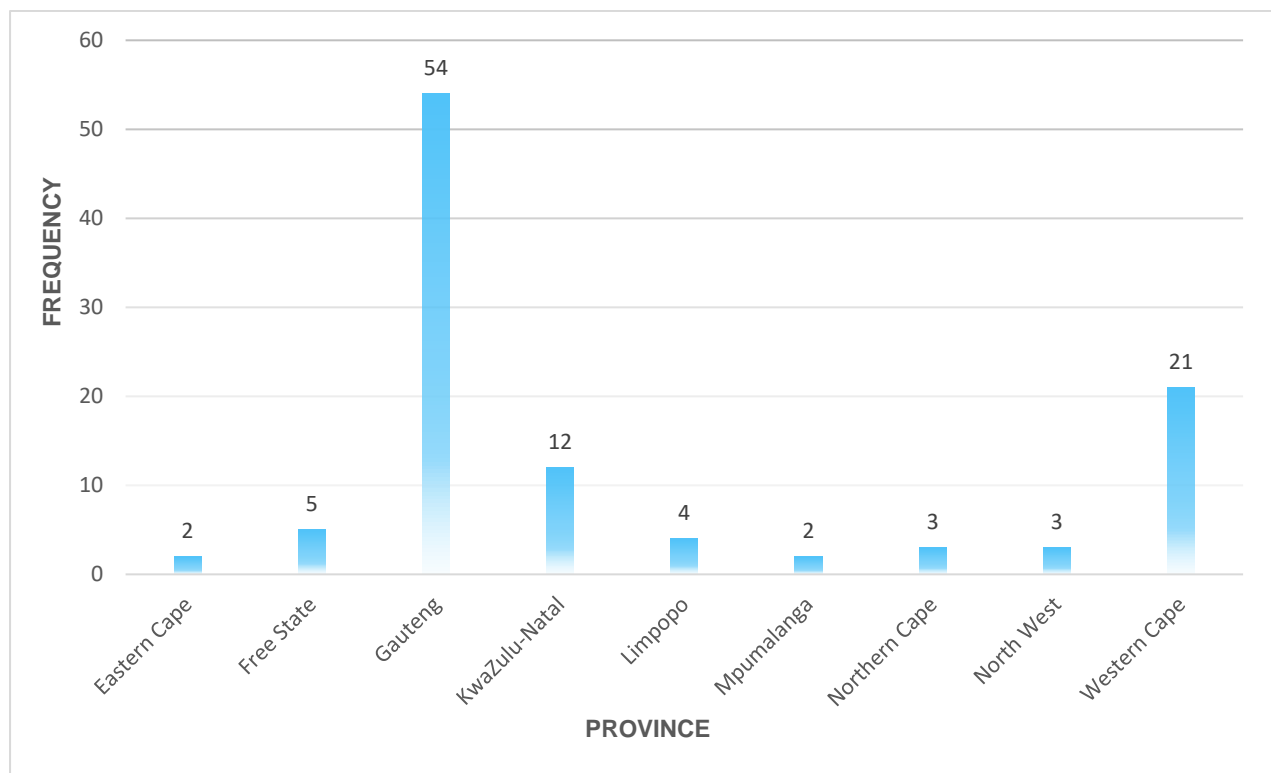


FIGURE 5.4: GEOGRAPHIC LOCATION DISTRIBUTION (N = 106)

In summary, the demographic profile of the sample consists of children mainly between five and nine years of age ($n = 67$), being equally male and female ($n = 106$) and residing in Gauteng ($n = 54$). Non-probability sampling and snowball sampling allowed for an estimated profile of characteristics of this rare population (Malhotra *et al.*, 2017:424).

5.3 RESULTS

In the following section, the results are discussed in accordance with the format of the research study. Therefore, the interpretation will not necessarily follow the chronological order of the questionnaire but rather the objectives as discussed in Chapter 1, Section 1.4.2. The findings of the open-ended question (Question 16) will be discussed with the related topic. The questionnaire included introductory questions leading up to the main objectives of the study. Therefore, the introduction questions' discussion occurs first.

5.3.1 Introductory questions

To place the study in context, respondents were required to answer questions that required minimal effort as recommended by Malhotra *et al.* (2017:384). The initial question asked parents to indicate their experience of the severity of their child's sensory issues on a continuous rating scale by using a slider (see Question 8 in the questionnaire in Addendum) on a scale of "1" (not severe) to "5" (extremely severe). As presented in Table 5.1 below, 24.53% (n = 26) of respondents placed the slider at the halfway mark. These respondents probably experience their child's sensory issues as severe but manageable. In addition, most parents rated their child's sensory issues a "4" on the scale (n = 42/39.62%), and a quarter of the respondents (n = 27/25.47%) indicated a "5" on the scale which refers to "extremely severe". The remainder of respondents indicated their child's sensory issues were not as severe. van Jaarsveld (2014) mentions that sensory issues are more extreme in children between the ages of five and nine years old. The majority of respondents' children were categorised into the foundation phase age group, and therefore, this could be a potential reason why the majority of answers were concentrated around scale items "4" and "5".

TABLE 5.1: INDICATE THE LEVEL OF SEVERITY OF YOUR CHILD'S SENSORY ISSUES (N = 106)

Scale	Answer	%	Frequency	Mean	Standard deviation
Not severe	1	0.94	1	3.79	0.96
	2	9.43	10		
	3	24.53	26		
	4	39.62	42		
Extremely severe	5	25.47	27		

Prior research indicated that children with sensory overreactivity often become distressed by the feeling of new clothes, socks, shoes, textures of certain textiles and wearing long-sleeved garments (Cheng & Boggett-Carsjens, 2005; Christopher, 2019; Kyriacou *et al.*, 2021). It was important to determine whether the respondents' children indeed struggled with

sensory overreactivity, specifically related to touch. In Question 9 the respondents indicated how frequently their child becomes distressed by the aforementioned occurrences (Table 5.2). When looking at the combined data of “often” and “very often”, it was evident that specific fabric textures (n = 81/76.42%) most frequently causes distress, followed by new clothes (n 79/74.53%) and socks (n = 75/70.76%). Although less frequent yet still noteworthy was the feeling of shoes (n = 66/62.26%) and long-sleeved garments (n = 59/55.66%).

TABLE 5.2: INDICATE HOW FREQUENTLY YOUR CHILD BECOMES DISTRESSED BY THE FOLLOWING (N = 106)

Question	Never		Rarely		Sometimes		Often		Very often		Mean	Standard deviation
	%	n	%	N	%	n	%	n	%	N		
The feeling of new clothes	0.94	1	1.89	2	22.64	24	45.28	48	29.25	31	4.00	0.82
Wearing of socks	4.72	5	7.55	8	16.98	18	37.74	40	33.02	35	3.87	1.10
Wearing of shoes	4.72	5	5.66	6	27.36	29	31.13	33	31.13	33	3.78	1.09
Textures of certain textiles	0.00	0	2.83	3	20.75	22	34.91	37	41.51	44	4.15	0.84
Long sleeve garments	0.00	0	16.0	17	28.30	30	27.36	29	28.30	30	3.68	1.05

It is important to remember that this study primarily focused on the properties of clothing from a textile and consumer science field, and not necessarily occupational therapy viewpoint, therefore, the results of the following questions were not be explored in depth. Finally, the questionnaire asked respondents to think about their child’s emotional state while putting on and wearing their school uniform. With this question, the researcher was able to gather the extent to which school uniforms really affect the child’s emotional well-being and quality of life. Employing a 5-point scale ranging from “never” to “very often”, the first question asked whether a school uniform causes irritation and unhappiness in the morning while getting ready for school. Widely, the response was “often” (n = 37/35.92%) and “very often” (n = 35/33.98%). Whether a school uniform encouraged meltdowns in the morning before school, similarly, 31.07% (n = 32) and 27.18% (n = 28) indicated that it occurs “often” and “very often”, respectively. In addition, the school uniform only contributes to meltdowns at school itself, “rarely” (n = 29/28.16%) and “sometimes” (n = 25/24.27%). As expected, most respondents (n = 81/78.64%) indicated that school uniforms affect their child’s concentration at school. 34.95% (n = 36) Stated that it influences their concentration levels “often”, 25.24% (n = 26) indicated that it does affect concentration “sometimes”, and finally, 18.45% (n = 19) indicated it influences their child “very often”. Table 5.3 highlights the results.

TABLE 5.3: INDICATE HOW FREQUENTLY YOUR CHILD BECOMES DISTRESSED BY THE FOLLOWING SCENARIOS (N = 103; MISSING: n = 3)

Question	Never		Rarely		Sometimes		Often		Very Often		Mean	Std Deviation
	%	n	%	n	%	n	%	n	%	N		
The school uniform causes irritation and unhappiness in the morning while getting ready for school.	0.00	0	5.83	6	24.27	25	35.92	37	33.98	35	3.98	0.90
The school uniform causes meltdowns in the morning while getting ready for school.	4.85	5	12.62	13	24.27	25	31.07	32	27.18	28	3.63	1.15
The school uniform influences my child's ability to concentrate on his school work.	2.91	3	18.45	19	25.24	26	34.95	36	18.45	19	3.48	1.08
The school uniform contributes to meltdowns at school.	20.39	21	28.16	29	24.27	25	18.45	19	8.74	9	2.67	1.23

5.4 TEXTILES

Objective 1.1 aimed to understand the influence of textile properties on children who experience sensory overreactive responses. As fully explained in Chapter 1, Section 1.1, the textile properties of garments include various components though only fibre content and fabrication of school uniforms came to the fore in phase 1 and subsequently formed part of phase 2.

Question 11, related to the fabrication and fibre contents of garments, required respondents to indicate their level of agreement to a variety of statements (Table 5.4). The response options for this question included “strongly disagree”, “disagree”, “neutral”, “agree” and “strongly agree”. The first statement asked respondents whether the fibre content of the fabric used to manufacture school clothing had a direct influence on the level of irritation the child experiences from the garment. The majority of respondents not only “agreed” (n = 47/46.08%) but “strongly agreed” (n = 36/35.29%) that fibre content does indeed have a direct influence on garment irritation, as previously mentioned by Shin *et al.* (2015). The minority of respondents “disagreed” with this statement (n = 7/6.60%) and, only 11.32% (n = 12) answered neutrally to this question. These results are also supported by the mean and standard deviation measures. The mean, which represents the central tendency of the 5-point scale items (Malhotra *et al.*, 2017:562), equals to $\bar{x} = 4.06$. The figure indicates that most of the responses were distributed around the 4th scale option, in other words, “agree”. The standard deviation (*s*) indicates the dispersion of measures around the mean. The

smaller the standard deviation, the more concentrated the responses, opposed to a larger standard deviation where the responses are more scattered (Babbie, 2016:425). As revealed by Table 5.4, $s = 0.97$, which indicates the responses were clustered around the mean value ($\bar{x} = 4.06$), in other words, the majority of respondents chose the “agree” option.

TABLE 5.4: LEVEL OF AGREEMENT TO THE FABRICATION AND FIBRE CONTENT OF GARMENTS (N = 102; MISSING: n = 3)

Question	Strongly disagree		Disagree		Neutral		Agree		Strongly Agree		Mean	Standard deviation
	%	N	%	n	%	N	%	n	%	n		
The fibre content of the fabric used has a direct influence on the level of irritation of the clothing item.	3.92	4	2.94	3	11.76	12	46.08	47	35.29	36	4.06	0.97
	6.86%; n = 7				11.76%; n = 12		81.37%; n = 83					
My child prefers clothing with a high cotton fibre content.	3.92	4	6.86	7	24.51	25	42.16	43	22.55	23	3.73	1.01
	10.78%; n = 11				24.51%; n = 25		64.71%; n = 66					
My child prefers a softer fabric opposed to a harder fabric.	1.96	2	1.96	2	2.94	3	35.29	36	57.84	59	4.45	0.81
	3.92%; n = 4				2.94%; n = 3		93.13%; n = 95					
If pilling (little balls of fluff) forms on the surface of clothing due to wearing and laundering, it causes irritation to my child.	3.92	4	13.73	14	32.35	33	28.43	29	21.57	22	3.50	1.09
	17.65%; n = 18				32.35%; n = 33		50.00%; n = 51					
If the fabric makes a sound during wear, my child gets irritated by it.	4.90	5	9.80	10	24.51	25	33.33	34	27.45	28	3.69	1.12
	14.70%; n = 15				24.51%; n = 25		60.78%; n = 62					

Previous research studies, although limited, have explored the fibre content of ready-to-wear (Uren & Okur, 2019) and therapeutic garments (Shin & Gaines, 2017). However, to the best of the researcher’s knowledge, no current research identifies the specific fibre content that contributes to irritation in school uniforms. Therefore, based on the answers obtained during the focus group discussions whereby respondents discussed their preference of cotton fabrics over synthetic fabrics, the statement in Question 11 asked respondents to indicate whether their children preferred wearing garments with a high cotton content. As can be seen in Table 5.4, by combining the “strongly disagree” and “disagree” data and also the “agree” and “strongly agree” data, it was clear that the majority of respondents ($n = 66/64.71\%$) agreed to this statement. However, just under a quarter of respondents ($n = 25/24.51\%$) answered neutrally, which indicates no definite preference for cotton fabrics. The remainder of respondents disagreed ($n = 11/10.78\%$) that their children preferred wearing garments with a high cotton content.

As illustrated by Table 5.4, 93.13% ($n = 95$) of the respondents indicated that their children prefer wearing a garment manufactured from a softer fabric as opposed to a harder fabric. Of the remaining 6.86% of respondents, only 2.94% ($n = 3$) indicated that their children had no actual preference, and only 3.92% ($n = 4$) disagreed with this statement. These findings are in line with the research presented by Shin and Gaines (2017) that identified that children preferred wearing garments with a soft hand as opposed to garments with a hard

hand (such as denim). During the focus group discussions in phase 1, many participants also mentioned their children's preference for soft materials-specifically soft tracksuit jackets, garments that have been washed and ultimately have a softer hand, and soft satin labels in clothing (Chapter 4, Section 4.2.1). The question related to secondhand school uniforms also addressed children's preference for softer garments. Table 5.10 in Section 5.3.3.2 demonstrates the findings of this question. Interestingly 18.81% (n = 19) and 9.90% (n = 10) buys secondhand garments not only "most of the time" but "always", however 16.83% (n = 17) of respondents purchase these garments sometimes. Lastly, less than 20% (19.80%/n = 20) and less than 35% (n = 35/34.65%) bought second garments "rarely" and "never". Although the results appeared to be mixed, the purpose of this question was not necessarily to tally the frequency of respondents who buy secondhand garments regularly. It was posed to determine the extent to which fabric texture and hand may influence children with sensory sensitivities. By gathering that more than 45% (n = 46/45.54%) of the individuals having to make adaptations to purchase clothes that have been worn previously to alleviate the rough texture of new uniforms is alarming. These results indicate that specific changes need to be made to the fabrication of children's school uniforms.

The open question (Question 16) presented in the questionnaire, asked parents to mention any other adaptations they made to alleviate the discomfort that child's school uniform causes. Previously, it was identified that some of the most sensitive parts of the human body include the feet, insides of the leg and abdomen, waist, arms and neck (See Section 2.2.2 and Table 2.1). This study did not necessarily focus on exploring shoes or socks as a topic of discussion, and purely focused on the actual prescribed uniform children are supposed to wear. A specific parent mentioned that their child longed for soft leather school shoes such as those from Froggie- a South African shoe retailer that specialises in manufacturing soft leather shoes for natural foot development (in kids) and comfort (Froggie, 2021). The specific responses are displayed in Figure 5.5. Crocs shoes also seemed to be a popular option amongst kids due to Crocs' flexible and comfortable nature (Crocs, 2021). One can assume that their children's feet are hypersensitive to hard footwear materials (used in average school shoes to increase its durability) and, therefore, only soft, flexible shoes alleviated their discomfort. In light of the topic related to the hypersensitivity of feet, other parents indicated that their children would wear their socks inside out with the seams on the outside (Figure 5.6), result in wearing seamless socks (which are often geographically difficult to obtain), or even wear pairs of seamless socks under their prescribed school uniform socks to alleviate the irritation from the seams (Figure 5.7). One particular parent mentioned that if socks' fabric weren't as thick their child would probably tolerate its overall feeling.

I have to buy school shoes at Froggie that are made from soft leather as she can't wear normal school shoes.

FIGURE 5.5: ANSWER (#1) TO QUESTION 16: OPEN-ENDED QUESTION

School socks turning the inside out, seams then outside

FIGURE 5.6: ANSWER (#4) TO QUESTION 16: OPEN-ENDED QUESTION

We use seamless sensory socks underneath long school socks as the he cannot tolerate the seam of socks

FIGURE 5.7: ANSWER (#17) TO QUESTION 16: OPEN-ENDED QUESTION

As mentioned before, it was assumed that many respondents would not be familiar with the technical terms associated with textiles and clothing. Therefore, the subsequent question included a definition of the term “pilling”, ensuring all respondents understood what the question entailed. It was known from previous research that children with a low threshold to sensory input experience hypersensitivity to certain material textures (Christopher, 2019; Dunn, 1997; Roy *et al.*, 2018). However, to the best of the researcher's knowledge, no research specifically identifies pilling as a troublesome texture in clothing. Hence, the issues surrounding pilling only emerged during the focus group discussions and was subsequently included in the questionnaire. The questionnaire asked parents to identify whether pilling caused any form of irritation to their children. In conjunction to the focus group discussion, 50.00% (n = 51) of respondents agreed that pilling is an irritant factor however, 32.35% (n = 33) answered neutrally, and 17.65% (n = 18) disagreed to this statement (Table 5.4). It is possible that many have not come across pillings' occurrence in school uniforms, as the nature of the majority of fabrics used for school uniforms (identified in Table 2.2) are not prone to pilling as easily as some other fabrics used in ready-to-wear children's wear.

Shin *et al.* (2015) and Kyriacou *et al.* (2021) previously identified that the sound fabrics made did indeed influence sensory stimulation even if the garments' fabric did not seem visibly discomforting. It suggests that respondents experienced other forms of sensory stimulation such as auditory sensory stimulation whilst just looking at the material texture. Based on this finding, along with the information presented in the focus group discussions, the questionnaire asked respondents whether their children experienced irritation from the sound a garment's fabric made during use and wear (Table 5.4). A total of 60.78% of respondents (n = 62) agreed to this question, confirming the findings of both research studies. Just under a quarter of respondents (n = 25/24.51%) did not express any actual

concern towards the auditory stimulation their children may experience and, 14.70% (n = 15) disagreed with this statement. It may be possible that the 39.21% (n = 40) of respondents' whose children did not express concern to the statement, do not wear garments that make any definite sound and, therefore, do not experience any sensory overreactivity issues related to the sound.

Finally, the temperature of garments' textiles seemed to influence children with sensory issues and, some parents mentioned the use of a tumble drier, heater, hair drier or simply placing garments in the sun, to warm up the clothing prior to their children wearing it. One parent mentioned that the "drier" the clothing, the better comfort their child experienced, however, the majority of parents mentioned that their children just prefer clothing that is slightly warmed-up.


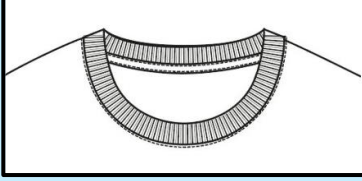
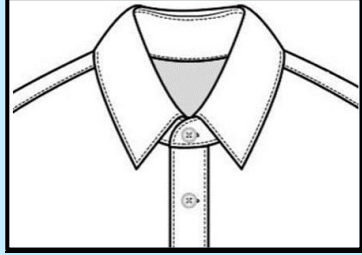
5.5 DESIGN

The design properties of clothing is a considerable determining factor of irritability that children with sensory overreactivity may experience (Spies & van Rensburg, 2012). Therefore, as identified in Chapter 3, Table 3.4, Objective 1.2 aimed to understand which design properties specifically irritate and cause discomfort for the wearer. The design properties of school uniforms under study included necklines and collars, sleeve and sleeve finishes, waistline finishes, closures, wearing ease, and decorative elements.

5.5.1 Necklines and collars

The first multiple-choice question related to the design properties of uniforms was based on collar preference. Respondents were given three options of collars accompanied by a picture of each for explanation purposes, depicting a shirt collar, crew neck, and collar with a stand (Table 5.5). These three collars are most popular on school uniform garments based on the findings of phase 1. Respondents were asked to indicate which collar they thought would irritate their child the most. As seen in Table 5.5, more than three-quarters of respondents (n = 82/81.19%) indicated that a collar with a stand is the most problematic as opposed to a shirt collar which causes minimal issues (n = 6/5.94%). The findings are clear since the collar with a stand is the tightest around the neck and most restrictive of the three options given. This data coincides with previous research. Roy *et al.* (2018) explain that some children are hypersensitive to any tactile sensation in their neck and will express discomfort, especially to clothing with a restrictive collar. The problem is that many South African schools prescribe a shirt with a standing collar often worn with a tie-specifically during winter.

TABLE 5.5: COLLAR PREFERENCE (N = 101; MISSING: n = 5)

Collar type			
	Shirt collar	Crew neck	Collar with a stand
%	5.94	12.87	81.19
n	6	13	82

Although ties are not discussed as a separate topic in the research study necessarily, it has surfaced that ties cause some form of discomfort when the shirt with a standing collar needs to be buttoned up all the way to the top. One respondent mentioned in the open-ended question that their child feels like he is being strangled by the collar and tie during wear. Similarly, others have indicated that their children would loosen their ties secretly to avoid discomfort, just to be scolded by school staff for looking unneat. One parent opted to remove the elastic from the school tie and added magnetic press studs to reduce the feeling of the tie around the child's neck. To alleviate the collars' feeling, other parents mentioned that their children would often wear a t-shirt underneath their uniform. Closures and more specifically buttons' discomfort are discussed in Section 5.5.6

5.5.2 Sleeve and sleeve finishes

In phase 2 of this study, garment elements related to sleeve and sleeve finishes only included the sleeve length (i.e., short versus long sleeves) and cuffs on long-sleeved garments, as these were the only issues that came to the fore during phase 1, the qualitative phase. The answering options for the questions related to sleeves and their finishes also included five options similar to prior questions in the questionnaire, ranging from "strongly disagree" to "strongly agree", as seen in Table 5.6. It was alleged that children with sensory overreactivity prefer wearing long-sleeved garments as opposed to short-sleeves due to the constant pressure a longer sleeve may create on a child's skin (Dunn *et al.*, 2002). This information, however, does not correspond to the data obtained in the current study as 79.20% (n = 80) of respondents indicated that their children actually prefer wearing short-sleeved garments and, only 8.91% (n = 9) agreed to prior research in their preference for long-sleeved clothing. Reebye and Stalker (2008) mention that some children prefer looser garments (i.e., short sleeves) as long-sleeved garments may contribute to clothing's restrictive nature. Haar (1998), on the other hand, mentioned that some children do long for

continuous tactile stimulation (known as “garment-hugging”) which, could explain why some children prefer wearing only long-sleeved garments. Although these findings are related to wearing ease (Section 5.3.2.5), it does serve as an explanation as to why children could prefer specific sleeve lengths.

TABLE 5.6: QUESTIONS ON SLEEVES AND CUFFS (N = 101; MISSING: n = 5)

Question	Strongly disagree		Disagree		Neutral		Agree		Strongly agree		Mean	Standard deviation
	%	N	%	n	%	n	%	N	%	N		
My child prefers short sleeve clothing opposed to long sleeve clothing.	1.98	2	6.93	7	11.88	12	40.59	41	38.61	39	4.07	0.98
	8.91%; N = 9				11.88%; N = 12		79.20%; N = 80					
The cuff of the school shirt/school jacket irritates my child.	2.97	3	4.95	5	17.82	18	42.57	43	31.61	8	3.95	0.98
	7.92%; N = 8				17.82%; N = 18		74.25%; N = 75					

Deduced from the open-ended question regarding at-home adaptations, many children still prefer wearing short-sleeved garments even during cold winter months when the weather permits long-sleeved garments. As can be seen in the responses of the open-ended question (Figure 5.8 and Figure 5.9), some children would rather “freeze” by wearing a summer dress and pull-over together with long socks, instead of wearing a long-sleeved shirt and having to tuck the garment into the waistband of the school trousers.

Prefers summer dress with pullover and long socks in winter, instead of having to tuck in a long sleeve shirt in long pants.

FIGURE 5.8: ANSWER (#19) TO QUESTION 16: OPEN-ENDED QUESTION

She will rather freeze than wear the winter clothing.

FIGURE 5.9: ANSWER (#53) TO QUESTION 16: OPEN-ENDED QUESTION

As previously mentioned in Chapter 2, Section 2.5.3, it was anticipated that long-sleeved shirts with buttoned cuffs could potentially hold some sensory issues as cuffs may also result in restriction of movement. Elasticised wrist finishes often found on tracksuit jackets also seemed to pose a variety of problems similar to the elasticised waistbands mentioned in Section 5.3.2.3, whereby children disliked the texture of the gathered fabric (elastic). As indicated in Table 5.6 above, almost 75% of respondents (n = 75/74.25%) agreed that any form of cuffs on long-sleeved garments irritated their children, 17.82% (n = 18) did not articulate any actual concern about cuffs and 7.92% (n = 8) disagreed that cuffs result in any form of irritation. Although the results do not present the exact explanation behind the irritation, the message regarding discomfort surrounding cuffs is quite clear, and, their effect on sensory overreactivity is prominent. This data also coincides with the clothing properties

of the sensory-friendly ranges offered by American clothing lines MagnaReady® and Marks and Spencer’s range named “Easy Dressing”, which uses magnetic strip closures on cuffs, as well as stretch cuffs, which ultimately suggests that cuffs present sensory issues.

5.5.3 Waistline finishes

Research surrounding the irritation of the waistlines of garments were extremely limited. Roy *et al.* (2018) identified that elasticised waistlines held sensory issues and created great discomfort for the sensory-sensitive child due to their undesirable texture. Table 5.7 presents respondents’ answers of engagement in various adaptations surrounding waistlines- these were mentioned during the focus group discussions. The possible answers for these adaptations included “never”, “rarely”, “sometimes”, “most of the time”, and “always”. In line with the research presented by Roy *et al.* (2018), some respondents mentioned that the elastic’s texture caused sensory issues, however, as indicated in Table 5.7, mixed results were obtained. The initial question asked respondents whether they turn the waistband/elastic over to refrain the waistband from touching their child’s body to alleviate discomfort. The majority of respondents (n = 37/36.63%) stated that they sometimes turn the waistband over, followed by 20.79% (n = 21) who stated that they rarely engage in this adaptation. Still, 14.85% (n = 15) fold the waistband over “most of the time” and 10.89% (n = 11) “always” does it. Based on the results, in conclusion, a sample population of 62.37% (n = 63) employ this adaptation based on their answers of “sometimes”, “most of the time” and “always”. This can either indicate that waistlines do not necessarily present such a common issue or/and it can indicate that the parents have not thought of this specific adaptation regarding waistlines. In addition, it might be possible that other adaptations are used instead of these adaptations under question. It, therefore, does not undermine the serious issues that some children do still experience and the findings obtained remains valuable.

TABLE 5.7: ENGAGEMENT IN ADAPTATIONS RELATED TO WAISTLINES (N = 101; MISSING: n = 5)

Question	Never		Rarely		Sometimes		Most of the time		Always		Mean	Standard deviation
	%	n	%	N	%	n	%	n	%	N		
We have to turn the waistband/elastic over that it does not touch my child's body.	16.83	17	20.79	21	36.63	37	14.85	15	10.89	11	2.82	1.20
My child wears underwear that covers the skin specifically to prevent the waistband/elastic from touching his/her skin.	15.84	16	22.77	23	18.81	19	25.74	26	16.83	17	3.05	1.34
We have to buy pants/skirts in bigger sizes to avoid the positioning of the waistband/elastic around the naval (abdomen), but rather on the hips.	13.86	14	17.82	18	15.84	16	28.71	29	23.76	24	3.31	1.37

In alleviating the discomfort caused by the waistband of school trousers, shorts or skirts, some parents mentioned during phase 1, that they resulted in buying larger sized underwear which ultimately creates a barrier between the waistband of the school uniform and the child's skin. This "barrier" obviously assists in preventing the waistband/elastic from touching the child's skin, which relieves the discomfort caused by this design feature. As can be seen in Table 5.7, a total of 25.74% of the respondents (n = 26) indicated that they use this adaptation "most of the time". On the other hand, 22.77% (n = 23) revealed that they rarely buy bigger underwear to prevent the waistband from touching the child's skin and, 18.81% (n = 19) stated that they "sometimes" opt for this option. Similarly to the aforementioned adaptation, this "modification" did not present itself as a common adaptation and that parents regularly engage in it. Interestingly, one of the parents who also identified as an occupational therapist in one of the focus group discussions, mentioned that the sensory problems associated with waistbands do not necessarily stem from the properties of the waistband itself, but more from the waistbands' *position* on the child's body. Likewise, Bubonia *et al.* (2012:250) mentioned that a waistlines' most important purpose is to keep a garment in the correct position on the body. This does seem ironic as the initial fit of the garment should therefore already be in the correct comfortable position on the body, however, as clearly indicated by Table 5.7, respondents would buy bigger sized garments "most of the time" (n = 29/28.71%) to change the position of the garment from the naval to the hips. In fact, 23.76% (n = 24) stated that they "always" employ this adaptation. As seen in Figure 5.10, some high-waisted garments tend to be preferred as they do not irritate the naval area. The limited information surrounding this topic could be due to the fact that many parents are simply not aware of the irritation their children may experience from the *position* of the waistband. Parents may believe that the discomfort stems from the texture or "visual discomfort" (as referred to in Section 5.3.1) of the waistband, when in fact, the waistband surrounds an extremely sensitive area of the body and discomfort is from the actual *fit* and *position* on the child's body (Biel & Peske, 2009:164; Saint-Martory *et al.*, 2008).

Her pants are high waisted and fit under her ribs so as not to irritate her navel area.

FIGURE 5.10: ANSWER (#30) TO QUESTION 16: OPEN-ENDED QUESTION

5.5.4 Closures

Prior studies related to closures in garments mentioned that elasticised pants specifically gave rise to sensory overstimulation (Roy *et al.*, 2018), as did buttons. Poonia (2020), Rodriguez (2020), Ahsan *et al.* (2018) and Suri (2016) even mentioned that buttons are usually the first to be replaced with Velcro when possible. As explained in Chapter 4, Section

4.2.3.4, no specific problems related to closures were elicited in phase 1. The questionnaire, therefore, only included one item related to closures. The findings are presented in Table 5.8 and, as assumed, the majority of respondents ($n = 85/84.15\%$) “agreed” that their children refrain from buttoning up their school shirts all the way to the top. Only 7.92% ($n = 8$) chose the “neutral” option indicating no real concern towards buttoned-up garments, less than 3% (2.98%/ $n = 3$) “disagreed” to this statement and less than 5.00% ($n = 5/4.95\%$) “strongly disagreed”. The results presented by the frequencies and percentages are supported by the mean value of $\bar{x} = 4.12$ and standard deviation of 1.02 which indicates that responses were rather concentrated (Table 5.8). This is congruent with previous research that established that hypersensitivity of the neck area contributed to the irritation children experienced from buttoned-up garments (Roy *et al.*, 2018).

TABLE 5.8: BUTTONS (N = 101; MISSING: n = 5)

Question	Strongly disagree		Disagree		Neutral		Agree		Strongly Agree		Mean	Standard deviation
	%	N	%	n	%	n	%	n	%	n		
If a shirt (formal school shirt/ golf shirt) has buttons, my child prefers not to close the top button(s).	4.95	5	2.97	3	7.92	8	43.56	44	40.59	41	4.12	1.02
	7.92%; n = 8				7.92%; n = 8		84.15%; n = 85					

From the open-ended question in the questionnaire, it was even mentioned that the buttons (assumably the thread on the inside of the garment) irritate when touching the skin. As can be seen in Figure 5.11, one respondent mentioned that their child wears a vest underneath his uniform to prevent the buttons from touching his skin. Although many children indicated that wearing a shirt underneath their uniform alleviated sensory issues (Question 16), many did not indicate the *reason* for doing this. Many knew that a shirt would assist in increasing the comfort of the uniform and prevent the uniform from touching the child’s body, but the *origin* of the irritation is not often mentioned. It can thus be assumed that many children resort to wearing other garments under their daily uniform as they dislike the hand of certain textiles and the feeling of the buttons on their bodies.

He wears a sleeveless vest underneath to hinder the buttons from touching his skin.

FIGURE 5.11: ANSWER (#42) TO QUESTION 16: OPEN-ENDED QUESTION

Furthermore, the open question revealed that some parents removed buttons from school uniforms and often replaced them with Velcro or other fastening mechanisms (Figure 5.12 and 5.13). These adaptations feature in prior research on therapeutic garments, as it has been revealed that buttons and zippers would often be replaced with magnetic buttons or magnetic strip-closures (Amazon.com, 2020; Marks-&-Spencer, 2020).

Replace buttons with Velcro

FIGURE 5.12: ANSWER (#51) TO QUESTION 16: OPEN-ENDED QUESTION

Take off buttons altogether and use other fastening mechanism

FIGURE 5.13: ANSWER (#48) TO QUESTION 16: OPEN-ENDED QUESTION

5.5.5 Wearing Ease

Wearing ease relates to the tightness and looseness of garments and, as previously established, some children do prefer tight clothing and choose to wear tight underwear underneath their clothes (Haar, 1998). Others cannot stand the feeling of tight clothes on their body (Biel & Peske, 2009). Interestingly, most respondents indicated that their children would wear oversized and very loose clothing rather than slim-fitting garments. In the open-ended question, one respondent described the opposite of loose garments as “restrictive” garments - which is also mentioned by Kyriacou *et al.* (2021), whereas another explained that her child often wears his older brothers’ clothes as these garments are bigger and more comfortable (Figure 5.14 and Figure 5.15). Typical of school sportswear and tracksuits, these garments are generally more comfortable and have a slightly baggier fit than the average school uniform. Likewise, many respondents indicated that their children had special exceptions to wear sportswear or tracksuits on more days of the week than stipulated. It could be assumed that their preference for “sportswear” over the usual school uniforms is indeed due to its comfortable and looser fit.

Allow wearing short and soft clothes and walking barefoot. Loose fitting clothes rather than restrictive clothes

FIGURE 5.14: ANSWER (#49) TO QUESTION 16: OPEN-ENDED QUESTION

He sometimes wears his older brother's clothes because it's bigger and not tight.

FIGURE 5.15: ANSWER (#59) TO QUESTION 16: OPEN-ENDED QUESTION

Another aspect that affects the tightness or looseness of garments against the body is layering. The layering of garments also presented various issues and mainly featured where formal shirts had to be tucked into the waistband of the pants, creating at least two layers of fabric on top of each other, touching the child’s skin. In this case, parents would resort to shortening the school shirt so that it cannot be tucked in and subsequently prevent irritation presented by “layering”. Although the exact cause behind this irritation is not fully known,

one parent mentioned that their child disliked the “in-between” feeling and slight movement of the garments over one another. Figure 5.16 presents one respondents’ response regarding her child’s outlook on “layering”. The English-translated version is presented below.

Sodra daar 2 lae klere betrokke is veral in die winter, gaan dinge baie moeilik.

“Once there are two layers of clothing involved, especially during winter, things are very difficult.”

FIGURE 5.16: ANSWER (#56) TO QUESTION 16: OPEN-ENDED QUESTION

5.5.6 Decorative elements

Trimmings in the form of embroidery is one of the only decorative elements that appear in school uniforms. Although it features mostly in the school crest, many participants have expressed sensory issues associated with embroidery during phase 1. It was predicted that embroidery’s irritation is due to the stabilizer on the inside of the garment as well as the various layers of bobbin thread used to create a specific embroidered logo. This was confirmed by the results presented in Table 5.9. Apart from 3.96% (n = 4) of respondents who “disagreed” and 9.90% (n = 10) that answered “neutrally” to the question when asked whether the backing (stabilizer) of embroidery causes irritation to their child, more than 85% (n = 87/86.14%) of respondents agreed that this served as a definite irritation. This indicates the large problem and irritation associated with embroidery on school uniforms. Some parents mentioned that they would sew a soft piece of fabric over the stabilizer and bobbin thread to prevent it from scratching the body. When possible, parents would purchase the iron-on badge rather than the embroidered badge as the iron-on badge did not provide any discomfort (Figure 5.17 and Figure 5.18).

Placing something soft behind the embroidery part of shirts, to avoid scratching the body

FIGURE 5.17: ANSWER (#2) TO QUESTION 16: OPEN-ENDED QUESTION

Use the iron-on badge rather than the shirts with embroidered badge (only an option in the junior school)

FIGURE 5.18: ANSWER (#8) TO QUESTION 16: OPEN-ENDED QUESTION

TABLE 5.9: EMBROIDERY (N = 101; MISSING: n = 5)

Question	Strongly disagree		Disagree		Neutral		Agree		Strongly Agree		Mean	Standard deviation
	%	n	%	N	%	n	%	n	%	N		
The backing of embroidery on a shirt causes irritation to my child (e.g., the embroidery of the school's crest/name).	0.00	0	3.96	4	9.90	10	30.69	31	55.45	56	4.38	0.82

5.6 CONSTRUCTION

Objective 1.3 looked at the influence of different construction properties of garments on children with sensory issues, and as formerly mentioned, included the seam type, seam class and labelling of garments. Although it is widely recognised that seams and labels irritate, Roy et al. (2018) and Kyriacou et al. (2021) mentioned that these two elements are in fact the biggest contributors to discomfort in clothing. Extremely limited research identifies and describes the *specific* seam and label type that causes the most irritation (Biel & Peske, 2009).

5.6.1 Seam type and seam class

Initially, the research study explored three different seam types namely a superimposed seam (SSa), a lapped seam (LSa) and a flat seam (FSf) as mentioned in Chapter 2, Section 2.6.1. After the focus group discussions, it came to the fore that an overlapped superimposed seam actually caused associated problems and therefore, respondents were presented with a multiple-choice question accompanied by images of different seam types. Respondents were required to identify the seam type that causes the most irritation by selecting only one of the options, and as clearly presented by Figure 5.19, a superimposed overlapped seam caused the majority ($n = 75/75\%$) of the irritation in garments. On the contrary, 25% ($n = 25$) of respondents indicated that a flat felled seam (which classifies as a lapped seam) caused the most irritation. Due to the limited research presented in the literature, the presumed reasons for the results are explained in conjunction with the answers provided by participants in phase 1 of the research study. Many participants identified that an overlapped seam consisted of a “flap” and not only does this extra piece of fabric irritate, but if ironed incorrectly, the fabric would be folded in some areas that create extra tactile stimulation. Additionally, these seams also tend to be quite bulky due to the various layers of thread used to create the actual overlapped seam.

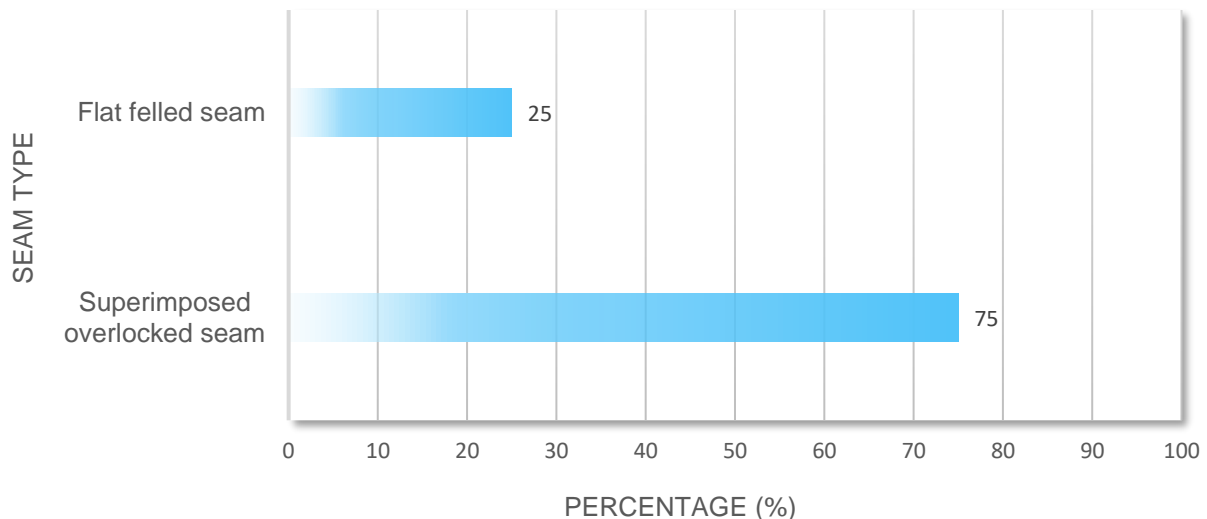


FIGURE 5.19: MOST IRRITANT SEAM TYPE

In the open-ended question, many respondents mentioned various adaptations they implemented to alleviate the irritation created by seams. It was indicated that some children would wear seamless garments underneath their school uniforms to avoid the seams from their school garments from touching their bodies (Figure 5.20). One parent mentioned creating fine stitches all along the seams of the school dress to flatten the seams (Figure 5.21), while another created small sections of fleece-like fabric and stitched it all along the inner seams of the garment covering the inner seams (Figure 5.22), Although the problems associated with seams in socks were rather problematic, these adaptations are discussed at the beginning of the chapter.

My daughter always wears a cotton seamless vest under her school shirt.

FIGURE 5.20: ANSWER (#32) TO QUESTION 16: OPEN-ENDED QUESTION

My child's biggest issue is seams and fabric. School dresses have many seams. Wear a vest under to avoid the feeling. Also flattened all the seams with tiny stitches.

FIGURE 5.21: ANSWER (#53) TO QUESTION 16: OPEN-ENDED QUESTION

On the inner seams I have sewn small pieces of a fleece type fabric. If it's a really bad day then we wear it inside out.

FIGURE 5.22: ANSWER (#33) TO QUESTION 16: OPEN-ENDED QUESTION

5.6.2 Labelling

At first, it was believed that all labels in garments tend to irritate children and encourage overreactive responses. After a thorough investigation, it was determined that two main

aspects played a role: the *fabrication* and *placement* of the label. To combat these issues, both parents and occupational therapists (in phase 1) mentioned a variety of adaptations they implement to reduce the effects of labels in clothing. These adaptations were narrowed down and presented in the questionnaire by once again requesting respondents to indicate how frequently (or not) they engaged in the adaptations presented in Table 5.10. Similarly to the aforementioned tables, this question included a 5-point rating scale with response options ranging from “Never” to “Always”.

As can be gathered from Table 5.10, a high frequency of respondents indicated that they “always” and “most of the time” cut out labels from garments (n = 82/81.18%). Furthermore, 12.87% (n = 13) indicated that they “sometimes” employ this adaptation which means that they *do* part-take in this adaptation in some way. Less than 6% (n = 6/5.94%) of respondents “rarely” or “never” have to remove labels. Therefore, with 94.05% (n = 95) of parents indicating that they *have* to cut out clothing labels in garments, the results are directly in line with the research presented by various researchers mentioning that labels are intolerable to some children with sensory overreactivity (Cheng & Boggett-Carsjens, 2005; Nederkoorn *et al.*, 2015; Roy *et al.*, 2018). The results are also supported by the mean value ($\bar{x} = 4.23$) and standard deviation ($s = 0.92$) revealed in Table 5.10.

TABLE 5.10: ADAPTATIONS RELATED TO LABELS (N = 101; MISSING: n = 5)

Question	Never		Rarely		Sometimes		Most of the time		Always		Mean	Standard deviation
	%	N	%	n	%	N	%	n	%	n		
Cut out clothing labels	0.99	1	4.95	5	12.87	13	32.67	33	48.51	49	4.23	0.92
Unpick (completely remove) clothing labels	10.89	11	8.91	9	25.74	26	27.72	28	26.73	27	3.50	1.27
Buy second-hand school clothing, since it is often softer than new school clothing items	34.65	35	19.80	20	16.83	17	18.81	19	9.90	10	2.50	1.38

The second question in Table 5.10 referred to the hypersensitivity some children experience towards labels in the sense that parents did not only have to cut out the label from the garment but fully remove the label using an unpicker. During phase 1 of the research study, it was determined that when labels are only cut out from a garment, a piece of the fabric remains that more often than not causes *even greater* discomfort than the full label itself. It was, therefore, a crucial question to include within the questionnaire. Clearly, the majority of respondents indicated that they “sometimes”, “most of the time” and “always” (n = 81/80.19%) have to unpick labels from their children’s school uniforms. Only 8.91% (n = 9) indicated that they rarely employ this adaptation, and 10.89% (n = 11) revealed that they “never” have to unpick a label from their child’s school uniform. Results from the questions in

the latter and the former, undoubtedly demonstrate the extent of irritation that labels may cause in clothing.

Another question related to labelling in garments asked participants to identify the type of label that generally causes the most discomfort and irritation to their children, and included three pictures of three different labels – a satin label, a woven label and a printed label. This question was presented in a multiple-choice format whereby participants had to select one option from the three given labels. Since prior research related to the topic is extremely limited, the researcher included the three most common label types in the questionnaire after thorough research of different school uniforms and their specific labels were done. As can be seen in Table 5.11, woven labels are the most irritant label ($n = 79/79.80\%$), and the reason for this could be due to these labels' various parts (base label and additional flap size indicator label) as well as their visibly (and tactile) discomforting texture. Some respondents ($n = 18/18.18\%$) indicated that a satin label may also cause issues. These issues could be attributed to the heat processes some manufacturers use to finish off the labels that ultimately melts the edges of the label, creating a hard and rough-textured edge-finish that scratches. A similar event can occur when one irons over a label. Lastly, 2% ($n = 2$) of parents indicated that a printed label would irritate their child the most (Table 5.11). It is, therefore, clear that a printed label causes the least irritation, and since labelling is mandatory in South Africa (International-Trade-Administration, 2020), suppliers should rather opt for this option.

TABLE 5.11: LABELS ($n = 99$; MISSING $n = 7$)

Label type			
	Satin label	Woven label	Printed label
%	18.18	79.80	2.02
N	18	79	2

5.7 CONCLUSION

This chapter encapsulates the results of the quantitative data obtained in phase 2. The data is interpreted in accordance with the objectives discussed in Chapter 1 and external findings (such as the findings from the open-ended questions and introductory questions) are discussed in relation to their individual topics. The chapter to follow, Chapter 6, provides the conclusion of the study, as well as the recommendations and limitations for future studies.

CHAPTER 6

CONCLUSION, RECOMMENDATIONS AND LIMITATIONS

6.1 INTRODUCTION

This chapter serves as a brief reflection of the overall study and commences with a summary of the findings in accordance to the objectives specified. The implications for the study as well as its theoretical contributions are identified and includes the limitations of the current study, in addition to recommendations for future studies. This chapter closes with concluding remarks of the study at hand.

6.2 SUMMARY OF THE FINDINGS

6.2.1 Objective 1.1: Textiles

Objective 1.1 addresses the influence of textile properties of school uniforms on children with sensory overreactivity. It was revealed that specific fabric textures and the feeling of new clothes seemed to pose as the biggest contributors to stress and enhancement of sensory overreactivity. Specific questions related to the textiles of school uniforms were presented to determine the issues, discomfort and irritation present in children's garments. One of the most dominant themes in the research results was the influence of fibre content as children had a definite preference for natural fabrics- specifically high cotton garments, as opposed to synthetic garments. A respondent reported that "just the look" of synthetic fabrics could set off an emotional reaction and that anything "more natural and less synthetic" is generally better.

Children's preferences towards textiles were based on two main factors-including the hand of textiles (hard vs. soft textures) and the noise fabrics made. When fabrics have a soft hand, children tend to regard these garments as comfortable, and thus, cotton was preferred due to its naturally soft texture. Other fabrics with hard and rough textures such as Dri-mac

are disliked. Although not related to tactile sensitivity, cotton fabrics also do not generally produce a sound when the fabric moves or rubs together due to its irregular surface contour and slight protruding fibre ends (unlike synthetics that have smooth contour) thus, eliminating the auditory discomfort usually presented by certain synthetic fabrics. Both the preference for soft garments as well as the dislike for noisy fabrics were mentioned by previous researchers. Additionally, many parents would purchase secondhand school uniforms from the school as these garments have a soft hand and are more comfortable. Other parents would wash their children's school uniforms profusely in light of trying to soften the fabric, however, due to profuse washing, pilling emerged which raised another concern. Pilling occurs when fabrics of different fibre combinations (e.g. cotton and polyester) experience abrasion resistance (Kadolph, 2013:37,39). Referring to cotton-polyester blends specifically, during use, wear and care, short pieces of cotton fibres break off and get entangled with the stronger polyester fibres, creating small balls of fibre on the surface of the fabric (Kadolph, 2013:37,39). Although the majority of school uniform garments are not prone to pilling, some garments do still pill which irritates approximately 50% (determined in phase 2) of children and can create an uncomfortable sensation as mentioned by Biel and Peske (2009:61) and Kadolph (2013:39).

Finally, the temperature of garments is another factor that seems to influence discomfort and contributes to irritation. Interestingly, various parents mentioned that their children preferred garments which were slightly heated-up which was implemented with the simple use of a tumble drier, heater, hair drier or placing garments in the sun.

6.2.2 Objective 1.2: Design

The findings expressed in the following section is based on the results obtained in line with objective 1.2 that explored the influence of different design properties of school uniforms. The aim was to distinguish which design factors specifically cause irritation during wear and which design features were preferred by children with sensory overreactivity. Considering the irritation and discomfort experienced from necklines and collars, it was established that collars of school uniforms can potentially cause irritation depending on the collar type. The results obtained from phase 2 indicated that a collar with a stand is the main culprit as suggested by more than 80% of respondents. It was determined that standing collars presented the most issues due to their restrictive and stiff nature and because the neck is highly sensitive. Standing collars are manufactured specifically in such a way to retain a specific shape, and therefore, contain fusible interlining that assists in supporting the stand of the collar (Bubonia *et al.*, 2012:134). Participants mentioned that the standing collar felt like it consisted of cardboard whereas, in actual fact, its stiffness and crispness is due to the

support of the interlining that can produce a hard textured collar. Furthermore, when the top button of the collar is fastened or when the child is expected to wear a tie, it becomes “unbearable”. The results from phase 2 revealed that almost 85% of children avoid buttoning their shirts all the way to the top as this enhanced the feeling of discomfort. The reason for this common irritant could be due to the fact that the neck is highly sensitive. It is for this exact reason why many children prefer wearing t-shirts underneath their uniform to refrain the collar from touching their skin, and why some children get special permission to wear crew-neck t-shirts to school, instead of shirts with a collar. It is said that the tie contributed to additional discomfort as it added to the feeling of restriction. Collars and necklines’ discomfort is widely mentioned in the literature (Roy *et al.*, 2018).

The results related to sleeves and sleeve finishes were deemed as interesting. Identified in phase 1, the dislike towards long-sleeved garments was prominent. It was mentioned that children experienced great discomfort from buttoned-up cuffs often found on long-sleeved shirts and elasticised wrist finishes on long-sleeved jackets. Phase 2 reiterated the findings in that almost 80% of children prefer wearing short-sleeved garments, even when the weather permits the wearing of long-sleeved, warmer garments. Reasons for short-sleeved garment preference could be related to the preference for looser, non-restrictive clothing as well as the avoidance of buttoned-up cuffs- which almost 75% of children dislike due to its associated discomfort. It was also determined that children dislike the feeling of any wrist finish’ texture. For the abovementioned reasons, many children prefer wearing their school tracksuit or sportswear to school instead of the formal uniform.

Discussions surrounding the waistline finishes of school uniforms pertained mainly to the type of waistband- specifically waistbands that include an elastic and their position on the human body. While it was recognised that elasticised waistbands irritate (Roy *et al.*, 2018), the root of irritation was unknown. Coincidentally, during the focus group discussion, it was indicated that irritation originated from the elasticised waistbands’ ruffled and bulky texture. Phase 2 revealed that more than 60% of children turn the elasticised waistband over to avoid the texture from touching their skin. Some parents revealed that they purchase bigger sized soft underwear that creates a “barrier” between the waistband and the child’s skin, which ultimately prevents the elasticised waistband from touching the child’s body. Finally, it was also determined that for some children, the discomfort was less due to the type of waist finish, but rather the position of the garment on the child’s body. Parents would often buy bigger sized garments to change the position of the waistband for it to fit high waisted or on the child’s hips. This adaptation is often implemented to prevent the waistband from being positioned on the naval-which is regarded as a highly sensitive area.

Closures in the form of mainly buttons, zippers, and Velcro were explored and the only fastener that proved to be problematic from a sensory viewpoint is the button. Children experienced great discomfort when especially shirts, including a standing collar, had to be buttoned all the way to the top-as previously mentioned. Furthermore, the buttons (or threads used to attach the buttons) on the inside of the garment also contributed to sensory irritation. In alleviating the discomfort caused by buttons on shirts, some parents mentioned that their children would wear a cotton or sleeveless shirt underneath their school uniform to refrain the buttons from touching their bodies.

An additional point of discussion is the results of the wearing ease of school uniforms. Phase 1 presented mixed results pertaining to wearing ease as some participants mentioned their children prefer tight and form-fitting clothing, while others mentioned their children prefer loose garments which allows movement. Overall, it seems that looser garments are more desirable as opposed to restrictive clothing. This is congruent with the research by Kyriacou *et al.* (2021) and Roy *et al.* (2018). Many parents mentioned that their children preferred wearing their school tracksuit or sportswear kits as these outfits were more comfortable, less restrictive and had a looser fit. Furthermore, it was indicated that many children avoid wearing various layers of clothing over one another, and even avoid tucking in their school shirts, as they dislike the fabric layers tucked into the waistband of their school bottoms. It could be assumed that layering contributes to the actual tightness and restrictiveness of garments' fit. Additionally, by layering garments, one essentially wears a combination of different fibre types on top of one another. This could create an uncomfortable sensation as heat and moisture are unable to escape from the skin through the different fabric layers. One parent specifically mentioned that their child prefers wearing "drier" clothing as it was regarded as more comfortable.

Lastly, the results based on the views of decorative trimmings (i.e. embroidery) were anticipated and corresponded with prior research on this topic (Royeen, 1985). Phase 1 revealed that more than 85% of children experienced discomfort from the stabilizer (backing of embroidery) and bobbin thread used to construct the embroidered school crest, which is generally positioned on the chest. This was identified as one of the most common issues presented throughout the study. Various adaptations were made including, applying the iron-on school badge instead of the embroidered badge (where possible) and attaching a soft piece of fabric on the inside of the garment to prevent the stabiliser and thread from scratching the child's body.

Overall, it was determined that winter uniforms had more associated challenges than summer uniforms as children were expected to wear garments that contributed to sensory

overreactivity during colder weather conditions. The prescribed winter uniform generally includes a tucked-in long-sleeved shirt with a standing collar and tie (in some cases), long trousers and several other layers of clothing such as a jersey and blazer.

6.2.3 Objective 1.3: Construction

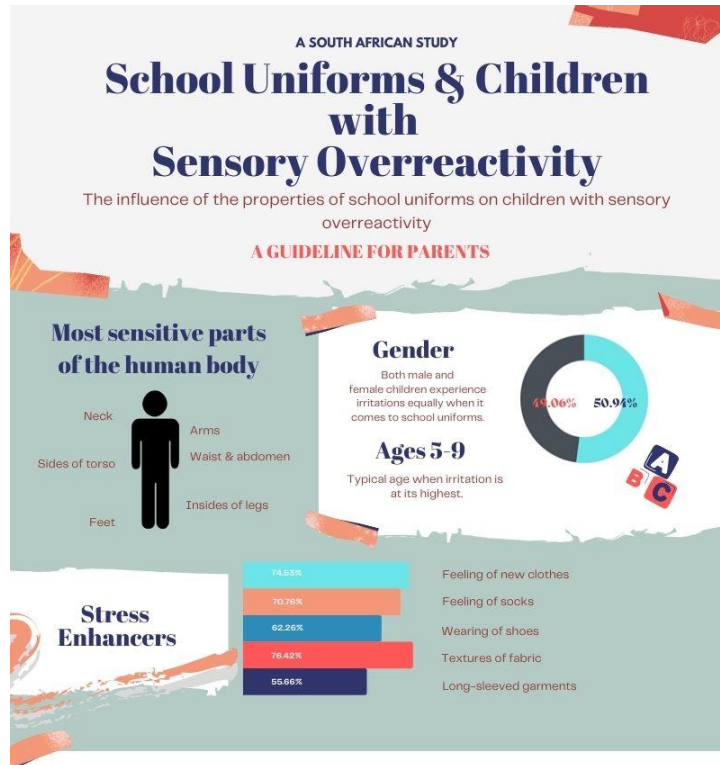
Objective 1.3 looked at the influence of different construction properties of school uniforms and how these characteristics may influence children with sensory overreactivity. Two main construction properties were explored which included seam types and seam classes, as well as labelling. Phase 1 identified that an overlapped superimposed seam was deemed as the least favourable and phase 2 determined that 75% of respondents agreed to this finding in that this seam type (which is one of the most widely used seam types in school clothing) caused the most irritation to their children. It can be assumed that overlapped seams irritate as they are characterised as the bulkiest seam type, and due to the fact that superimposed seams often include an additional “flap” which might increase tactile stimulation. The adaptations mentioned in the open-ended question included wearing seamless garments underneath the school uniform to avoid *any* seams from touching the child’s body. Furthermore, parents would create fine stitches all along the seams on the inside of the garment in order to flatten the seams and decrease the overall bulkiness. Lastly, sewing an additional fleece-like fabric over the seams on the inside of the garment also tend to alleviate the irritation from seams.

Labelling in school uniforms presented to be largely problematic as the fabrication of the label as well as its placement highly influenced sensory overreactivity. Additionally, a woven label type caused the most sensory issues as indicated by almost 80% of respondents. Furthermore, nearly 95% of respondents indicated that they have to cut out labels from garments to alleviate the irritation, and more than 80% specified that they did not only cut out the labels but had to fully remove the label by unpicking the label from the garment.

6.2.4 Objective 2

The final objective aimed to establish a guideline that indicates easy and affordable changes that can be made to a school uniform to alleviate the discomfort and irritation associated. The research findings and recommendations pertaining to this objective are presented in Table 6.1 and Table 6.2 and is aimed at parents, retailers and manufacturers of school clothing. Additionally, an infographic presenting creative, affordable and effortless approaches that can be taken towards school uniforms (to alleviate its tactile stimulation) was created and is presented in Figure 6.1. Throughout the data collection process, various

at-home adaptations were described by parents themselves to alleviate the discomfort and irritation their children experience from their school uniforms.



How to alleviate discomfort caused by school uniforms



FIGURE 6.1: INFOGRAPHIC (Self-developed)

The results from both phases 1 and 2 were combined, along with additional findings presented by prior literature and are presented in Table 6.1. The information presented in Table 6.1 aims to assist parents with valuable adaptations which they can easily implement and have not necessarily thought of. Furthermore, it may assist parents to make the correct clothing choices for their children to alleviate irritation and decrease the effects of sensory overreactivity. This resource may also assist occupational therapists in their daily practice in providing advice to their clients and their parents. Lastly, the information may encourage schools to include “sensory-friendly” uniforms in their current school uniform range and assist with changes to the current uniform. Since the data was already analysed and explained in previous chapters, the tables below as well as the infographic, present a summary of the findings and are self-explanatory.

TABLE 6.1: “AT-HOME” ADAPTATIONS OF SCHOOL UNIFORMS

Discomfort from	Adaptation
Fibre content	Recreate design and style of garment but substitute the fabric for a more tolerable and comfortable textile. (i.e. Knit a school jersey from a different yarn.)
	Wear seamless garments underneath uniform.
Synthetic fabrics	Avoid garments made from synthetic fabrics and opt for high cotton garments if options in school uniform garments are presented.
Noisy fabrics	Avoid garments made from synthetic fabrics and opt for textiles from natural fibres if options in school uniform garments are presented.
Hard/rough textured fabrics	Wash garments several times.
	Purchase second-hand school uniforms.
	Avoid hard/rough textured fabrics and opt for soft textured fabrics if options in school uniform garments are presented.
Pilling	Remove pilling from fabric using a razor or “Bobble-off” device.
Temperature of fabrics	Heat-up clothing by tumble-drying.
	Heat-up clothing using an electric heated blanket.
	Heat-up clothing with a hair drier.
	Place garment in sun to heat it up.
Collars	Wear a t-shirt underneath a shirt with a collar to mask the collars’ texture.
	Avoid standing collared shirts and opt for a shirt collared shirt (Chapter 3, Section 3.3.3).
	Avoid standing collared shirts (if possible) and wear a t-shirt.
	Avoid buttoning collars up all the way to the top.
Ties	Add a magnetic press stud to the back of the tie and clip to shirt.
Long-sleeved shirts	Wear short-sleeved shirts if possible.
	Winter: If too cold, wear cotton long sleeve shirt underneath short sleeve school shirt.

Elasticised cuffs	Fold cuff over towards the outside of the sleeve.
	Remove the elastic from the cuff.
Buttoned-up cuffs	Avoid wearing long-sleeved shirts.
	In extremem cases, replace the button on the cuff with a magnetic press stud.
Waistline	Avoid tucking garments into the waistband and rather shorten the hem of the shirt so that it cannot be tucked in (and will not stick out underneath a jacket/jersey).
	Wear garments on the hips/high-waist instead of the naval.
	Purchase up-sized garments so that the waistband fits loosely.
	Turn the elasticised waistband over to avoid it from touching the skin.
Buttons	Wear upsized underwear to create a “barrier” between the waistband and skin.
	Avoid buttoning collars up all the way to the top.
	Replace with Velcro/ magnetic buttons (if possible).
	Wear garment underneath shirt to avoid shirt buttons and thread from touching the body
Tight-fittinggarments	Wear looser garments that allows for movement.
	Wear up-sized garments.
	Increase the armhole size on shirts.
	Wear school tracksuit or sportswear instead of formal uniform.
Loose-fitting garments	Wear fitted, form-fitting garments (garment-hugging).
Embroidery	Cover stabaliser (backing) with a soft fabric.
	Replace the embroidered logo with an iron-on badge (if possible).
	Put embroidered crest on shirt pocket instead of on the “chest”.
	Sew embroidered badge to another piece of fabric and sew to the school garment with a single stitch.
Seams	Avoid garments with a superimposed seam. If unavoidable, sew “flap” to the garment using fine stitches.
	Choose garments with flat felled seams when options are available.
	Iron seams flat.
	Choose seamless garments (if possible) (Roy <i>et al.</i> , 2018)
Seams in socks	Cut-off toes.
	Wear socks inside out.
	Wear seamless socks.
	Wear tolerable socks underneath prescribed school socks.
Labelling	When diffirent options are available, choose garments with heat-transferred printed labels and avoid woven labels and embroidered labels.
	Cut out labels from garments.
	Completely unpick labels from garments. (More effective than cutting the label out).

Shoes	Wear well-fitted shoes with socks/stockings (deep pressure stimulation).
	Select soft shoes (e.g. leather shoes from Froggie or Crocs).
Formal school uniform	Wear school sportswear or tracksuit. If not permitted, request permission to do so.
	Wear compression clothing underneath uniform (Roy <i>et al.</i> , 2018).
Other	Wear undergarments inside out.

While easy and affordable changes can be made to school uniforms by parents themselves, from a retailers' perspective, it is important to consider the changes that need to be made to attend to the needs and demands of consumers. In addition, schools also need to take the influence of the different properties of a school uniform into consideration when deciding on a specific uniform and/or dress code. This argument relates to the discussion surrounding universal design (Chapter 2, Section 2.2.4) which suggests the creation of products that are usable by all people regardless of age and potential sensory issues- allowing for all consumers to be accommodated (Thunberg *et al.*, 2021). Therefore, specific long-term adaptations to be made by schools, retailers and manufacturers are presented in Table 6.2.

TABLE 6.2: RECOMMENDATIONS FOR RETAILERS FOR SENSORY-FRIENDLY SCHOOL UNIFORMS

TEXTILES	
Fibre content and fabrication	Fibre content: Opt for more natural fibres (specifically cotton).
	Fibre content: Avoid synthetic fibres (specifically acrylic and nylon).
	Avoid noisy fabrics (such as Dri-mac).
	Opt for textiles with a soft hand and feel.
	Avoid fabrics containing a rough and textured feel.
DESIGN	
Collars	Avoid standing collared shirts (stiff, restrictive nature, rough textured).
	Opt for a regular shirt collar (Chapter 3, Section 3.3.3)
	Ease the strictness of rules regarding buttoning shirts and collars to the top.
Cuffs	In extreme cases, eliminate buttons on buttoned-up cuffs and replace with magnetic fasteners.
	Eliminate elasticised wrist finishes and replace with soft, untextured casing for elasticised "cuffs".
	Eliminate the use of interlining within cuffs to reduce its stiff and restrictive nature.
Buttons	In extreme cases, replace buttons with Velcro.
	In extreme cases, replace regular buttons with magnetic buttons.

Waistline	Design school bottoms that it is either high-waisted or fit on the hips.
	Soft, untextured waistband casing for elasticised waistbands.
Wearing ease	Create school shirts that do not have to be tucked in that feature a neatly designed hem finish.
	Ease the strictness of rules regarding tucked-in shirts.
	Allow children to wear school tracksuits/sportswear to school.
Embroidery	Replace the embroidered logo with an iron-on badge.
	Put embroidered crest on shirt pocket instead of on the “chest”.
CONSTRUCTION	
Seams	Replace overlapped superimposed seams with flat-felled seams.
	Press seams flat during manufacturing.
	Introduce seamless garments e.g. ski-pants or socks.
Labelling	Implement the use of only heat-transferred/printed labels within garments.
	If woven labels are unavoidable, use soft base fabrics and rather print than embroid on the label.
	If woven labels are unavoidable, place labels on shoulder line seams or outside leg seams (least sensitive areas on the body).
OTHER	
Ties	Ease the dress code of wearing ties.
	Introduce clip-on ties.
Socks	Instead of a specific school sock, opt for a plain sock (e.g. white or grey). Parents can then choose seamless versions if needed.
	Introduce seamless school socks.
Shoes	Ease of strictness on rules pertaining to shoes.
Blazer	Ease of strictness on rules pertaining to wearing a blazer (layers create discomfort).
Preferred winter outerwear	Fleece top*

*as recommended by 54.55% (N = 54) of respondents in the questionnaire (Question 19)

6.3 IMPLICATIONS AND THEORETICAL CONTRIBUTIONS OF THE STUDY

The findings of this study have a considerable amount of possible practical and real-life contributions and will contribute vastly to various fields of research. This study is useful to consumers- specifically school children that wear school uniforms, parents of children with sensory overreactivity as well as occupational therapists that treat children with this condition. It is furthermore beneficial to schools and especially their foundation phase departments, as well as retailers that include school uniform garments as part of their product offering.

6.3.1 Consumer Science: Clothing Retail

To date, from a sensory point of view, few studies have focused on the textile, design, and construction properties of children's clothing and more specifically, school uniforms, especially within the South African context. Additionally, limited studies have focused on the effects of school uniforms and possible issues presented by these garments. Few studies have determined the exact root of irritation of specific garment elements, such as the reason why some seam types irritate more than others, or why some children prefer specific collars over others. This study, therefore, fulfils the current gap in research pertaining to the irritant clothing properties presented by school uniforms.

6.3.2 Children

The motivation to conduct this study was ultimately to try and make a difference in the lives of children with sensory overreactivity. This study has emphasised the significant effect of children's clothing and specifically, their school uniforms may have on sensory overreactivity. The influence of a school uniform on a child's emotional state while getting dressed and during wear was prominent during the first phase and the data from the second phase indicated the magnitude of its influence. It was established that more than 80% of the respondents' children experience unhappiness in the morning while getting dressed for school and often experience meltdowns when putting on their school uniforms. In addition, more than 50% of the respondents indicated that regular school uniforms may affect their children's concentration if they experience discomfort from the garments and may sometimes even contribute to meltdowns at school. The results pertaining to these questions are alarming in the sense that children are severely affected by the clothing on their bodies and that their school uniform may affect their academic performance and overall quality of life. This study has created awareness surrounding the influence of a school uniform on a child with sensory overreactivity and that it should not be underestimated. Finally, this study has also allowed the implementation of various adaptations that could be made to uniforms which will allow the discomfort children may experience, to be easily alleviated.

6.3.3 Parents of children with sensory sensitivities

This study has voiced parents' concerns regarding uniforms and has created a supporting tool that parents can utilise in the event when their children experience discomfort from school uniforms. Although it was clear that parents realised the contribution that school uniforms may bring to a sense of uniformity and discipline at school, they felt that it is important that their children remained comfortable and avoided wearing a uniform that increased sensory overreactivity. Therefore, some parents questioned the schooling

systems' ideas of prescribing formal uniforms to seven and eight-year-old children if more informal options are available. Specifically, formal uniforms often feature many textures, design, and construction elements that contribute to tactile stimulation. Furthermore, as previously mentioned by van Jaarsveld (2014), specifically children in the foundation phase age group experience hypersensitivity to tactile stimulation. It was implied that schools should allow children to wear less formal and more comfortable school uniforms on a daily basis.

“...as a parent...you do ask, why do children in grade 1, or grade 2 need to wear formal winter uniforms... surely there's also a conversation that needs to be had around -why we do these things? ... I know for uniformity and for discipline and for presentation but...surely...an eight-year-old seven-year-old really doesn't need to wear a collar and tie” (P2:213).

“... if the child is constantly...in the state of fight or flight because of the uniform..., what are we doing here as a school system?” (P2:219).

The allowance for variation was another dominant point of discussion. It was argued that schools should allow children with sensory sensitivities to make certain adaptations to their uniforms to accommodate their special needs.

“So, I took him out him out of a school that could not compromise on the fact that my child had a sensory processing difficulty, and I've put him into schooling environment where that wasn't requested. A schooling environment that was more open to my child buying the badge of the school and me sewing it on or ironing it onto a similar colour jacket that didn't elicit all these responses. And now he's a happy learner. He's thriving in his academic environment, just because he doesn't have that added sensory experience. That is an autonomic nervous system response that he cannot control and it's not his fault” (P4:222).

“Can we not then say just as much as a child needs hearing aids because they can't hear and spectacles because they can't see that a child is able to come to school comfortably dressed in a manner in which they can come to school for the primary reason for learning. I'm just putting it up there” (P4:242).

Therefore, to parents of children with sensory sensitivities, this study may be used as a supportive tool in the decision-making process of establishing which school garments to purchase, the care instructions to follow and easy and affordable adaptations that can be made to garments to alleviate irritation. Parents may use this study as supporting evidence when asking for school uniform exceptions at their children's schools.

6.3.4 The educational system

This study has allowed for awareness creation surrounding the needs of children with sensory overreactivity has to be implemented, specifically at school and in the classroom. For parents, it was important for their children's teachers to be made aware of the difficulties

their children experience in the classroom once they experience discomfort and irritation from their uniform. It is important that their children are not discriminated against based on the sensitivities they experience.

“Teachers need to be educated on this ... [The other day] the teacher phoned me and she said, I think your child should go on medication because he's struggling to concentrate.

[I asked] him [my child] why he doesn't concentrate, and he [said]: ‘Something really irritated me, [and] I couldn't get it right’ (P1:225).

The research may therefore be beneficial to teachers and especially foundation phase teachers who educate children between the ages of 5 and 9 years old. By creating awareness surrounding the effects of tactile stimulation, teachers will fully comprehend the nature of sensory overreactivity and its influence on children's daily lives. Awareness will contribute positively to children's (and teachers') morale within the classroom and play a role in enhancing children's concentration at school and, overall quality of life. This concept is emphasised in Figure 6.2, which represents a comment by one of the participants in the focus group discussion.

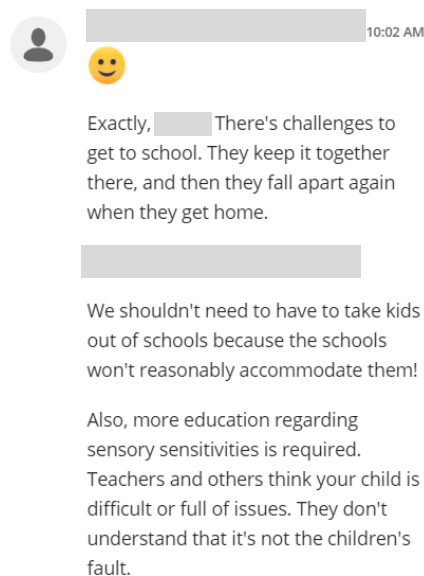


FIGURE 6.2: CHAT-LINE: P2 FOCUS GROUP 1

In the event where schools consider introducing newly designed school uniforms, schools and their independent retailers may use this study as a basis to establish the needs and demands of children to make uniforms as universally designed as possible. This will ensure that all children are accommodated.

6.3.5 Occupational therapists

The study may furthermore act as a reference point for occupational therapists and assist in creating useful advice which parents of children with sensory overreactivity may follow to decrease the effects of sensorial stimulation. The study also highlights opportunities for future studies specifically in the occupational therapy field related to, for instance, ready-to-wear garments and its influence on the sensorial system.

6.3.6 Clothing retailers and general consumers

Finally, the findings of this study may be beneficial to various South African (and international) retailers who include school uniform garments as part of their product offering. Not only will this meet the demands of a specific niche market, encourage inclusivity, and simultaneously boost sales, but it will also create awareness amongst the general consumer of the struggles many children with sensory issues face. The study also proves that variations of uniforms can be implemented easily and affordably by both developing and developed countries, as there is no real need for advanced technological measures to ensure its implementation.

6.3.7 Conclusion

This exploratory study thus contributes to the existing research surrounding the clothing of sensory-sensitive consumers but adds another dimension by focusing on specific elements which may cause discomfort in particularly school uniforms. This study thus provides a platform for future research regarding similar topics. Although this study was conducted in a South African context, the findings may be easily applied to different environments and different categories of children's clothing, for instance, as briefly mentioned, an entire study based on ready-to-wear garments and socks as the principles of the research remain the same. Section 6.4 provides a comprehensive explanation for future studies.

6.4 RECOMMENDATIONS AND LIMITATIONS FOR FUTURE STUDIES

6.4.1 Recommendations

Throughout the research study, it became apparent that there is still opportunity for other research endeavours pertaining to the clothing properties of sensory-sensitive consumers. During phases 1 and 2, it was established that an entire study based on children's socks, vests, pantyhose/stockings, and undergarments would be extremely valuable, as these garments' influence was mentioned over and over again throughout the data collection process. Another valuable research opportunity relates to the care instructions of sensory-sensitive consumers' clothing, as many participants mentioned the effects that laundering may

provide. Several extractions from the focus group discussions as well as the online questionnaire are presented below.

“So, no socks, no shoes, and that's a breeze. But in winter, you have the stocking with the shoe. And normally you don't, you get nicer school shoes, like from Froggies or one of those. But it's also extremely expensive than normal Toughies all the normal school shoes that are available” (P3:44).

“One of my therapy kids, she's wearing boys' vests and not girl's vests because of the lace that they usually have. So, she wears boys' vests underneath a school shirt...I think it's also inside out. But then that makes wearing her school shirt and uniform more bearable” (P5:81).

Vest under the garment. Can never wear the stockings. Refuses tracksuit pants/tops. Can't tolerate socks with shoes.

FIGURE 6.3: ANSWER (#7) TO QUESTION 16: OPEN-ENDED QUESTION (PHASE 2)

Wear socks and stockings inside out; wear a soft vest underneath school shirt; wear summer short sleeve shirt in winter; wear trousers in winter instead of stockings and skirt;

FIGURE 6.4: ANSWER (#20) TO QUESTION 16: OPEN-ENDED QUESTION (PHASE 2)

We use vests or t-shirts under uniform but it's hot in summer. Tumble dry uniform with tennis balls often to make it softer

FIGURE 6.5: ANSWER (#50) TO QUESTION 16: OPEN-ENDED QUESTION (PHASE 2)

“I think the seams that have the flap, it can be really influenced by the cleaning method that you use. So, if you don't iron your shirt... that could influence how that flap lies. And that can also cause irritation. And sometimes it might not be on correctly and it might be ironed with like a bit of a kink in it...” (P8: 41).

It would also be significant to explore other senses' such as children's olfactory (i.e., sound) and visual sense, and how these senses may be influenced by different clothing properties.

“And as well as the 52 [Dri-mac fabric] he indicated to me, he is non-verbal, but he indicated to me that he likes the inside of the 52 [Dri-mac fabric] but definitely not the outside. I think it might be the noise that it makes, but I'm not sure...” (P6:101).

“So, if you think about that synthetic kind of school jersey, just the look of it can even set off an emotional reaction already” (P5:74).

From an occupational therapy viewpoint, it would be vastly interesting to explore the influences of clothing on specific occupations in-depth. These occupations include children's education, social participation, play and activities of daily living.

If I could [afford] to buy [a sensory-friendly] uniform for her she would be happy and concentrate in class like other kids.

FIGURE 6.6: ANSWER (#37) TO QUESTION 16: OPEN-ENDED QUESTION (PHASE 2)

Another interesting and critical viewpoint is the consideration taken by retailers in their approaches and methods in the production of children's clothing. It would be worthwhile to explore the entire production process, whether the end-consumer is *actually* considered and whether retailers think about the socio-economic impact.

From an occupational therapy viewpoint, it would be vastly interesting to explore the influences of clothing on specific occupations in-depth. These occupations include children's education, social participation, play and activities of daily living.

6.4.2 Limitations

6.4.2.1 Qualitative phase

Despite the fact that extreme measures were implemented to ensure optimised data collection, some limitations within the qualitative and quantitative phases were encountered.

Due to the public health emergency, the Covid-19 pandemic, the study's data collection methods had to be adapted to adhere to governmental regulations. It was, therefore, decided that the focus group discussion occur online to ensure safety and physical social distancing. Participants were able to communicate over the Blackboard collaborate platform by speaking or typing in the chatbox, and all cameras were turned off to decrease data usage. While participants were able to express their emotions by means of "emoticons" in the chatbox, due to the lack of facial expressions and body language, the researcher was unable to gauge participants' actual feelings and determine whether some questions might have been stressful or upsetting, as briefly mentioned by Leedy and Ormrod (2015:176). Therefore, future research could benefit from hosting online focus group discussions by asking participants to turn on their cameras, adding depth to the data provided or conduct face-to-face interviews.

Qualitative methodologies such as focus group discussions are valuable in determining significant points of discussion extracting diverse information from participants (Babbie, 2016:282; Kumar, 2018:336). Despite its advantages, gathering participants to partake in the study proved to be a challenge. Even when various participants agreed to participate by accepting the emailed invitation and parcel containing several samples of fabric, some participants failed to attend the virtual meeting which resulted in a smaller sample as initially planned for. This potential issue was also mentioned by Malhotra *et al.* (2017:188).

Therefore, future research can perhaps conduct one-to-one interviews which encourages participant attendance, resulting in an adequate, representative sample population.

6.4.2.2 Quantitative phase

Leedy and Ormrod (2015:176) mention the limitations associated with online surveys. Although an effort was made to include a representative sample population within the research study, online questionnaires only represent a particular group of consumers including people who have access to the internet, are comfortable with utilising their smart devices or computer, and spend a reasonable time utilising emails and social media. This means that only consumers who are active social networking users were more likely to complete the survey, resulting in a sample which is biased to some degree.

Some challenges occurred in reaching participants for the focus group discussions, as invitational links via email were sent out but that there was no guarantee whether the email reached the potential participant. Similarly with the messages sent via Facebook Messenger as many potential participants did either not receive the invitational link or open the message sent. Finally, some participants were also reluctant to complete the survey even when it was posted on a private Facebook group, indicating the nature of the research study, what would be expected of them and the names of the academic parties involved. The aforementioned events contributed to a smaller sample population recruitment. Additionally, Babbie (2016:260) mentions that with self-administered online questionnaires, respondents tend to spend more time on answering the initial questions within the questionnaire, paying less attention to answers closer to the end of the survey. This was proven by the fact that 106 respondents started the questionnaire however, only 99 completed the survey.

6.5 CONCLUDING REMARKS

This study was conducted to facilitate children (and parents of children) with sensory sensitivity issues. It focused on a particular clothing category that is very relevant to specifically South African children namely school uniforms. It was important to consider the textile, design and construction properties of these uniforms and how they might influence a schoolchild on a daily basis since all three categories of properties influence the sensory characteristics of the garment. From the findings, it was evident that a school uniform indeed has an impact on a child's emotions, well-being, and occupations (e.g. education, social participation, play, and activities of daily living). Various parents even mentioned additional problems that school uniforms caused, including meltdowns before and at school, lack of concentration in the classroom, constant negotiation with schools to adapt uniforms and

make them bearable for the child, and a constant search for garments that would be non-irritating to their children.

Therefore, the outcome of this study contributes significantly towards the large research gap presented and is regarded as highly relevant to children, parents, occupational therapists, retailers and other researchers within this field of study.

This study's significance and relevancy were furthermore confirmed since this exploratory study was chosen to form part of a well-known and sought-after conference- Pangborn, an international sensory science conference focusing on emerging research within the field of sensory and consumer science. The abstract of this specific study was accepted and the Master's student was granted the opportunity of presenting the findings at the virtual conference.

The emotional connection that exists between humans and their clothing is often much stronger than often perceived, and it is important to recognise the potential impact that clothing may have on one's emotional well-being. While clothing may be a wonderful aid to schools in assisting with inclusivity, discipline and uniformity, the child with sensory overreactivity suffer due to the physical irritation and psychological discomfort a uniform provides. In essence, the intervention of school uniform manufacturing and its processes are of vast importance to support, primarily, a child's well-being.

Even if this study can only assist one child or one parent, the effort was most certainly worthwhile.



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ADDENDUM A

ETHICS LETTER OF APPROVAL



UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

Faculty of Natural and Agricultural Sciences
Ethics Committee
E-mail: ethics.nas@up.ac.za

21 June 2021

ETHICS SUBMISSION: LETTER OF APPROVAL

Dr L Diedericks
Department of Consumer and Food Sciences
Faculty of Natural and Agricultural Science
University of Pretoria

Reference number: NAS081/2021

Project title: The influence of different clothing properties on children with Sensory Integration Dysfunction

Dear Dr L Diedericks,

We are pleased to inform you that your submission conforms to the requirements of the Faculty of Natural and Agricultural Sciences Research Ethics Committee.

Please note the following about your ethics approval:

- Please use your reference number (NAS081/2021) on any documents or correspondence with the Research Ethics Committee regarding your research.
- Please note that the Research Ethics Committee may ask further questions, seek additional information, require further modification, monitor the conduct of your research, or suspend or withdraw ethics approval.
- Please note that ethical approval is granted for the duration of the research (e.g. Honours studies: 1 year, Masters studies: two years, and PhD studies: three years) and should be extended when the approval period lapses.
- The digital archiving of data is a requirement of the University of Pretoria. The data should be accessible in the event of an enquiry or further analysis of the data.

Ethics approval is subject to the following:

- The ethics approval is conditional on the research being conducted as stipulated by the details of all documents submitted to the Committee. In the event that a further need arises to change who the investigators are, the methods or any other aspect, such changes must be submitted as an Amendment for approval by the Committee.
- **Applications using GM permits:** If the GM permit expires before the end of the study, please make an amendment to the application with the new GM permit before the old one expires
- **Applications using Animals:** NAS ethics recommendation does not imply that Animal Ethics Committee (AEC) approval is granted. The application has been pre-screened and recommended for review by the AEC. Research may not proceed until AEC approval is granted.

Post approval submissions including application for ethics extension and amendments to the approved application should be submitted online via the Ethics work centre.

We wish you the best with your research.

Yours sincerely,



Prof VJ Maharaj
Chairperson: NAS Ethics Committee

ADDENDUM B

CONSENT FORM



UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

Faculty of Natural and Agricultural Sciences
Department of Consumer and Food Sciences
1 July 2021

CONSENT FORM

Dear Participant

NATURE AND PURPOSE OF THE RESEARCH PROJECT

This research forms part of a larger research project in the Department of Consumer and Food Sciences, University of Pretoria to explore the influence of different clothing properties on children with Sensory Integration Dysfunction. The purpose of this research project is to get a better understanding which properties of a school uniform cause sensory irritation to a child living with SID or tactile defensiveness.

RESEARCH PROCEDURE

You will be asked to engage in a focus group discussion about school uniforms and the properties (elements of the clothing items) that you have experienced causes irritation from a sensory point of view.

Please note: No prior preparation is needed to participate in this focus group discussion. Participation is voluntary, with no penalty or loss of benefit if you decide not to take part. The focus group discussion will take approximately 60 minutes to complete, and will not be longer than 90 minutes at the most.

PRIVACY AND CONFIDENTIALITY

Participants' responses are strictly confidential, and only members of the research team will have access to the information. At no time will personal opinions be linked to specific individuals. Data will be safely and securely stored and will not be accessible from the public domain. The privacy and confidentiality of your participation are therefore ensured.

WITHDRAWAL CLAUSE AND RIGHTS OF ACCESS TO DATA

Participants may withdraw at any stage of the research without having to explain why. By no means will your withdrawal be held against you. As a participant, you also have the right of access to your data.

POTENTIAL BENEFITS

The findings derived from this research could assist parents when purchasing school uniforms for their children. In addition, it could also provide valuable findings that schools (and specifically special needs schools) can consider when revising their school uniform. This research could be valuable for clothing retailers that offer basic school uniform items to see how they can improve their product offering. All of the above would enhance the well-being of the child living with SID.

ADDITIONAL INFORMATION

Dr Lizette Diedericks can be contacted at Lizette.Diedericks@up.ac.za or at (012) 420 2575/ 082 787 1833 for further information about the research project.

CONSENT

I have read the above information relating to the research project and declare that I understand it. I have been allowed to contact and discuss relevant aspects of the project with the project leader, and hereby declare that I agree voluntarily to participate in the project.

I indemnify the University and any employee or student of the University against any liability that I may incur during the project.

Signature

Date

ADDENDUM C

QUESTIONNAIRE

Section A: Consent form

Q1

Faculty of Natural and Agricultural Sciences
Department of Consumer and Food Sciences
15 July 2021

CONSENT FORM

Dear Participant

NATURE AND PURPOSE OF THE RESEARCH PROJECT

This research forms part of a larger research project in the Department of Consumer and Food Sciences, University of Pretoria to explore the influence of different clothing properties on children with Sensory Integration Dysfunction (SID). The purpose of this research project is to get a better understanding which properties of a school uniform cause sensory irritation to a child living with SID or tactile defensiveness.

RESEARCH PROCEDURE

You will be asked to indicate how the school uniform that your child wears cause irritation from a sensory point of view.

Please note: No prior preparation is needed to complete the questionnaire. Participation is voluntary, with no penalty or loss of benefit if you decide not to take part. Completion of the questionnaire takes approximately 5 minutes. The procedure is completed by a word of appreciation for your time and effort.

PRIVACY AND CONFIDENTIALITY

Participants' responses are strictly confidential, and only members of the research team will have access to the information. Your response will be bulked with those obtained from other participants and appropriate statistical analysis will be performed on the bulked data. At no time will personal opinions be linked to specific individuals. Data will be safely and securely stored and will not be accessible from the public domain. The privacy and anonymity of your participation are therefore ensured.

WITHDRAWAL CLAUSE AND RIGHT OF ACCESS TO DATA

Participants may withdraw at any stage from the research without having to explain why. By no means will your withdrawal be held against you. As a participant you also have the right of access to your data.

POTENTIAL BENEFITS

The findings derived from this research could assist parents when purchasing school uniforms for their children. In addition, it could also provide valuable findings that schools

(and specifically special needs schools) can consider when revising their school uniform. This research could be valuable for clothing retailers that offer basic school uniform items to see how they can improve their product offering. All of the above would enhance the well-being of the child living with SID.

ADDITIONAL INFORMATION

Dr. Lizette Diedericks can be contacted at lizette.diedericks@up.ac.za or at (012) 420 2575/082 787 1833 for further information about the research project.

CONSENT

I have read the above information relating to the research project and declare that I understand it. I have been allowed to contact and discuss relevant aspects of the project with the project leader, and hereby declare that I agree voluntarily to participate in the project.

I indemnify the University and any employee or student of the University against any liability that I may incur during the course of the project.

Q2 I agree to the terms and conditions as stated above:

- Yes, I agree (1)
- No, I do not agree (2)

Skip To: End of Survey If Q2 = 2

Section B: Information of the child

Q3 Do you have a child that has mild to severe overreactive responses towards light touch input (especially to clothing)? (Tactile defensiveness)

- Yes (1)
- No (2)

Skip To: End of Survey If Q3 = 2

Q4 Does your child wear a school uniform to school?

- Yes (1)
- No (2)

Skip To: End of Survey If Q4 = 2

Q5 If you have more than one child with sensory issues, please complete the questionnaire with your child with the MOST severe overreactive responses towards light touch in mind. (The child that is the MOST sensitive).

Please indicate your child's year of birth:

Q6 What is the gender of your child?


- Female (1)
- Male (2)
- I prefer not to say (3)
-

Q7 In which province do you live?

- Eastern Cape (1)
- Free State (2)
- Gauteng (3)
- KwaZulu-Natal (4)
- Limpopo (5)
- Mpumalanga (6)
- Northern Cape (7)
- North West (8)
- Western Cape (9)

Q8 Indicate how you experience the level of severity of your child's sensory issues by using the slider.

0 1 2 3 3 4 5

0 = not severe; 5 = extremely severe ()	
--	--

Q9 Please indicate how frequently your child becomes distressed by the following:

	Never (1)	Rarely (2)	Sometimes (3)	Often (4)	Very often (5)
the feeling of new clothes (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
wearing of socks (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
wearing of shoes (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
textures of certain textiles (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
long sleeve garments (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Section C: School Uniform

Q10 Think about your child's emotional state while putting on and wearing his/her school uniform. Please indicate how frequently the school uniform affects your child in the following scenarios:

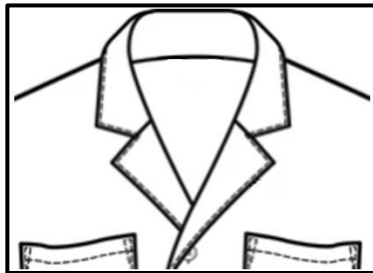
	Never (1)	Rarely (2)	Sometimes (3)	Often (4)	Very often (5)
The school uniform causes irritation and unhappiness in the morning while getting ready for school. (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The school uniform causes meltdowns in the morning while getting ready for school. (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The school uniform influences my child's ability to concentrate on his school work. (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The school uniform contributes to meltdowns at school. (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q11 Please indicate your level of agreement with the following statements related to fabrication:

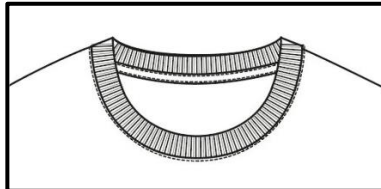
	Strongly disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly agree (5)
The fiber content of the fabric used has a direct influence on the level of irritation of the clothing item. (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My child prefers clothing with a high cotton fibre content. (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My child prefers a softer fabric opposed to a harder fabric. (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
If pilling (little balls of fluff) forms on the surface of clothing due to wearing and laundering, it causes irritation to my child. (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
If the fabric makes a sound during wear, my child gets irritated by it. (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q12 Which one of the following collars would irritate your child the MOST?

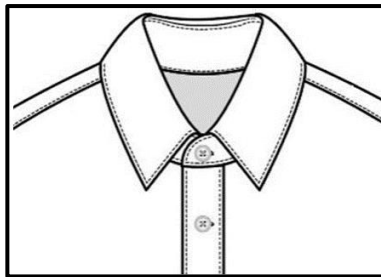
Crew neck (1)



Shirt collar (2)



Collar with a stand (4)



Q13 Please indicate your level of agreement with the following statements:

	Strongly disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly agree (5)
If a shirt (formal school shirt/ golf shirt) has buttons, my child prefers not to close the top button(s). (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My child prefers short sleeve clothing opposed to long sleeve clothing. (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The cuff of the school shirt/ school jacket irritates my child. (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The backing of embroidery on a shirt causes irritation to my child (e.g. the embroidery of the school crest/name). (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q14 Read through the list of possible adaptations related to a waistband/elastic and indicate how frequently (or not) you engage in the following adaptations:

	Never (1)	Rarely (2)	Sometimes (3)	Most of the time (4)	Always (5)
We have to turn the waistband/elastic over that it does not touch my child's body. (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My child wears underwear that covers the skin specifically to prevent the waistband/elastic from touching his/her skin. (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
We have to buy pants/skirts in bigger sizes to avoid the positioning of the waistband/elastic around the naval (abdomen), but rather on the hips. (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q15 Read through the list of possible adaptations and indicate how frequently (or not) you engage in the following adaptations:

	Never (1)	Rarely (2)	Sometimes (3)	Most of the time (4)	Always (5)
Cut out clothing labels. (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Unpick (completely remove) clothing labels. (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Buy second-hand school clothing, since it is often softer than new school clothing items. (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q16 Please tell us of any other adaptations to your child's school uniform you engage in that makes it more tolerable.

ADDENDUM D

PLAGIARISM DECLARATION

DECLARATION OF ORIGINALITY UNIVERSITY OF PRETORIA

The Department of Consumer and Food Sciences places great emphasis upon integrity and ethical conduct in the preparation of all written work submitted for academic evaluation.

While academic staff teach you about referencing techniques and how to avoid plagiarism, you too have a responsibility in this regard. If you are at any stage uncertain as to what is required, you should speak to your lecturer before any written work is submitted.

You are guilty of plagiarism if you copy something from another author's work (e.g. a book, an article or a website) without acknowledging the source and pass it off as your own. In effect you are stealing something that belongs to someone else. This is not only the case when you copy work word-for-word (verbatim), but also when you submit someone else's work in a slightly altered form (paraphrase) or use a line of argument without acknowledging it. You are not allowed to use work previously produced by another student. You are also not allowed to let anybody copy your work with the intention of passing it off as his/her work.

Students who commit plagiarism will not be given any credit for plagiarised work. The matter may also be referred to the Disciplinary Committee (Students) for a ruling. Plagiarism is regarded as a serious contravention of the University's rules and can lead to expulsion from the University.

The declaration which follows must accompany all written work submitted while you are a student of the Department of Consumer and Food Sciences. No written work will be accepted unless the declaration has been completed and attached.

Full names of student: Wenette Jordaan

Student number: 16015887

Topic of work: The influence of the properties of school uniforms on children with sensory overreactivity

Declaration

1. I understand what plagiarism is and am aware of the University's policy in this regard.
2. I declare that this thesis is my own original work. Where other people's work has been used (either from a printed source, Internet, or any other source), this has been properly acknowledged and referenced in accordance with departmental requirements.
3. I have not used work previously produced by another student or any other person to hand in as my own.
4. I have not allowed and will not allow anyone to copy my work with the intention of passing it off as his or her own work.

SIGNATURE:

