A Cluster Randomised Controlled Trial Evaluation of the Effects of Watching Sesame Tree on Young Children's Attitudes and Awareness

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Executive Summary

The first series of *Sesame Tree* – the Northern Ireland version of *Sesame Street* – began broadcast in Northern Ireland in April 2008. The series has been developed locally to support the Personal Development and Mutual Understanding area of the Revised Northern Ireland Curriculum. It aims to promote a range of positive outcomes among young children including a better understanding of themselves and others, more positive relationships with others, a greater appreciation of and respect for diversity and an awareness of how to live as part of a community.

The Centre for Effective Education at Queen's University Belfast has been commissioned by *Sesame Workshop* to undertake an independent and rigorous evaluation of the effects of *Sesame Tree* on young children's attitudes and awareness. This is the first of three reports outlining the findings of that evaluation.[1]

Methodology

This first report presents the findings of a cluster randomised controlled trial designed specifically to test the effects of watching *Sesame Tree* on young children's attitudes and behaviour. A total of 441 children aged 5-6 years from 20 primary schools in Northern Ireland took part in the trial. 10 of the schools were randomly assigned to the intervention group and 10 to the control group. Those schools in the intervention group agreed simply to show their children three 15 minute episodes of *Sesame Tree* per week for 10 weeks. The children in all 20 schools were tested prior to the 10 week trial and then again following the end of that period.

Outcomes

The evaluation tested five specific outcomes; these were that watching *Sesame Tree* would result in children being:

1. More willing to be inclusive of others in general;
2. More willing to be inclusive of those from a different racial background;
3. More interested in participating in the cultural events associated with their own and other communities (specifically in terms of the Protestant and Catholic communities);
4. Less likely to see one another as similar or different in relation to the Catholic/Protestant divide; and
5. More aware of the wider environment and, in particular, of the need to recycle household waste.

Findings

Overall, the evaluation provides strong and robust evidence that *Sesame Tree* has had a positive effect in terms of increasing:

- The willingness of particular subgroups of children (namely children from higher socio-economic backgrounds; Protestant children and girls) to be inclusive of others (Outcome 1);
- Protestant children's interest in cultural events associated with their own community and also those associated with the other community (Outcome 3); and
- The awareness of children in general of the need to recycle household waste (Outcome 5).

The evaluation found no evidence that *Sesame Tree* had any effect in relation to the other two outcomes (Outcomes 2 and 4).

Discussion

The report cautions against the over-interpretation of these particular findings given that they: are based on just one study; relate to just a small number of outcomes that were identified and measured; and rely on the quality of the measures used for those outcomes. Rather, the report identifies three underlying conclusions from the findings of the evaluation:

- There is strong and robust evidence that *Sesame Tree* is having a clear and measurable effect on some young children's attitudes and awareness. Moreover, these effects are encouraging (with effect sizes ranging typically from 0.2 to 0.4) given that they compare very favourably with other interventions of this type.
- There is sufficient evidence to suggest that *Sesame Tree* is having a differential effect on particular subgroups of children in relation to their religion, socio-economic background and, to a lesser extent, gender.
- There is evidence to suggest that *Sesame Tree* may be more effective when it is more explicit in its messaging. In relation to the theme of recycling, it is suggested that a wider range of concrete examples need to be used to help children generalise their awareness to other items of household waste. Following on from this, the report suggests that this need to be more explicit and thus to use more concrete and recognisable examples is also worth considering in relation to the coverage of issues of inclusion and exclusion and also respect for diversity and cultural differences.

Implications

The report suggests that:

1. There is a need for further research to ascertain the extent to which *Sesame Tree* is having a differential effect in relation to religion, socio-economic background and gender and some of the reasons for this.
2. In relation to the possible production of a second series of *Sesame Tree*, there is a need to consider how it might be developed to appeal to and thus engage more directly with Catholic children, children from lower socio-economic backgrounds and boys.
3. Also in relation to the possible production of a second series of *Sesame Tree*, it would be beneficial to undertake some formative research to explore the potential effectiveness of using more explicit messaging around issues of inclusion and exclusion and respecting cultural differences.

1. Introduction

The first series of *Sesame Tree* – the Northern Ireland version of *Sesame Street* – consists of 20 fifteen minute episodes that have been developed and produced locally and broadcast on regional television since April 2008. The broad aims of the series are to:

- support parents, teachers and early years practitioners in developing young children's knowledge and understanding in the Foundation and Pre-school stages, not only of themselves, but also of the wider community;
- help meet the requirements of the Northern Ireland Curriculum particularly in the field of Personal, Social and Emotional Development and to help develop aspects of the Thinking Skills and Personal Capabilities dimensions of the curriculum;
- present positive images to children of the self and others; and
- promote a range of other positive outcomes among young children including valuing diversity, emotional wellbeing, developing problem solving skills, and becoming aware of our common humanity.

Alongside the television series, an outreach pack has also been developed and circulated to all primary schools in Northern Ireland. This pack includes six episodes from the series together with a range of suggested activities for the classroom and the home to help reinforce some of the key learning objectives associated with the series.

The Centre for Effective Education at Queen's University Belfast has been commissioned by *Sesame Workshop* to undertake an independent and rigorous evaluation of the effects of *Sesame Tree* on young children's attitudes and awareness. This is the first of three reports outlining the findings of that evaluation:

1. *A Cluster Randomised Controlled Trial Evaluation of the Effects of Watching Sesame Tree on Young Children's Attitudes and Awareness*. This first report focuses specifically on evaluating the effects of simply watching the television series on young children's attitudes and awareness and is based on the findings of a cluster randomized controlled trial involving 20 primary schools and 441 children aged 5-6.

2. *A Naturalistic Study of Young Children's General Exposure to Sesame Tree and its Effects on their Attitudes and Awareness*. The second report will present the findings of a naturalistic study of over 800 children of the same age drawn from 39 primary schools selected randomly across Northern Ireland. The aim of this naturalistic study is to study the general exposure of children to the television series as broadcast on regional television and to ascertain whether there is a

relationship between how much children naturally watch the series on television and changes in their attitudes and awareness over time.

3. *A Cluster Randomized Controlled Trial Evaluation of the Effects of the Sesame Tree Outreach Pack on Young Children's Attitudes and Awareness*. The third and final report will present the findings of a second randomized controlled trial involving 28 primary schools that will evaluate the specific effects of the outreach pack on children of the same age and their attitudes and awareness.

1.1 Overview of *Sesame Tree*

A list of the 20 episodes that comprise the first series of Sesame Tree is provided in Appendix 1. Each episode follows a similar format with a studio element based around the two main characters: *Potto*, a furry, inventive monster-type who lives in a tree with his friend *Hilda*, the Irish hare. Potto and Hilda live in a 'question tree' called *Sesame Tree* and together they seek to answer questions posed by children from Northern Ireland. Each episode also includes a live action film of about three minutes duration that have all been filmed locally and featuring young children from Northern Ireland. These films appear about two-thirds of the way through each episode and have the specific objective of helping Potto and Hilda solve the children's questions.

As an example, in Episode 4 of the first series, Potto and Hilda, after a disagreement, decide to split up the *Sesame Tree* and they are eventually faced with the question 'Why do we have to share?' Hilda then goes to visit a local family in Northern Ireland with quintuplets to find the answer. As the question suggests, the theme for this episode is 'sharing' and the children are provided with the opportunity to explore how to deal with conflict and how to live as part of a community.

Potto and Hilda, the main characters, are supported in the series by a colourful cast including: the eccentric bird *Auntie Claribelle*; the bookworms, *Samson* and *Goliath*, who live among Potto's books; and the three *Weatherberries*, a group of Muppet fruit who hang from a vine inside the tree. The episodes also include clips from the American version of *Sesame Street* and in some segments, Potto contacts his friends on *Sesame Street* through his own computer device.

1.2 The Northern Ireland Revised Curriculum and Sesame Tree's Educational Objectives

The *Sesame Tree* series has been developed for an audience of 3-6 year-old children and therefore covers both pre-school (3-4 year olds) and foundation stage (5-6 year olds) groups. The development of the series and the storylines for each episode are specifically designed to meet the statutory requirements of the Personal Development and Mutual Understanding (PD&MU) area of the Revised Northern Ireland Curriculum and the two strands associated with this: (1) Personal Understanding and Health and (2) Mutual Understanding in the Local and Wider Community.

These statutory requirements are summarized in Table 1 and have been identified as the educational objectives for the *Sesame Tree* series. As can be seen, the statutory requirements for Strand 1 (Personal Understanding and Health) 'address personal and emotional issues as well as health, wellbeing and safety matters' while those for Strand 2 (Mutual Understanding in the Local and Wider Community) 'examine issues relating to personal and social relationships, interdependence and the need for mutual understanding and respect in the community and in the wider world'[2] (PMB, 2007: p. 5).

Table 1. Statutory Requirements Associated with the Personal Development and Mutual Understanding Strand of the Revised Northern Ireland Curriculum

(1) Personal Understanding and Health	*(2) Mutual Understanding in the Local and Wider Community*
Pupils should be enabled to explore:	Pupils should be enabled to explore:
A. themselves and their personal attributes; **B.** their own and others' feelings and emotions; **C.** their dispositions and attitudes to learning; **D.** the importance of keeping healthy and how to keep safe in familiar and unfamiliar environments.	**E.** their relationships with family and friends; **F.** their responsibilities for self and others; **G.** how to respond appropriately in conflict situations; **H.** similarities and differences between groups of people; **I.** learning to live as a member of the community.

A summary of how the 20 episodes of the *Sesame Tree* series maps onto these statutory requirements is presented in Table 2 overleaf which is taken from the *Sesame Tree* Curriculum.[3]

1.3 Present Report

The following section, Section 2, describes the methodology employed in relation to the current evaluation, including the specific outcomes that provide the basis for the evaluation and the design of the cluster randomised controlled trial and the way in which the data from the trial have been analysed. Section 3 then presents the findings from the trial itself, organised by each of the five outcomes specified in the previous section. The report concludes, in Section 4, by summarising the main findings and discussing the key implications of these.

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[2] Partnership Management Board (2007) *Personal Development and Mutual Understanding for Key Stages 1 & 2* (Belfast: CCEA).

[3] See Walsh, G. and Kehoe, S. (2007) 'Sesame Tree Northern Ireland. Educational objectives and links with the early years curricula in Northern Ireland'.

Table 2. Mapping educational objectives onto episodes and themes

Theme of Sesame Tree Episode	Statutory Requirement									Episode
	A	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	
1 Two Birthdays/Festivals	▨	▨							■	15
2 Nest/Home	▨	▨						■		1
3 Sharing					▨	■	■			4
4 Tidying Up				▨		▨	■		■	6
5 Perspective/wee minute	▨	■			▨		▨			14
6 Special Clothes					▨			■	■	5
7 Recycling									■	7
8 Doing Hard Things		▨	■							12
9 Eating Crisps/Health				■						2
10 Best Colour	■		▨							10
11 Turn taking						▨	■		■	11
12 Languages	▨		▨		▨			■		3
13 Can't Fly/Being Special	■							▨		13
14 Looking Different	▨			■				■		16
15 Land & Sea/Different needs						■	■	▨		19
16 Patience/Birthday Cake		■				■				9
17 Potto's Fear/Preparedness		■	■							17
18 Honesty		▨				■	▨		▨	8
19 Sing/Dance/Self Expression		■			▨					20
20 Empathy		■			▨	▨			▨	18

■ Explicit Educational Outcome   ▨ Implicit Educational Outcome

2. Methodology

This section outlines the methodology used for the present evaluation. It begins by describing the specific outcomes that were tested and how these relate to the content and learning goals of *Sesame Tree*. The evaluation itself took the form of a cluster randomised controlled trial and this is explained before a description of the sample is then provided. The section concludes with an explanation of the approach used to analyse the data.

2.1 Outcomes

In relation to this present evaluation, an outcome is defined as a real and discernible change in young children's attitudes and/or awareness that has occurred as a direct result of watching *Sesame Tree*. As outlined in the previous section, there were many different outcomes that could have potentially provided the focus for this current evaluation. However, given finite resources there was a need to focus on a particular subset of these that captured the curriculum goals of enhancing young children's 'mutual understanding in the local and wider community'.

As outlined in the previous section, these goals correspond largely to Strand 2 of the Northern Ireland Personal Development and Mutual Understanding Curriculum and include a focus on developing positive relationships, recognising and respecting cultural differences and learning to live responsibly in the wider community. With this in mind, the following specific outcomes were selected to test whether watching *Sesame Tree* would lead young children to be:

1. More willing to be inclusive of others in general;
2. More willing to be inclusive of those from a different racial background;
3. More interested in participating in the cultural events associated with their own and other communities (specifically in terms of the Protestant and Catholic communities);
4. Less likely to see one another as similar or different in relation to the Catholic/Protestant divide; and
5. More aware of the wider environment and, in particular, of the need to recycle household waste

2.2 Cluster Randomised Controlled Trial

A cluster randomised controlled trial was used to ascertain whether watching *Sesame Tree* results in the above outcomes for young children. 20 primary schools in Northern Ireland were recruited for the trial and then randomly assigned to either the intervention group (10 schools) or the control group (10 schools). To ensure that the intervention and control groups were similar in relation to their main socio-demographic characteristics, the random assignment was undertaken by organising the schools into 10 pairs where the schools in each pair were matched in relation to the following characteristics: school

type (i.e. Catholic Maintained or Protestant Controlled schools); educational and library board area; and proportion of children eligible for free school meals (a proxy measures of socio-economic deprivation). The schools in each pairing were then randomly assigned to either the intervention or the control groups.

The children in the Year 2 classes (aged 5-6 years) of each of the schools participated in the trial. The intervention itself consisted of the Year 2 class teachers in each of the intervention schools showing their children three episodes of *Sesame Tree* each week at times determined by themselves. This continued for 10 weeks between April 5 and June 13 2008. The children in the 10 control schools simply carried on with their normal schooling activities during this time.

For the two weeks prior to the beginning of this period all children were tested across the 20 schools and were then retested during the two weeks immediately following the end of this period. Each child was tested using a standardised research instrument; a copy of which is available from *Sesame Workshop* on request. The instrument included a number of tasks that the children were asked to do. These tasks aimed to measure the children's attitudes, levels of awareness and/or intended behaviour in relation to the five outcomes outlined above. To avoid repetition, these tasks are described alongside the reporting of the findings below.

The one factor to note is that *Sesame Tree* was being broadcast regionally on BBC2 during this 10 week period. As such, the children in the control group were exposed to *Sesame Tree* naturally during this time. Similarly, we those in the intervention group will have also had similar levels of naturalistic exposure to the series in addition to watching it in class. The main implication of this for the present study therefore is that it is assessing the impact of a slightly more intense exposure to *Sesame Tree* (i.e. watching three episodes of the series per week) *above and beyond* the impact of naturalistic exposure to the series via local television. The way in which the naturalistic exposure to *Sesame Tree* of children in the control group was dealt with in the analysis is explained below.

2.3 Sample

The main characteristics of the sample are described in Table 1. As can be seen, 441 children took part in this trial overall (225 in the intervention group and 216 in the control group). Of these, there were roughly equal numbers of Catholic and Protestant children (n=239 and n=202 respectively) as well as equal proportions of boys (n=223) and girls (n=218). The mean age of the children was 6 years and 3 months (sd= 4 months) and all but three of the children (99%) were white/Caucasian. Just over half of the children (52%) were located in the Belfast Education and Library Board area, with smaller proportions in: the South Eastern Board area (16%); Southern Board area (12%); and Western Board area (20%).

In comparing the characteristics of the children in the intervention and control groups, it can be seen that the two groups were fairly similar in relation to their average age and religious breakdown.

Table 3. Characteristics of the Sample

	Intervention Group	Control Group	Total
Mean Age (in months)[1]	74.9 (sd=3.6)	74.6 (sd=3.7)	74.7 (sd=3.6)
Gender[2]			
Male	125 (55.6%)	98 (45.4%)	223 (50.6%)
Female	100 (44.4%)	118 (54.6%)	218 (49.4%)
Total	225 (100.0%)	216 (100.0%)	441 (100.0%)
Religion[3]			
Protestant	111 (49.3%)	91 (42.1%)	202 (45.8%)
Catholic	114 (50.7%)	125 (57.9%)	239 (54.2%)
Total	225 (100.0%)	216 (100.0%)	441 (100.0%)
Mean Multiple Deprivation Score			
Protestant[4]	19.1 (sd=13.2)	25.4 (sd=17.9)	21.9 (sd=15.8)
Catholic[5]	40.2 (sd=22.0)	28.8 (sd=17.8)	34.2 (sd=20.7)
Total[6]	29.5 (sd=21.0)	27.4 (sd=17.9)	28.5 (sd=19.5)
Education and Library Board Area[7]			
Belfast	110 (48.9%)	118 (54.6%)	228 (51.7%)
South Eastern	54 (24.0%)	17 (7.9%)	71 (16.1%)
Southern	22 (9.8%)	31 (14.4%)	53 (12.0%)
Western	39 (17.3%)	50 (23.1%)	89 (20.2%)
Total	225 (100.0%)	216 (100.0%)	441 (100.0%)

[1]$p=0.493$, $t=0.687$, df=277; [2]$p=0.032$, Chi-Square=4.574, df=1; [3]$p=0.129$, Chi-Square=2.304, df=1;
[4]$p=0.006$, $t=2.764$, df=156.0 (corrected for unequal variances); [5]$p<0.0005$, $t=4.243$, df=203.8 (corrected for unequal variances);
[6]$p=0.264$, $t=1.118$, df=417.5 (corrected for unequal variances); [7]$p<0.0005$, Chi-Square=22.276, df=3.

However, and as can be seen, some statistically significant differences are evident in relation to gender, average multiple deprivation scores and the children's distribution across education and library board areas. Of these, the most notable differences relate to the multiple deprivation scores.[4] As can be seen, while the average multiple deprivation scores for children in the intervention and control groups are similar, and not statistically significant, important differences are evident when breaking the sample down further by religion. More specifically, the Protestant children in the intervention group had a lower

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[4] The multiple deprivation scores used here relate to the respective electoral ward that the child's home is located in. These scores are based on a combination of 43 indicators representing 7 different dimensions of neighbourhood deprivation (income; employment; health and disability; education, skills and training; proximity to services; living environment; and crime and disorder). Higher scores represent higher levels of deprivation. For more information see: Northern Ireland Statistics and Research Agency (2005) *Northern Ireland Multiple Deprivation Measure 2005: A User's Guide*, Belfast: NISRA.

average multiple deprivation score (19.1) compared to their counterparts in the control group (25.4). Conversely, the Catholic children in the intervention group had a significantly higher average multiple deprivation score (40.2) compared to those in the control group (28.8). Overall, therefore, it can be seen that the Protestant children in the intervention group were from more affluent and advantaged households than their Catholic counterparts in the intervention group.

Differences such as these are not uncommon in relation to cluster randomised controlled trials such as this one where a relatively small number of schools have been randomised (n=20) and where there is a fair amount of variation in the size of the schools. However, if these differences are simply ignored they can give rise to potentially misleading findings. Fortunately, these differences can be controlled for statistically through the use of pre-test scores and also by including these main socio-demographic variables as covariates in the analysis. This is explained further in the next section.

2.4 Analysis

The main analysis has taken the form of multilevel modelling using the software MLwinN 2.10; either linear regression for continuous outcome variables or binary logistic regression for dichotomous outcome variables. The use of multilevel modelling is considered appropriate and necessary in relation to the analysis of cluster randomised controlled trials to address the adverse effects of clustering.[5]

2.4.1 Main analyses

The main statistical models that provide the basis of the analysis, and as reported in the appendices, have the relevant post-test outcome score as the dependent variable and then include the following independent variables:

- The related *pre-test score* (to control for any initial individual differences between the children in relation to that outcome);
- A dummy variable - *intervention* - indicating whether the child is in the control group (coded '0') or the intervention group (coded '1');
- A dummy variable - *boy* - indicating whether the child is a boy (coded '1') or a girl (coded '0');
- A dummy (school-level) variable - *protestant* - indicating whether the child attended a Protestant controlled school (coded '1') or a Catholic maintained school (coded '0');
- The variable *deprivation* that gives the multiple deprivation score for each child based on their home postcode; and
- A dummy variable - *depr_missing* - identifying the small number of children for whom their home postcodes were not provided and thus the postcode of their school was used as the

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[5] The main effect that clustering has on data is to reduce the standard errors of the parameter estimates produced. This, in turn, results in more findings being deemed to be statistically significant than there should be. For further information see: Goldstein, H. (2003) *Multilevel Statistical Models*, 3rd Edition, London: Arnold; Raudenbush, S. and Bryk, A. (2001) *Hierarchical Linear Models*, London: Sage.

nearest proxy measure instead. The inclusion of this dummy variable helps to partition the specific variation in scores due to the use of the school postcode

As detailed in the appendices, four statistical models were run for each outcome variable. The main model (Model 1) assesses the overall effects of watching *Sesame Tree* on the respective outcome measure after controlling for any initial differences in the children's pre-test scores and also gender, religion and socio-economic background (i.e. levels of multiple deprivation). The key element of Model 1 is the coefficient relation to the dummy variable 'intervention' that represents the difference in the average scores of those children in the intervention group compared to the control group (once the other factors listed above have been controlled for).

2.4.2 Subgroup analyses

Beyond this overall analysis, three further analyses have been conducted for each outcome in relation to assessing whether *Sesame Tree* was more effective for boys or girls (Model 2), Protestants or Catholics (Model 3) or those from differing socio-economic backgrounds (Model 4). In each case, the potential effects of these respective variables has been analysed by adding an additional interaction term to the basic model (i.e. 'boy*intervention', 'protestant*intervention' or 'deprivation*intervention'). In these cases, it is this interaction term that provides the main focus for the analysis, representing the additional effect that the intervention has had, if any, on boys or Protestant children or those from lower socio-economic (i.e. more deprived) backgrounds.

2.4.3 Calculating and displaying effect sizes

Appendix 2 provides details on how the effect sizes from the main and subgroup analyses reported in the next section have been calculated. The bar charts displayed in the following section have been created to display the effects of the television series once a range of contextual factors have been controlled for.

More specifically, in relation to outcome variables that are continuous, the bar charts display the average gain in the mean scores for those in the intervention group in comparison with the control group and once religion, gender and/or socio-economic background are controlled for. In addition, the mean pre-test scores displayed are those for the children in the intervention group once these other variables have been controlled for. Further explanation on this is also provided in Appendix 2. For outcome variables that are dichotomous, the bar charts simply display the relative odds of children in the intervention group being more likely to achieve a positive outcome in relation to that variable compared to the control group at pre-test and post-test and once contextual variables have been controlled for.

2.4.4 Accounting for the naturalistic exposure to Sesame Tree on television among children in the control group

As mentioned earlier, the children in the control group may have been exposed to *Sesame Tree* naturally as it was broadcast on BBC2 over the 10 week period of the intervention. A measure of exposure was created based on the children's ability to correctly identify three of the characters from *Sesame Tree* (Potto, Hilda and Claribelle) and also to correctly identify what these three characters did (i.e. Potto invented things, Hilda did things quickly and the Weatherberries could forecast the weather). A point was given for each correct answer and thus the measure ranged from 0 (not being able to identify any of the characters or the things they did correctly) to 6 (being able to correctly identify everything). The measure had strong discriminant properties evident in the fact that the average score for children in the intervention group was 4.7 (sd = 1.5) compare to just 1.5 (sd = 1.4) for the control group.

For each of the outcomes analysed, a preliminary check was made to see whether there was any relationship for the children in the control group with regard to their levels of exposure as captured by this measure and their post-test scores. In all cases no statistically significant relationships were found. This is likely to reflect the relatively short duration of the intervention (10 weeks) and the fact that *Sesame Tree* was broadcast during this period at times when children were much less likely to see it. Given that this measure of natural exposure was not found to have a significant effect on the children in the control group it was not included in any of the analyses that follow.

3. Findings

This section reports the findings of the cluster randomised controlled trial. The findings are organised in relation to the five key outcomes listed in the introduction:

1. An increase in children's willingness to be inclusive of others in general;
2. An increase in children's willingness to be inclusive of those from a different racial background;
3. An increase in children's interest in participating in the cultural events associated with their own and other communities (specifically in terms of the Protestant and Catholic communities);
4. A reduction in children's tendency to see one another as similar or different in relation to the Catholic/Protestant divide; and
5. An increase in children's awareness of the wider environment and, in particular, of the need to recycle household waste.

For each outcome, a brief description of the particular measures used is provided before the findings of the trial are then reported. Full details on each of the four statistical models described in the previous section used in the analysis for each outcome are provided in Appendices 3 to 7 respectively.

3.1 Children's Willingness to be Inclusive of Others in General

The measure used in relation to this first outcome involved showing children two photographs of a white child and a black child respectively at different points in the interview. Photographs of boys were used when boys were being interviewed and, similarly, photographs of girls were used when girls were being interviewed. The order in which the children were shown each photograph was randomized. For each photograph the children were asked to imagine that this child had only just started in their school and this was the first day in their class. They were then asked five questions:

*   "Would you go up to him/her and say hello?"
*   "Would you let him/her play with you and your friends at lunchtime?"
*   "Would you share your things with him/her in class, like your coloured pencils?"
*   "Would you invite him/her to come to your house to play after school?"
*   "Would you share a secret with him/her?"

For each question, the children were given the choice of four responses that were coded as follows: 1 - "<u>NO</u>"; 2 - "no"; 3 - "yes'; and 4 - "<u>YES</u>"

An overall measure of each child's willingness to be inclusive of others was created by calculating the mean score of the children's answers to all ten questions (five asked in relation to the white child and

five in relation to the black child).[6] Each child's score therefore ranged from 1 (not inclusive at all) to 4 (very inclusive). The measure was found to be unidimensional and reliable (α = 0.895). Full details of the analysis for this measure are provided in Appendix 3.

For the sample as a whole, no evidence was found of any change in attitudes among the children in the intervention group compared to the control group. However, this overall finding does mask a number of positive effects that were evident in relation to particular subgroups within the sample.

3.1.2 Gender

In relation to gender, it can be seen from Figure 1 that the mean inclusion score for boys at pre-test was lower than for girls (3.39 compared to 3.75). Moreover, while there was only a marginal (and not statistically significant) change among the boys at post-test (with the mean score reducing by just 0.05 compared to the control group), there is evidence that watching *Sesame Tree* was having a positive effect on girls with an increase in their mean inclusion score of 0.13 compared to the control group (effect size = 0.280) and this increase was found to be approaching statistical significance (p=0.083).

Figure 1. The Effects of Sesame Tree on the General Willingness of
Girls and Boys in the Intervention Group to Include Others*
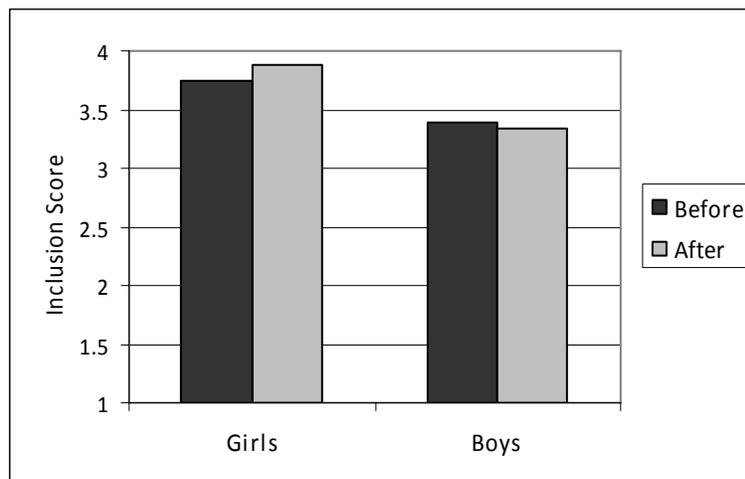
* These effects are those found above and beyond any changes in the Control
Group and once religion and socio-economic background have been controlled for.

3.1.2 Religion

In relation to the effects of *Sesame Tree* on Protestant and Catholic children's general willingness to be inclusive of others, it can be seen from Figure 2 that while the children's mean inclusion scores were similar at pre-test (3.60 for Protestants and 3.57 for Catholics), the television series appears to have

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[6] The subsequent scale was found to be highly reliable (Alpha = 0.895) and valid, with only one underlying factor to the 10 items.

quite different effects for both groups of children at post-test. For Protestant children, there is evidence that watching *Sesame Tree* has increased their mean inclusion scores by 0.22 compared to the control group (effect size = 0.337) and this increase was found to be highly statistically significant (p=0.006). However, and for the Catholic children, there is some evidence that it has actually led to a slight reduction in their mean inclusion score by -0.11 compared to the control group (effect size = -0.188) and this reduction was found to be approaching statistical significance (p=0.056).

Figure 2. The Effects of Sesame Tree on the General Willingness of Protestant and Catholic Children in the Intervention Group to Include Others*

* These effects are those found above and beyond any changes in the Control Group and once gender and socio-economic background have been controlled for.
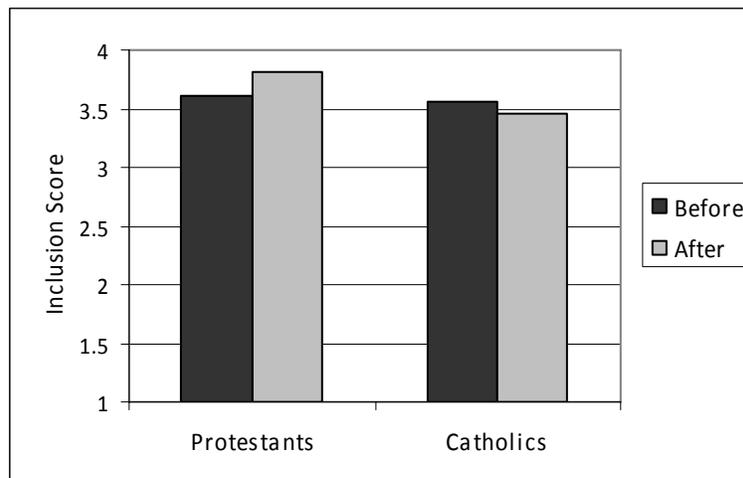
3.1.3 Socio-economic background

Finally, and in relation to the differential effects of watching *Sesame Tree* on children from areas of low and high multiple deprivation, Figure 3 shows the pre-test and post-test scores of intervention group children from the third most highly deprived areas in the sample and also those from the third least deprived areas. As can be seen, those children from the most highly deprived areas had a slightly higher mean inclusion pre-test score than those from the least deprived areas (3.73 compared to 3.53 respectively). However, while watching *Sesame Tree* did not appear to have any effect on those from the most highly deprived areas (leading to a marginal, and not statistically significant, reduction of -0.04 among those in the intervention group compared to the control group), there is some evidence that watching *Sesame Tree* had a positive effect on those from the least deprived areas. As can be seen, the mean inclusion scores of those in the intervention group from areas of low deprivation increased by 0.25 (effect size = 0.414) and this increase was nearing statistical significance (p=0.073).

Figure 3. The Effects of Sesame Tree on the General Willingness of Children from Different Socio-Economic Backgrounds in the Intervention Group to Include Others*
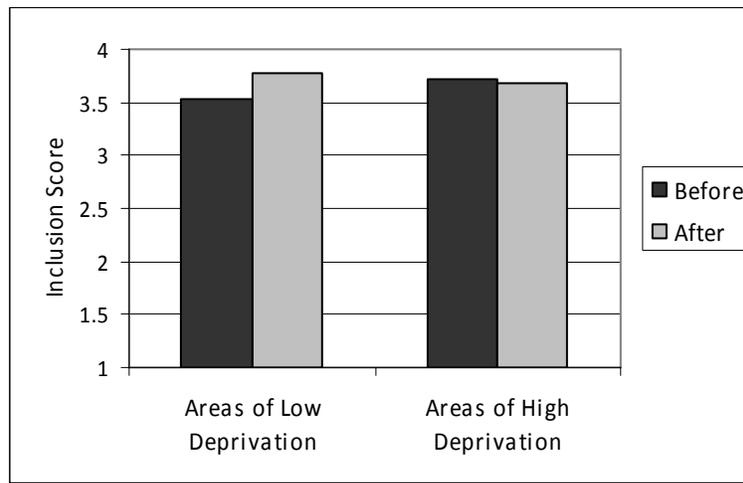
* These effects are those found above and beyond any changes in the Control Group and once religion and religion have been controlled for.

3.2 Children's Willingness to be Inclusive of those from a Different Racial Background

In addition to the general measure of inclusion analysed above, two separate measures were also calculated for each child regarding their willingness to be inclusive of the white child and the black child in the respective photographs they were shown. These two measures were calculated in the same way as above but based on the children's five answers in relation to the white and black child respectively. Both measures were found to be unidimensional and reliable (α = 0.811 and 0.853 respectively).

As mentioned in the previous section, all but three of the children in the sample (n= 438 or 99.3%) were white/Caucasian. In relation to the pre-test scores, and analysing all of the children in the study combined (control and intervention children), it was found that the children were more willing to be inclusive of the white child (mean = 3.59, sd = 0.63) in comparison to the black child (mean = 3.50, sd = 0.71) and this was found to be statistically significant (p=0.001, t = 3.474, df = 437) (effect size = 0.126).

As the focus for the present analysis is on whether watching *Sesame Tree* had the effect of reducing this gap in scores for the white and black child, a single measure for each child was created by subtracting their score for the black child from their score for the white child. The resultant measure therefore ranged from +3 (indicating a strong preference for the white child over the black child) to 0 (indicating no differences in preferences) to -3 (indicating a strong preference for the black child over the white child).

The results of the analysis are detailed in Appendix 4. Overall, there was no evidence that watching *Sesame Tree* had an effect overall on children's willingness to be inclusive of those from a different racial

background. On this occasion, there was also no evidence that the television series was effective for particular subgroups of children in terms of gender, religion and socio-economic background.

3.3 Children's Willingness to Participate in the Cultural Events Associated with their Own and Other Communities

Northern Ireland remains a deeply segregated region with 95 per cent of children still attending either Catholic or Protestant schools and 75 per cent of the population living in residential areas that are predominantly Protestant or Catholic. Such divisions are also evident in relation to cultural and sporting activities where certain activities tend to be strongly associated with one side of the religious divide or the other. This particular outcome involves showing the children two separate photographs: a photograph of an Orange Parade (a cultural activity traditionally associated with the Protestant community) and also of children playing Hurling (a Gaelic sport traditionally associated with the Catholic community).

The order in which they were shown these was randomised. For each photograph the children were asked:

- "Would you like to dress up like them and play that game at home?"
- "Would you like to be there to watch them?"
- "Would you like to join in and march/play with them?"

The children had a choice of four responses that were just the same as for the social inclusion task. A general measure of the children's attitudes towards the Parade and the Hurling game were created by calculating the average score for each child in relation to these three questions. As before, the two measures therefore ranged from 1 (indicating that the child did not want to participate at all) to 4 (indicating that the child was very keen to participate). Both measures were found to be unidimensional and sufficiently reliable for the purposes of the present study (α = 0.598 and 0.628 respectively).

For both items, the analysis was run separately for Protestant and Catholic children in order to ascertain whether watching *Sesame Tree* had a positive effect in terms of increasing their interest in cultural activities associated with their own community as well as activities associated with the other community.

3.3.1 Responses to Orange Marches (Protestant Cultural Activity)

Details of the main analysis in relation to the children's attitudes towards Orange Parades can be found in Appendix 5. As Figure 4 shows, Protestant children not surprisingly showed more interest in Orange Parades than Catholic children during pre-tests (mean scores of 2.98 compared to 2.71 respectively). As can also be seen, there is evidence that watching the series had a positive effect on the Protestant children, increasing their mean scores by 0.27 (effect size = 0.316) and this effect was found to be

statistically significant (p=0.038). This positive effect for Protestant children was found to be equally so for girls and boys and also for those from different socio-economic backgrounds.

In contrast, only a marginal and not statistically significant change in attitudes towards Orange Parades was found among Catholic children who watched *Sesame Tree* (an increase in their mean score of 0.01 compared to the control group) and this remained the same for both boys and girls and those from different socio-economic backgrounds.

Figure 4. The Effects of *Sesame Tree* on the Interest in Orange Parades
(Protestant Cultural Activity) among Protestant and Catholic Children *
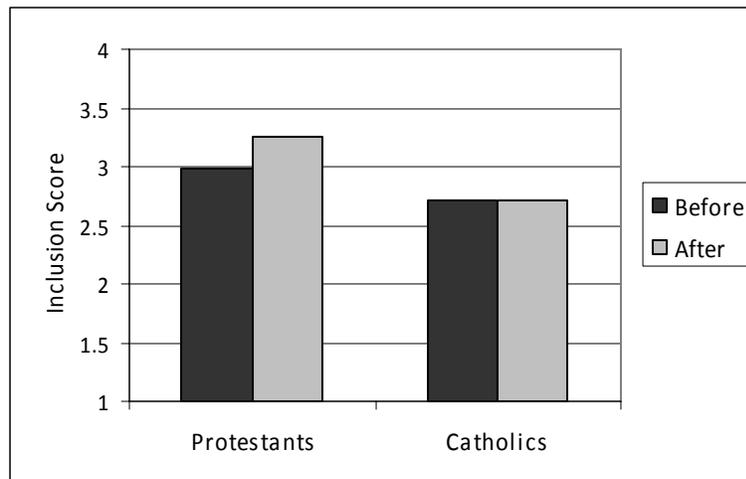
* These effects are those found above and beyond any changes in the Control
Group and once gender and socio-economic background have been controlled for.

3.3.2 Responses to Hurling (Catholic Sporting Activity)

The same analysis was also run in relation to Protestant and Catholic children's interest in Hurling and full details of the statistical analysis are provided in Appendix 6. As Figure 5 shows, and as anticipated, Catholic children in the intervention group demonstrated a higher interest in Hurling than Protestant children (a mean score of 2.95 compared to 2.82) at pre-test. However, no evidence was found in relation to Catholic children's interest in hurling being effected by watching *Sesame Tree* (indeed their mean score reduced marginally by -0.07 compared to the control group, although this was not statistically significant). This lack of effect also remained when analysing Catholic girls and boys separately and those from differing socio-economic backgrounds.

However, and as also shown in Figure 5, there is some evidence that watching *Sesame Tree* had a positive effective on Protestant children's interest in Hurling with their mean scores increasing by 0.21 compared to the control group (effect size = 0.216) and this increase was nearing statistical significance (p=0.091). This change was found to be equally so for Protestant girls and boys and also those from differing socio-economic backgrounds.

Figure 5. The Effects of *Sesame Tree* on the Interest in Hurling (Catholic Sporting Activity) among Protestant and Catholic Children *
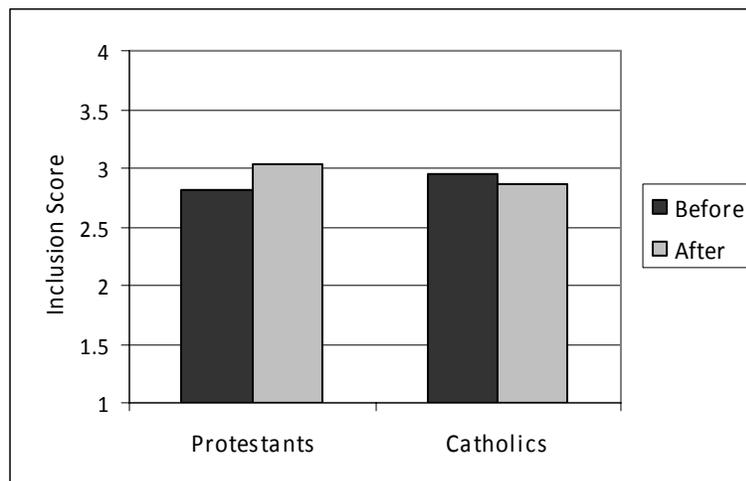

* These effects are those found above and beyond any changes in the Control Group and once gender and socio-economic background have been controlled for.

3.4 Children's Tendency to See Each Other as Similar or Different in Relation to the Catholic/Protestant Divide

One of the goals of *Sesame Tree* is to increase children's awareness and acceptance of the many ways in which we are similar and different to one another. The measure used in relation to this particular outcome has been designed to ascertain whether watching *Sesame Tree* has the effect of reducing young children's tendency to view each other as similar or different simply in relation to the Protestant/Catholic divide.

The task involved showing the children two photographs – one of a child wearing a Celtic soccer shirt (associated with the Catholic community) and the other of a child wearing a Rangers soccer shirt (associated with the Protestant community).[7] They were shown the two photographs in random order. For each photograph they were asked how similar or different they felt each child was. The four responses they could choose from were:

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[7] Celtic and Rangers are two soccer teams in Glasgow, Scotland. These two teams dominate the Scottish Premier League and there is intense rivalry between them. There is also a strong tendency for supporters of Rangers to be Protestant and supporters of Celtic to be Catholic, both in Scotland and Northern Ireland. It is quite common in Northern Ireland to see children and adults wearing Celtic or Rangers soccer shirts and the wearing of such shirts has become a common way of distinguishing Protestants and Catholics.

- • "A lot the same" (coded 1)
- • "A little the same" (coded 2)
- • "A little different" (coded 3)
- • "A lot different" (coded 4)

To create a single measure, each child's score for the Rangers figure was subtracted from that for the Celtic figure. This generated a measure that ranged from -3 (indicating that the child sees the Celtic child as much more similar to him/herself than the Rangers child) to 0 (indicating that the child makes no distinction between the two) to +3 (indicating that the child sees the Rangers child as much more similar to him/herself than the Celtic child).

Not surprisingly, in analysing the children's responses for the whole sample during the pre-tests, the mean score for Catholic children was negative (mean= -0.250, sd=1.29) whereas the mean score for the Protestant children was positive (mean=0.212, sd=1.25). This difference was found to be statistically significant (p<0.001, t=-3.774, df=432) confirming that Catholic and Protestant children of this age do use items such as soccer shirts (that tend to be markers for Protestant and Catholic communities) as a basis for deciding whether a child is similar or different to themselves (effect size = 0.364).

The analysis of the effects of *Sesame Tree* on these attitudes were run separately for Protestant and Catholic children and the statistical models produced are provided in Appendix 7. In relation to the measure used for this particular outcome, no evidence was found of the television series having an effect on Catholic and Protestant children's tendency to see each other as similar or different. This was equally so for girls and boys and also children from differing socio-economic backgrounds.

3.5 Children's Awareness of the Environment and the Need to Recycle

The children's environmental awareness was measured in relation to their awareness of recycling. During the pre-tests and post-tests, each child was shown an empty plastic drinks bottle and asked to imagine that they had just finished using the bottle. They were then asked what they would do with the bottle, and why, and their answers to both questions were recorded verbatim. Their answers were then coded into a simple binary variable indicating whether they mentioned recycling (either in terms of putting the bottle in the recycling bin or keeping it and using it for something else) or not. The task was then repeated later in the interview with an empty breakfast cereal packet. Both items were presented in random order to the children. Full details of the analysis for both items are provided in Appendix 8.

3.5.1 Empty plastic drinks bottle

The findings from the analysis of the children's responses to the plastic bottle are shown in Figure 6. As can be seen, a positive effect was evident for the sample as a whole with children being 1.7 times more likely to mention the need to recycle the plastic bottle after watching *Sesame Tree* than before in comparison with the control group (approximate effect size = 0.087) and this finding was approaching

statistical significance (p=0.06). While no differential effects were found between boys and girls or Catholic and Protestant children, the socio-economic background of the children was found to have an influence on the children's responses (p=0.048). As can be seen from Figure 6, for those third of the children in the sample from the least deprived areas, watching Sesame Tree had the effect of increasing their ability to mention the need to recycle by 6.3 times compared to the control group (approximate effect size = 0.325).

Figure 6. The Effects of *Sesame Tree* on Children's Awareness of the Need to Recycle an Empty Plastic Drinks Bottle*
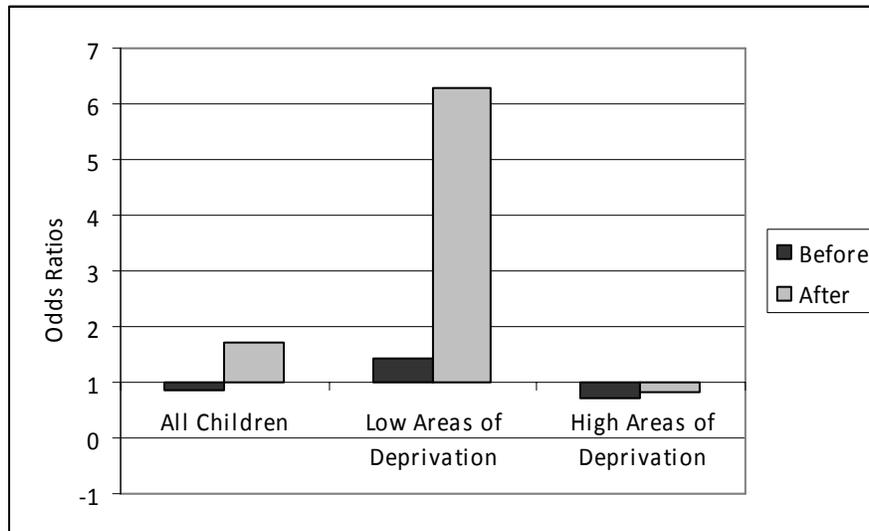
* These effects represent the odds of children in the intervention group recognising the need to recycle the bottle compared to those in the control group, and once gender, religion and socio-economic background are controlled for (for all children) and/or just gender and religion controlled for (for those from low and high areas of deprivation).

3.5.2 Empty cereal packet

Interestingly, when considering the children's reactions towards the empty cereal packet, and as also detailed in Appendix 8, there was no evidence that *Sesame Tree* had any effect on the children's tendency to suggest recycling either overall or in relation to any of the specific subgroups of children being studied.

4. Conclusions

This final section provides an overview of the key findings and then considers some of the implications of these in relation to the possible development of subsequent series of *Sesame Tree*.

4.1 Summary of Key Findings

Table 4 provides a summary of the findings of the evaluation set against the five main outcomes specified at the beginning of this report. As can be seen, there is evidence that *Sesame Tree* has had a clear and measurable effect on children in a number of areas, namely: children's willingness to be inclusive of others; their interest in the cultural activities associated with both their own community and those of others; and a greater awareness of the environment and the need to recycle.

Table 4. Summary of the Findings of the Evaluation (with Effect Sizes)

Outcome	Overall	Gender	Religion	Socio-Economic Background
1) More willing to be inclusive of others in general	-	Girls (ES = +0.280)	Protestants (ES = +0.337) Catholics (ES = -0.188)	Affluent Children (ES = +0.414)
2) More willing to be inclusive of those from a different racial background	-	-	-	-
3a) More interested in participating in the cultural events associated with their own community	Not Applicable	-	Protestants (ES = +0.316)	-
3a) More interested in participating in the cultural events associated with other communities	Not Applicable	-	Protestants (ES = +0.216)	-
4) Less likely to see one another as similar or different in relation to the Catholic/Protestant divide	-	-	-	-
5a) More aware of the wider environment and, in particular, of the need to recycle household waste (empty plastic bottles)	All Children (ES = +0.087)	-	-	Affluent Children (ES = +0.325)
5b) More aware of the wider environment and, in particular, of the need to recycle household waste (empty cereal packets)	-	-	-	-

Within this, it is important to note that the evaluation found no evidence of an effect in relation to other outcomes and some of the effects that were found tended to be associated with particular subgroups of children. There are a number of implications to draw out and consider in relation to these and this will be done below. However, it is also important to note that this is just one evaluative study that focused on only a small number of key outcomes. There may be many other effects that *Sesame Tree* is having on children's awareness, attitudes and behaviour that have simply not been picked up in this one study.

Moreover, in relation to the outcomes that have been focused on here, the evidence is inevitably going to be limited by the quality of the measures used. In this present study some of the measures used have been designed specifically for the study; especially those concerning children's attitudes to the Catholic/Protestant divide in Northern Ireland. There is always the possibility that some of these measures may simply not have been sensitive enough to pick up effects that *Sesame Tree* may have possibly had on the children in these areas.

4.2 Discussion

Overall therefore it is important not to over-interpret the findings of this present evaluation and/or read too much into some of the specific findings. Rather, it is more appropriate to simply draw out a number of key and underlying messages from the evidence as a whole. In this respect, there are perhaps three main messages to arise from this evaluation:

1. This report has provided strong and robust evidence that *Sesame Tree* can have a positive effect on young children's levels of awareness and attitudes, simply through them watching the series. It should be remembered that some of these effects were fairly strong relative to other interventions of this type (with effect sizes ranging typically between 0.2 to 0.4). The fact that these were achieved simply by children watching three short (15 minute) episodes a week for just 10 weeks is noteworthy and extremely encouraging.

2. Beyond this the evidence would appear to indicate that *Sesame Tree* is more effective in relation to some outcomes than others and also for certain subgroups of children compared to others. It is worth stressing again that some of these differential effects may be artefacts of some of the particular methods used and so caution is needed in not reading too much into these particular findings. However, there is sufficient evidence to warrant further investigation into why:

   a. Protestant children may be responding more positively to the television series than Catholic children;
   b. Children from more affluent socio-economic backgrounds tend to be responding more positively than those from more deprived backgrounds; and

    c. Girls tend to be responding more positively to the series than boys (although this was only in relation to one particular outcome and so any gender differences that exist should not be over-emphasised).

3. Finally, there is one specific finding that is worth drawing out and emphasising here as it may reflect a broader issue that deserves further consideration. More specifically, it is interesting to note that while a positive effect was found in relation to the children's increased awareness of the need to recycle an empty plastic bottle, the same was not true in relation to their responses to the other item used – an empty breakfast cereal packet. This is particularly interesting precisely because a plastic bottle was used in *Sesame Tree* to emphasise the point regarding recycling. What this may indicate is the need for *Sesame Tree* to be explicit in terms of its messaging. In this present case it would suggest that in order for the children to be encouraged to generalise the message regarding recycling household waste they need to be shown explicitly a much wider range of items that can be recycled.

Moreover, it is worth exploring whether this point regarding the need to be explicit in relation to messaging may also be applicable more broadly. In relation to the children's responses to the cultural and sporting activities they were shown, the positive effects that were found could well be due to the fact that both Orange Marches and Hurling were featured explicitly in the live action films (LAFs) within episodes of *Sesame Tree*. Whether the children would be able to generalise these effects to showing a greater interest in other cultural activities and events that were not explicitly covered in *Sesame Tree* is debatable.

In addition, it could be hypothesised that one of the reasons for the lack of an effect in relation to children being more willing to include someone from a different racial background to themselves may be due to the fact that issues of exclusion were not covered explicitly in relation to race. While racial diversity was certainly featured in a number of episodes, this may not have been sufficiently direct and explicit to address the specific attitudes that lie behind children's tendency to be less willing to include a child from a different racial background.

Similarly, it could be argued that the lack of an effect in relation to the similarities/differences outcome may have been due to the fact that the photographs used for the measure were of children wearing Celtic and Rangers soccer shirts. While the majority of children of this age will recognise the cultural significance of these shirts, because they were not featured in the television series then this may be the reason why the children's attitudes do not seem to have changed in relation to these.

4.3 Implications

From the above discussion there are a number of key implications worth drawing out for further research and for the subsequent development of future series. More specifically these are:

1. There is a need for further research to ascertain the extent to which *Sesame Tree* is having a differential effect in relation to gender, religion and socio-economic background and some of the reasons for this. It is hoped that the naturalistic study that is currently being undertaken by the present research ream (Report 2) should provide more evidence in this regard. However, some qualitative research that can explore the children's experiences and perspectives in greater depth is likely to provide greater insights into some of the possible reasons for these differential effects.

2. In relation to the possible production of a second series of *Sesame Tree*, there is a need to consider how it might be developed to appeal to and thus engage more directly with Catholic children, children from lower socio-economic backgrounds and boys.

3. Also in relation to the possible production of a second series of *Sesame Tree*, it would be beneficial to undertake some formative research to explore the potential effectiveness of using more explicit messaging around issues of inclusion and exclusion and respecting cultural differences.

Appendix 1: List of Sesame Tree Episodes

Episode	Title	Theme
01	The Bookworms Move House	Different Kinds of Homes
02	Food for Thought	Healthy Eating
03	Booga Granny Hare!	Different People and Different Languages: Communication and Listening
04	The Share Necessities	Sharing
05	Big Hare Day	Special Clothes
06	Finders Keepers	Cleanliness
07	A Present for Claribelle	Reusing
08	CSI Sesame Tree	Honesty is the Best Policy
09	Beezer Broccoli Birthday Cake	Patience
10	Arty Party	Personal Favourites
11	Turn and Turn About	Patience and Sharing
12	Practice Makes Perfect	Doing Your Best and Persisting
13	Potto's Really Rockin' Pocket Shoes	Special Attributes
14	One Wee Minute	Perspectives
15	Hilda's Two Birthdays	Public Holidays and Celebrations
16	Same Difference	Similarities and Differences
17	Potto's Perfect Picnic	Preparedness
18	Sad Hare Blues	Recognising Emotions, Empathy
19	The Goldfish Tree	Different Needs
20	A Very Special Visitor	It's Good to Sing and Dance!

Appendix 2: Calculation of Effect Sizes and Generation of Illustrative Bar Charts

Calculation of Effect Sizes for Model 1

In the statistical models detailed in Appendices 3-7, the main effects of *Sesame Tree* on children in the sample as a whole have been estimated using the main model (Model 1). For such models, where the outcome variable is continuous, the effect size associated with being in the intervention group has simply been calculated by dividing the coefficient relating to the dummy variable 'intervention' by the standard deviation of the pre-test scores for that outcome variable.

In cases where the outcome variable is dichotomous, the odds ratio (Exp[b] for the coefficient associated with the dummy variable 'intervention') can be used as an effect size measure in its own right and has been used in the graphical display of the findings (see below). However, and for the purposes of consistency, an estimate of the effect size was calculated by generating a simple 2x2 contingency table showing the distribution of intervention and control children across the two categories of the post-test binary outcome variable and calculating the effect size, Phi, from this.

Calculation of Effect Sizes for Models 2 to 4

Models 2 to 4 have been used to ascertain the effects of *Sesame Tree* on particular subgroups, defined in terms of gender, religion and socio-economic background respectively. Where an interaction effect was found to be statistically significant (i.e. 'Intervention*Boy', 'Intervention*Protestant' or 'Intervention*Deprivation' respectively), effect sizes for each of the groups were calculated by running the models again but on the respective subsamples (either: boys and girls separately; Protestants and Catholics separately; or children with the highest and lowest third of scores of the multiple deprivation measures respectively). The models would be the same but with the relevant variable (i.e. 'Boy', 'Protestant' or 'Deprivation') and the associated interaction term removed. The effect size associated with being in the intervention group for each subgroup was then simply calculated by dividing the coefficient relating to the dummy variable 'intervention' by the standard deviation of the pre-test scores for that subgroup on the outcome variable.

Graphical Display of Effects

For continuous outcome variables, the bar charts used in the report to graphically display the effects of *Sesame Tree* were calculated as follows. The 'Before' mean scores for each subgroup were calculated by generating a multilevel model on that subgroup of children with the relevant pre-test scores for that outcome forming the dependent variable. The independent variables added to the model were 'Boy',

'Protestant', 'Deprivation', 'Dep_missing' and 'intervention'. However, if the subgroup of children was defined in terms of gender (i.e. being boys or girls) then the independent variable 'Boy' was not included in the model and similarly for religion and deprivation. The resultant model was then used to estimate the average pre-test score for that subgroup of children in the intervention group. More specifically, values of 0.5 were used for the variables 'Boy' and 'Protestant' (to create an estimated average pre-test score based on equal representation of boys and girls and also Protestants and Catholics) and 0 was used for deprivation (given that this variable had been centred around the median, this had the effect of creating an estimated pre-test score based on the average child). Overall, such a procedure gave the average pre-test score for that subgroup of children in the intervention group controlling for gender, religion and deprivation.

The 'After' mean scores used in the bar charts were then calculated simply by adding the relevant coefficient for the dummy 'intervention' variable to the relevant mean pre-test score already calculated for that subgroup as explained above.

For dichotomous outcome variables, the bar charts represented the relative odds of a child in the intervention having a positive outcome compared to the control group at pre-test and then again at post-test. For the pre-test measure, the relative odds were calculated by generating a hierarchical linear model for that particular subgroup of children with the pre-test measure for the outcome variable included as the dependent variable and then the following independent variables added to the model: 'Boy', 'Protestant', 'Deprivation', 'Dep_missing' and 'intervention'. However, and as before, if the subgroup of children was defined in terms of gender (i.e. being boys or girls) then the independent variable 'Boy' was not included in the model and similarly for religion and deprivation. The pre-test odds ratio was then calculated from the coefficient for the dummy 'intervention' variable (simply be calculating Exp[b]).

In relation to the odds ratio for the post-test scores, the model above was amended so that the post-test scores for that outcome measure now became the dependent variable and the pre-test scores were added as an additional independent variable. The post-test odds ratio was then calculated in the same way by taking the exponential of the coefficient for the dummy 'intervention' variable (Exp[b]).

Appendix 3: Statistical Models - General Willingness to be Inclusive of Others Outcome

Table 5. Multilevel Linear Regression Models with the Children's Post-Test Scores Regarding their General Willingness to be Inclusive of Others as the Dependent Variable

Independent Variables	Statistical Model (Standard Errors in Parentheses)			
	Model 1	Model 2	Model 3	Model 4
	Main Effect	Effects of Gender	Effects of Religion	Effects of Deprivation
Intercept	0.883	0.854	0.981	0.863
	(0.157)	(0.157)	(0.152)	(0.155)
Pre-test Score$_{ij}$	0.733	0.732	0.726	0.735
	(0.040)	(0.040)	(0.040)	(0.040)
Intervention$_j$	**0.026^a**	0.201	-0.128	0.069
	(0.063)	(0.076)	(0.064)	(0.059)
Boy$_{ij}$	-0.085	-0.001	-0.085	-0.072
	(0.049)	(0.070)	(0.048)	(0.049)
Protestant$_j$	0.007	0.007	-0.158	-0.009
	(0.065)	(0.063)	(0.067)	(0.058)
Deprivation$_{ij}$	0.004	0.004	0.004	0.007
	(0.002)	(0.002)	(0.001)	(0.002)
Depr_Missing$_{ij}$	0.048	0.060	0.076	0.018
	(0.141)	(0.141)	(0.140)	(0.140)
Intervention*Boy$_{ij}$		**-0.160^b**		
		(0.096)		
Intervention*Protestant$_i$			**0.345^c**	
			(0.095)	
Intervention*Deprivation$_{ij}$				**-0.006^d**
				(0.003)
Ω_u	0.007	0.006	0.000	0.004
	(0.006)	(0.005)	(0.000)	(0.004)
Ω_e	0.202	0.201	0.202	0.202
	(0.015)	(0.015)	(0.015)	(0.015)
-2*loglikelihood	489.833	487.067	479.245	485.021

[a]p=0.687, Chi-Square=0.162, df=1; [b]p=0.094, Chi-Square=2.804, df=1; [c]p<0.001, Chi-Square=13.108, df=1;
[d]p=0.022, Chi-Square=5.243, df=1.

Appendix 4: Statistical Models - Willingness to be Inclusive of those from a Different Racial Background Outcome

Table 6. Multilevel Linear Regression Models with the Children's Post-Test Scores Regarding their Willingness to be Inclusive of those from a Different Racial Background as the Dependent Variable

Independent Variables	Statistical Models (Standard Errors in Parentheses)			
	Model 1	Model 2	Model 3	Model 4
	Main Effect	Effects of Gender	Effects of Religion	Effects of Deprivation
Intercept	0.178	0.183	0.188	0.188
	(0.055)	(0.061)	(0.059)	(0.055)
Pre-test Score$_{ij}$	0.175	0.176	0.177	0.174
	(0.059)	(0.059)	(0.059)	(0.059)
Intervention$_j$	**-0.053**[a]	-0.061	-0.078	-0.072
	(0.056)	(0.078)	(0.079)	(0.059)
Boy$_{ij}$	-0.024	-0.034	-0.023	-0.034
	(0.056)	(0.082)	(0.056)	(0.057)
Protestant$_j$	-0.041	-0.041	-0.066	-0.030
	(0.059)	(0.059)	(0.082)	(0.060)
Deprivation$_{ij}$	-0.002	-0.002	-0.002	-0.004
	(0.002)	(0.002)	(0.002)	(0.002)
Depr_Missing$_{ij}$	-0.364	-0.366	-0.356	-0.359
	(0.167)	(0.167)	(0.168)	(0.167)
Intervention*Boy$_{ij}$		**0.018**[b]		
		(0.114)		
Intervention*Protestant$_i$			**0.056**[c]	
			(0.118)	
Intervention*Deprivation$_{ij}$				**0.003**[d]
				(0.003)
Ω_u	0.000	0.000	0.001	0.000
	(0.000)	(0.000)	(0.004)	(0.000)
Ω_e	0.292	0.292	0.291	0.291
	(0.021)	(0.021)	(0.021)	(0.021)
-2*loglikelihood	618.588	618.563	618.401	617.329

[a]p=0.350, Chi-Square=0.874, df=1; [b]p=0.874, Chi-Square=0.025, df=1; [c]p=0.635, Chi-Square=0.225, df=1;
[d]p=0.261, Chi-Square=1.261, df=1.

Appendix 5: Statistical Models – Interest in Cultural Activities Outcome

Table 7. Multilevel Linear Regression Models with Protestant Children's Post-Test Scores Regarding their Attitudes towards Orange Parades as the Dependent Variable

Independent Variables	Statistical Models (Standard Errors in Parentheses)		
	Model 1	Model 2	Model 3
	Main Effect	Effects of Gender	Effects of Deprivation
Intercept	1.025	0.950	1.020
	(0.246)	(0.252)	(0.245)
Pre-test Score$_{ij}$	0.564	0.562	0.571
	(0.074)	(0.073)	(0.074)
Intervention$_j$	**0.272[a]**	0.430	0.279
	(0.131)	(0.177)	(0.131)
Boy$_{ij}$	0.046	0.242	0.041
	(0.129)	(0.196)	(0.128)
Deprivation$_{ij}$	0.015	0.015	0.010
	(0.004)	(0.004)	(0.005)
Depr_Missing$_{ij}$	-0.644	-0.564	-0.662
	(0.597)	(0.598)	(0.595)
Intervention*Boy$_{ij}$		**-0.339[b]**	
		(0.257)	
Intervention*Deprivation$_{ij}$			**0.011[c]**
			(0.008)
Ω_u	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)
Ω_e	0.689	0.683	0.683
	(0.074)	(0.073)	(0.073)
-2*loglikelihood	431.510	429.780	429.901

[a]$p=0.038$, Chi-Square=4.312, df=1; [b]$p=0.187$, Chi-Square=1.738, df=1; [c]$p=0.204$, Chi-Square=1.616, df=1.

Table 8. Multilevel Linear Regression Models with Catholic Children's Post-Test Scores Regarding their Attitudes towards Orange Parades as the Dependent Variable

Independent Variables	Statistical Models (Standard Errors in Parentheses)		
	Model 1	Model 2	Model 3
	Main Effect	Effects of Gender	Effects of Deprivation
Intercept	1.307	1.282	1.292
	(0.217)	(0.226)	(0.217)
Pre-test Score$_{ij}$	0.520	0.522	0.517
	(0.062)	(0.063)	(0.063)
Intervention$_j$	**0.012**[a]	0.058	0.057
	(0.122)	(0.170)	(0.137)
Boy$_{ij}$	-0.023	0.021	-0.005
	(0.119)	(0.164)	(0.121)
Deprivation$_{ij}$	0.003	0.003	0.006
	(0.003)	(0.003)	(0.005)
Depr_Missing$_{ij}$	-0.045	-0.036	-0.067
	(0.293)	(0.294)	(0.294)
Intervention*Boy$_{ij}$		**-0.093**[b]	
		(0.239)	
Intervention*Deprivation$_{ij}$			**-0.004**[c]
			(0.006)
Ω_u	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)
Ω_e	0.701	0.700	0.699
	(0.068)	(0.068)	(0.068)
-2*loglikelihood	528.740	528.589	528.218

[a]p=0.920, Chi-Square=0.010, df=1; [b]p=0.697, Chi-Square=0.152, df=1; [c]p=0.470, Chi-Square=0.523, df=1.

Table 9. Multilevel Linear Regression Models with Protestant Children's Post-Test Scores Regarding their Attitudes towards Hurling as the Dependent Variable

Independent Variables	Statistical Models (Standard Errors in Parentheses)		
	Model 1	Model 2	Model 3
	Main Effect	Effects of Gender	Effects of Deprivation
Intercept	0.752	0.810	0.752
	(0.191)	(0.199)	(0.192)
Pre-test Score$_{ij}$	0.599	0.599	0.599
	(0.062)	(0.062)	(0.062)
Intervention$_j$	**0.206[a]**	0.093	0.206
	(0.122)	(0.165)	(0.122)
Boy$_{ij}$	0.277	0.136	0.277
	(0.121)	(0.184)	(0.121)
Deprivation$_{ij}$	0.008	0.008	0.009
	(0.004)	(0.004)	(0.005)
Depr_Missing$_{ij}$	0.216	0.159	0.216
	(0.557)	(0.558)	(0.557)
Intervention*Boy$_{ij}$		**0.243[b]**	
		(0.240)	
Intervention*Deprivation$_{ij}$			**-0.000[c]**
			(0.008)
Ω_u	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)
Ω_e	0.596	0.592	0.596
	(0.064)	(0.064)	(0.064)
-2*loglikelihood	403.650	402.626	403.649

[a]$p=0.091$, Chi-Square=2.851, df=1; [b]$p=0.311$, Chi-Square=1.027, df=1; [c]$p=1.000$, Chi-Square=0.000, df=1.

Table 10. Multilevel Linear Regression Models with Catholic Children's Post-Test Scores Regarding their Attitudes towards Hurling as the Dependent Variable

Independent Variables	Statistical Models (Standard Errors in Parentheses)		
	Model 1	Model 2	Model 3
	Main Effect	Effects of Gender	Effects of Deprivation
Intercept	1.006	1.006	0.994
	(0.181)	(0.186)	(0.188)
Pre-test Score$_{ij}$	0.637	0.637	0.639
	(0.056)	(0.056)	(0.056)
Intervention$_j$	**-0.074^a**	-0.074	-0.060
	(0.106)	(0.148)	(0.119)
Boy$_{ij}$	0.209	0.209	0.214
	(0.102)	(0.142)	(0.105)
Deprivation$_{ij}$	-0.001	-0.001	-0.001
	(0.003)	(0.003)	(0.004)
Depr_Missing$_{ij}$	-0.092	-0.092	-0.098
	(0.254)	(0.254)	(0.255)
Intervention*Boy$_{ij}$		**0.000^b**	
		(0.209)	
Intervention*Deprivation$_{ij}$			**-0.000^c**
			(0.005)
Ω_u	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)
Ω_e	0.534	0.534	0.534
	(0.052)	(0.052)	(0.052)
-2*loglikelihood	470.853	470.853	470.790

[a]p=0.486, Chi-Square=0.486, df=1; [b]p=1.000, Chi-Square=0.000, df=1; [c]p=0.802, Chi-Square=0.063, df=1.

Appendix 6: Statistical Models – Similarities and Differences Outcome

Table 11. Multilevel Linear Regression Models with Protestant Children's Post-Test Scores Regarding their Attitudes towards Similarities and Differences as the Dependent Variable

Independent Variables	Statistical Models (Standard Errors in Parentheses)		
	Model 1	Model 2	Model 3
	Main Effect	Effects of Gender	Effects of Deprivation
Intercept	-0.142	-0.065	-0.165
	(0.156)	(0.178)	(0.157)
Pre-test Score$_{ij}$	0.067	0.067	0.070
	(0.073)	(0.073)	(0.073)
Intervention$_j$	**0.188[a]**	0.039	0.176
	(0.184)	(0.250)	(0.183)
Boy$_{ij}$	0.290	0.101	0.302
	(0.181)	(0.280)	(0.181)
Deprivation$_{ij}$	0.004	0.004	0.011
	(0.006)	(0.006)	(0.008)
Depr_Missing$_{ij}$	2.108	2.032	2.130
	(0.833)	(0.836)	(0.829)
Intervention*Boy$_{ij}$		**0.323[b]**	
		(0.364)	
Intervention*Deprivation$_{ij}$			**-0.015[c]**
			(0.012)
Ω_u	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)
Ω_e	1.339	1.333	1.326
	(0.144)	(0.144)	(0.143)
-2*loglikelihood	538.306	537.524	536.700

[a]p=0.306, Chi-Square=1.048, df=1; [b]p=0.376, Chi-Square=0.784, df=1; [c]p=0.204, Chi-Square=1.614, df=1.

Table 12. Multilevel Linear Regression Models with Catholic Children's Post-Test Scores Regarding their Attitudes towards Similarities and Differences as the Dependent Variable

Independent Variables	Statistical Models (Standard Errors in Parentheses)		
	Model 1	Model 2	Model 3
	Main Effect	Effects of Gender	Effects of Deprivation
Intercept	0.019	-0.045	0.079
	(0.223)	(0.230)	(0.248)
Pre-test Score$_{ij}$	0.128	0.127	0.131
	(0.062)	(0.062)	(0.062)
Intervention$_j$	**0.069[a]**	0.227	-0.052
	(0.299)	(0.337)	(0.356)
Boy$_{ij}$	0.075	0.221	0.067
	(0.166)	(0.227)	(0.167)
Deprivation$_{ij}$	-0.005	-0.004	-0.010
	(0.006)	(0.006)	(0.009)
Depr_Missing$_{ij}$	-0.386	-0.357	-0.330
	(0.399)	(0.399)	(0.407)
Intervention*Boy$_{ij}$		**-0.311[a]**	
		(0.330)	
Intervention*Deprivation$_{ij}$			**0.009[c]**
			(0.013)
Ω_u	0.142	0.135	0.170
	(0.094)	(0.091)	(0.107)
Ω_e	1.245	1.242	1.234
	(0.124)	(0.124)	(0.123)
-2*loglikelihood	653.511	652.632	653.035

[a]$p=0.306$, Chi-Square=1.048, df=1; [a]$p=0.347$, Chi-Square=0.886, df=1; [c]$p=0.465$, Chi-Square=0.535, df=1.

Appendix 7: Statistical Models – Recycling Outcome

Table 13. Multilevel Binary Logistic Regression Models with the Children's Post-Test Scores Regarding their Awareness of Recycling Used Plastic Bottles as the Dependent Variable

Independent Variables	Statistical Model (Standard Errors in Parentheses)			
	Model 1	Model 2	Model 3	Model 4
	Main Effect	Effects of Gender	Effects of Religion	Effects of Deprivation
Intercept	0.116	0.054	0.134	0.018
	(0.301)	(0.322)	(0.311)	(0.291)
Pre-test Score$_{ij}$	1.542	1.543	1.545	1.534
	(0.249)	(0.250)	(0.249)	(0.249)
Intervention$_j$	**0.538^a**	0.689	0.475	0.771
	(0.287)	(0.390)	(0.386)	(0.297)
Boy$_{ij}$	-0.262	-0.121	-0.259	-0.174
	(0.255)	(0.351)	(0.255)	(0.257)
Protestant$_j$	-0.117	-0.119	-0.173	-0.173
	(0.295)	(0.298)	(0.379)	(0.286)
Deprivation$_{ij}$	-0.018	-0.017	-0.018	-0.005
	(0.007)	(0.007)	(0.007)	(0.010)
Depr_Missing$_{ij}$	0.444	0.467	0.457	0.350
	(0.740)	(0.739)	(0.743)	(0.746)
Intervention*Boy$_{ij}$		**-0.303^b**		
		(0.515)		
Intervention*Protestant$_i$			**0.141^c**	
			(0.571)	
Intervention*Deprivation$_{ij}$				**-0.026^d**
				(0.013)
Ω_u	0.070	0.077	0.064	0.034
	(0.112)	(0.115)	(0.109)	(0.098)

[a] p=0.060, Chi-Square=3.525, df=1; [b] p=0.556, Chi-Square=0.347, df=1; [c] p=0.805, Chi-Square=0.061, df=1; [d] p=0.048, Chi-Square=3.902, df=1.

Table 14. Multilevel Binary Logistic Regression Models with the Children's Post-Test Scores Regarding their Awareness of Recycling Empty Cereal Packets as the Dependent Variable

Independent Variables	Statistical Model (Standard Errors in Parentheses)			
	Model 1	Model 2	Model 3	Model 4
	Main Effect	Effects of Gender	Effects of Religion	Effects of Deprivation
Intercept	0.974	0.946	0.878	0.983
	(0.426)	(0.453)	(0.460)	(0.433)
Pre-test Score$_{ij}$	1.672	1.676	1.679	1.675
	(0.279)	(0.280)	(0.280)	(0.280)
Intervention$_j$	**0.113^a**	0.168	0.336	0.088
	(0.418)	(0.509)	(0.588)	(0.456)
Boy$_{ij}$	-0.495	-0.436	-0.499	-0.500
	(0.291)	(0.425)	(0.291)	(0.293)
Protestant$_j$	-0.584	-0.582	-0.373	-0.577
	(0.431)	(0.432)	(0.581)	(0.432)
Deprivation$_{ij}$	-0.035	-0.035	-0.036	-0.037
	(0.010)	(0.010)	(0.010)	(0.014)
Depr_Missing$_{ij}$	0.592	0.603	0.562	0.603
	(0.879)	(0.881)	(0.882)	(0.882)
Intervention*Boy$_{ij}$		**-0.112^b**		
		(0.580)		
Intervention*Protestant$_i$			**-0.453^c**	
			(0.837)	
Intervention*Deprivation$_{ij}$				**0.003^d**
				(0.019)
Ω_u	0.420	0.424	0.420	0.418
	(0.260)	(0.261)	(0.260)	(0.260)

[a] $p=0.787$, Chi-Square$=0.073$, df$=1$; [b] $p=0.847$, Chi-Square$=0.037$, df$=1$; [c] $p=0.588$, Chi-Square$=0.293$, df$=1$;
[d] $p=0.890$, Chi-Square$=0.019$, df$=1$.