

Getting the Message: Using Parental Text Messaging to Increase Learner Attendance

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12 March 2017

A minor dissertation submitted in partial fulfilment of the degree of Master of
Commerce Specialising in Economic Development

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Abstract

This paper presents results from a randomised controlled trial in low-income neighbourhoods in Cape Town, South Africa, to test whether parental messages can increase learner attendance at after-school programmes. Parents who were randomly assigned to one of two treatment groups received simple weekly text messages providing them with information about their children's attendance in the previous week. Learners whose parents received text messages attended on average 5.6%-6.1% more after-school sessions than the control group ($p < 0.01$), after controlling for background characteristics and spillover effects. This effect was sustained over the course of the observation period. Structured interviews with parents suggest that those parents who received messages were more likely to engage their children regarding the after-school programme, and were better able to monitor their children's attendance. The intervention cost approximately R1.01 per child per week and has potential for replication. However, good quality data collection systems and regular updates of parent contact information are important for the success of similar interventions. This paper shows that low-cost text messages to poorer parents can increase learners' investment in their education, and shows potential to be scaled up.

Acknowledgements

I would like to thank David and Elaine Potter and RUBEN for their financial support in the completion of this paper. Without you, this project would not have been possible. I would also like to thank Prof. Justine Burns for her potentially misguided but nonetheless constant faith in my abilities, for her endless support and dedication, and for the countless hours she spent poring over drafts. I truly could not have asked for a better supervisor.

Thanks must also go to Amani Tawana for her partnership and tireless support in rolling out the intervention and collecting data, and to the AVA team for their hard work in supporting this. I also owe gratitude to the UCT research team, particularly Sabelosenkosi Ndlovu for the hours and dedication put into the telephone survey: thank you for being a true partner through this process.

Finally, thanks must go to my loved ones, especially Maximilian Weylandt for his emotional support through difficult times and his useful comments on this paper, and Rob and Di Owsley for their constant encouragement and for being the rock in the storm.

Declaration

This research formed part of the Western Cape Government's Behavioural Change Project, a research partnership between the Western Cape Government, specifically the Department of the Premier's Policy Division, and the University of Cape Town. All costs incurred in this intervention were borne by the overall project funding for the Behavioural Change project, and I would like to thank the various parties for their administrative and financial support throughout the process. A summary of intervention costs can be found in the Appendix.

Table of Contents

Abstract.....	ii
Acknowledgements	iii
Declaration	iv
Table of Contents	v
List of Tables	vii
List of Figures.....	viii
Abbreviations	ix
1. Introduction	1
2. The Case for Parental Messaging.....	4
2.1. Why Parents Should Get Involved.....	4
2.2 Parental Engagement: Methodological and Measurement Challenges	7
2.3 If They Don't Bother, Why Should I?	9
2.4. Why Don't Parents Engage?	11
2.4.1. Material Barriers to Parental Engagement	11
2.4.2. Behavioural Barriers to Parental Engagement	13
2.5. Helping Parents.....	14
2.5.1. Nudges for Learning	15
2.5.2. Messaging to Change Behaviour	16
2.5.3. Messaging in Education	17
2.6. Why Messaging?.....	20
3. Intervention.....	20
3.1. Background.....	20
3.2. Intervention Focus	21
3.3. Randomisation	22
3.4. Messages	24
3.4.1. Message Design	25
3.4.2. Treatment 1 and 2.....	25
3.4.3. Behavioural Insights	26
3.4.4. How and When Messages Were Sent	28
4. Data.....	29

4.1. Baseline and Attendance Data	29
4.2. Survey	31
4.3. Focus Group.....	33
5. Analysis and Results	33
5.1. Did Randomisation Work?	33
5.2. Was Implementation Successful?.....	35
5.3. YeBo Attendance	36
5.3.1. Comparison of Means	36
5.3.2. Multivariate Regression	39
5.3.3. Robustness	46
5.3.4. Heterogeneous Effects.....	48
5.3.5. Dynamic Analysis.....	54
5.4. Mechanisms.....	58
5.4.1. Survey Responses	58
5.4.2. Survey Results and Parental Engagement.....	60
5.4.3. Mediation Analysis.....	63
5.5. What Did Parents Say?	68
6. Limitations and Caveats	70
6.1. Spillovers	70
6.2. Survey Selection.....	71
6.3. Different Message Designs	72
6.4. Additional Limitations	73
7. Discussion.....	75
8. Conclusion	80
References.....	80
Appendix 1. Messages	94
Appendix 2. Intervention Timeline and Record of Implementation.....	96
Appendix 3. Message Cost and Procedure.....	99
Appendix 4. Balance Checks.....	100
Appendix 5. Tobit Model Results Censoring at both Zero and One.....	101
Appendix 6. Results after Accounting for Intra-Household Spillovers	104
Appendix 7. Treatment Effect on the Treated	105

Appendix 8. Weekly Treatment Effects: Alternative Outcome Measures	106
Appendix 9. Interview Script and Focus Group Transcript.....	107

List of Tables

Table 1: Treatment 1 vs Treatment 2 Messages	26
Table 2: Summary Statistics Across Experimental Groups	34
Table 3: Attendance Summary by Experimental Group	38
Table 4: : Regression Results for Proportion of Sessions Attended: OLS and Tobit	43
Table 5: Regression Results of Non-Zero Attendance and 65% Attendance Dummy Variables on Treatment Status	45
Table 6: Robustness Check – Continuous Attendance: Random and Fixed effects, and SCLS Correction	48
Table 7: Robustness Check – Non-Zero Attendance and 65% Attendance	48
Table 8: Comparing Means of Attendance Outcomes Across Treatment Conditions and Sub-Groups	50
Table 9: Heterogeneous Effects: OLS and Tobit Estimates with Interactions Terms for Continuous Attendance Variable	52
Table 10: Heterogeneous Effects: Probit Estimates with Interactions Terms for Non-Zero and 65% Attendance Dummy Variables.....	53
Table 11: Weekly Treatment Effects: Difference in Means Compared to Treatment Co- efficients.....	56
Table 12: Impact of Treatment over course of Observation Period: Random Effects Model	57
Table 13: Summary Statistics of Children of Survey Respondents and Non-Respondents....	59
Table 14: Summary of Parent Survey Responses by Treatment Condition	61
Table 15: Mediation Analysis for Proportion of Sessions Attended Outcome: Tobit and OLS Models	66
Table 16: Mediation Analysis for Non-Zero Attendance Outcome: Probit Model	67
Table A. 1: Messages: Both Treatment 1 and Treatment 2.....	94
Table A. 2: Treatment 2 Additional Sentences for Messages	95

Table A. 3: Intervention Timeline and Record of Implementation.....	96
Table A. 4: Message Cost Summary.....	99
Table A. 5: Sample Balance Check: Probit Regression of Treatment Status on Observables	100
Table A. 6. Tobit Model: Censoring Outcome Variable at Zero and One	101
Table A. 7: Heterogeneous Effects: Tobit Model Censoring Outcome Variable at Zero and One with Interaction Terms.....	102
Table A. 8: Mediation Analysis: Tobit Model Censoring Outcome Variable at Zero and at One	103
Table A. 9: Treatment Effects after Removing Intra-Household Spillover Observations ...	104
Table A. 10: Treatment Effect on the Treated: IV Regression of Proportion of Sessions Attended on Message Delivery.....	105
Table A. 11: Weekly Treatment Effects on Non-Zero and 65% Attendance Dummy Outcomes.....	106

List of Figures

Figure 1. Breakdown of Telephone Survey Call Results	32
Figure 2. Message Delivery Details Per Week	35
Figure 3. Mean Proportion of Sessions Attended by Group	37
Figure 4. Distribution of Outcome 1: Proportion of Sessions Attended	40
Figure 5. Weekly Mean Proportion of Sessions Attended by Group	54
Figure 6. Mediation of Treatment Effect on Proportion of Sessions Attended- Tobit Estimate.....	68

Abbreviations

ARV	Antiretroviral
AVA	Action Volunteers Africa
ITT	Intention-to-treat
OLS	Ordinary least squares
RCT	Randomised controlled trial
SES	Socio-economic status
SMS	Short messaging system
STEM	Science, Technology, Engineering and Mathematics
TOT	Treatment effect on the treated
YeBo	Year Beyond Afterschool Programme

1. Introduction

Education is a crucial determinant of individual mobility and lifetime earnings (Heckman, 2000; Psacharopoulos & Patrinos, 2004; Willis, 1986). Those with higher education levels tend to earn more, live longer and report higher levels of life satisfaction (Sweetland, 1996). In South Africa, education has long been considered the lever for groups marginalized under apartheid to raise their labour market returns and thereby reduce the country's stark income inequality (Keswell, 2004). However, in spite of shrinking education attainment gaps between races, white South Africans are still four times more likely to hold a bachelors' degree than black South African (StatsSA, 2011). Moreover, the quality of primary and secondary education remains low for poorer, mostly black South Africans, and lags significantly behind similar countries: South Africa recently ranked 74th and 75th out of 75 countries in the 2015 TIMSS assessment in maths and science respectively (Reddy et al., 2016). Understandably, given the bifurcation of the schooling system¹ and the history of under-resourced poor schools, much of the focus in literature and policy has been on schools themselves (Christie, 2008; Department of Basic Education, 2015). Parents, however, represent a potentially underutilised resource and policy channel for improving South Africa's educational outputs (Smit & Liebenberg, 2003).

The human capital literature treats the decision of whether or not to invest in education as a function of the future returns and current costs of education. (Sweetland, 1996). While children have discretion over a range of these decisions, such as whether to listen to teachers in class, or even whether to attend class or not², parents can participate in the investment decision both by making certain choices for their children and by encouraging children to increase their own education investments (Bursztyn & Coffman, 2012). An extensive international literature supports the claim that parents can play an important role in encouraging children to learn, predominantly by influencing their own preferences for education or by providing incentives to learn.

Yet in reality parents face a number of constraints to effectively engaging their children, most of which are more pronounced for low-income parents. Some of these limitations are material (such as a lack

¹ Former white schools still perform significantly better than schools which cater to poorer South Africans. Notably, there is a sharp difference between schools in the top wealthiest quintile compared to those in the other 4 quintiles (Van der Berg, 2008).

² Several authors show that learners are important decision makers regarding school choices, while some show that learners frequently miss classes without the knowledge of parents, particularly in higher grades when learners have a greater degree of independence (Bursztyn & Coffman, 2012; Hao et al., 2014; Smit & Liebenberg, 2003).

of time) or related to parents' lack of education (such as parent illiteracy), which constrains their capacity to help children with schoolwork and engage in other learning activity. However, low-income parents also face a number of *behavioural barriers* to effectively encouraging their children's education investments. Parents living in material scarcity face multiple 'stressors' that draw on their cognitive resources and consequently limit the attention they can give to their children (Mani et al., 2013). Several authors also show that those with lower income tend to discount the future more, thereby making them undervalue investments such as education (Pabilonia et al., 2009).

Schools and other external parties frequently try to intervene to encourage parental engagement, though they often fail to account for the above limitations (Mayer et al., 2015). In contrast, several studies in the United States show that text messages sent to low-income parents can overcome some of these barriers and ultimately induce increased learner investments, including increased attendance in formal education (Bergman, 2012; Rogers & Feller, 2016). In these studies, regular messages that provided parents with specific, relevant, and actionable information, and those that reduced information asymmetries between parents and children, were the most effective at increasing investments.

Building on this literature, this paper presents the results of a randomised controlled trial to test whether parental text messages can increase learner attendance at an after-school programme in low-income communities in Cape Town, South Africa. This paper adds to the growing literature on parental messaging to improve education, and provides the first robust empirical analysis of a parental messaging intervention in South Africa, and one of the first in a developing country. The paper also provides the first robust empirical analysis of an intervention to increase parental engagement in South Africa.

The text messages provided parents in the treatment group with information on learner attendance from the previous week. These messages were primarily designed to refocus parents' attention on their children's education and to reduce information asymmetries between parents and children regarding after-school attendance. It is hypothesized that parents who are better able to observe their children's attendance can use incentives to encourage attendance more effectively. In addition, half of the treatment group parents received messages with concrete examples of potential future benefits from attending after-school programmes. All messages were designed to be brief, specific and actionable in line with the findings of previous messaging interventions. The results in this paper suggest that

sending messages to inform parents of their child's attendance at the after-school programme increases learner attendance by 5-6% of available sessions ($p < 0.01$), and by 12-13% relative to control group attendance. However, the addition of text highlighting concrete future benefits of after-school programmes did not have any significant effect on learner behaviour. These results are robust to multiple model specifications, although the true impact could be understated due to the presence of spillover effects.

A follow-up structured telephone survey was conducted with parents to identify how the messages altered parent behaviours and attitudes, and to identify the potential mechanisms that produced changes in learner attendance. The results suggest that parents who received text messages were more likely to engage learners about the after-school programme and more likely to accurately observe learner attendance, both of which could have induced higher learner attendance. Given potential endogenous selection in the telephone survey sample, however, this result is difficult to generalise for the full sample.

Overall, message treatment effects were significant across multiple different types of learners and within a sample that is broadly similar to low-income urban schools and neighbourhoods in the Western Cape. Treatment effects also increased and then stabilized over the course of the intervention period. The intervention thus shows potential for further application in education programmes within similar contexts, though self-selection into the YeBo programme limits the generalisability of results for programmes where children are recruited differently. The intervention also shows the potential to be sustainable and is relatively low cost, at R1.01 per learner per week, or R7.98 to produce an incremental session attended for one learner³. However, declining message delivery rates highlight the importance of regularly updating parent contact details.

The remainder of the paper is structured as follows. Section 2 provides a review of the theoretical and empirical literature on parental engagement and the literature on behavioural interventions in education, specifically focusing on parental messaging. This section builds a theoretical foundation for the use of parental messaging to improve learner effort, specifically for interventions with low-income parents.

³ This compares favourably with similar interventions in the US, which cost roughly 10 times as much, or 6 times as much after adjusting for purchasing power parity.

Section 3 explains the experimental design of the messaging intervention and provides some background on the YeBo after-school programme, while Section 4 describes the data sources used to analyse the intervention.

Section 5 then presents the intervention results and analysis. This section first describes the success of the randomisation and implementation of the experiment, and then analyses the treatment effects on attendance, including how this effect changed over the intervention and potential heterogeneous effects. This section also reviews and analyses the survey data so as to identify potential causal channels between the message and increased learner attendance. Finally, the section briefly reviews the qualitative evidence from the survey and the focus group.

Section 6 then presents the limitations of the study. Finally, Section 7 discusses the intervention results, how they relate to the existing literature, and their policy implications, and Section 8 concludes.

2. The Case for Parental Messaging

2.1. Why Parents Should Get Involved

Individuals and society gain from investments in education. On an individual level, education increases earnings capacity and leads to higher labour market returns over a person's lifetime (Card, 1999). On a societal level, these investments can also generate positive externalities that deliver social benefits (Schultz, 1971; Sweetland, 1996). Human capital theory also shows that learning begets learning, stressing the importance of investing in education at earlier ages (Becker, 1975; Cunha & Heckman, 2008).

According to this body of work, the private decision of whether or not to invest in education is a function of its future returns and current costs (Becker, 1975; Ben-Porath, 1967). In some cases, these models are silent about who makes this decision, implicitly assuming that either parents acting altruistically, or children acting rationally, choose to invest in education or not (Becker, 1975). Other models explicitly treat parents acting altruistically in their children's interests as the sole decision-making agents (Cunha & Heckman, 2010). By contrast, several authors propose that children have agency in choosing their level of certain education investments, and see this choice as a non-

cooperative game between parents and children (Becker, 1974; Bursztyn & Coffman, 2012; Hao et al., 2014; Weinberg, 2001). Indeed, research shows that school-age children have discretion over a range of smaller investments, such as completing school assignments and attending class, and in some cases also make more important decisions, such as whether or not to stay in school (Hao et al., 2014). This treatment of the education investment choice has become increasingly popular in the economics literature (Bursztyn & Coffman, 2012; Cunha & Heckman, 2008; Lavecchia et al., 2014).

Given that the returns to education are reaped over the course of a lifetime, the decision to invest requires a complex calculation of the present value of a long sequence of future benefits. In reality, parents and children face constraints to optimizing this decision. Research in behavioural economics shows that people have inconsistent time preferences and face computational limitations to determining future benefits. They therefore systematically undervalue these types of future gains (Frederick et al., 2002; Stanovich et al., 2012). Further studies show that these biases are particularly acute in children (Read & Read, 2004; Stanovich et al., 2012). Children also have less developed executive control functions than adults, and are thus worse at resisting temptation (Atkins et al., 2012; Giedd et al., 2012). People, and particularly children, are therefore likely to underinvest in education. This provides the foundation for education decisions as non-cooperative games between parents and children, as children tend to place a lower value on education than their parents. Under these conditions, parents cannot solely determine investments, though, they can play a role to incentivize and encourage them. Bridgeland et al. (2015), for example, find that most learners who choose to drop out of high school later regret leaving school, and also attribute their decision to a lack of rules and a lack of supervision.

In line with this reasoning, several authors have developed models that treat school-age children's decision to invest in education (whether this is measured as class attendance, staying in school, studying, or other forms of effort) as a function of parental influence⁴ (Becker, 1974, 1991; Bursztyn

⁴ This paper is predominantly interested in how parents can influence learners' investment in education and thus draws a distinction between school-age children and pre-school or early childhood stage children, focusing on parental engagement while children are at school-going age. School-age children have agency in determining several investments, whereas for children in pre-school or at early childhood stage this is limited; they are largely passive. There is a well-established literature that finds that engaged parents that provide specific stimuli and promote a learning-friendly home-environment at early childhood stage have a lasting impact on children's learning capacity and outcomes (Carneiro & Heckman, 2003; Cunha & Heckman, 2008; Cunha et al., 2004; Villena-Roldán et al., 2012)

& Coffman, 2012; Hao et al., 2014). While these models often ignore the intrinsic value certain children may have for school (some children like to learn), they make the reasonable assumption that on average children would choose to apply less than optimal effort due to the reasons discussed above.

Becker (1974) and Hao et al. (2014), for example, model children's decision to drop out of high school as a function of parents' capacity to incentivize school effort (by making future resource transfers conditional on children staying in school⁵) and parents' preferences for their children's education. While these papers present evidence that future resource transfers are an effective strategy for parents and can usefully explain school dropout, the works of several authors imply potential modifications to the model. Firstly, children react more to short-term than to long-term incentives (Ariely & Wertenbroch, 2002; Fryer Jr, 2010; Levitt et al., 2016). Secondly, incentives do not need to be explicitly material: parents can motivate effort through emotional or social rewards, such as exhibiting pride (Cheung & Pomerantz, 2012; Mullainathan & Shafir, 2013). Thirdly, Bursztyn and Coffman (2012) note that parents' ability to observe child effort (in their specific case, school attendance) is not given, and affects parents' capacity to incentivize effort. This follows from the logic that parents and children have different preferences regarding children's effort in education, and children would avoid applying optimal effort if they are not observed (Becker, 1991; Bursztyn & Coffman, 2012). Finally, parents can directly influence learner preferences (within the above framework, this could be conceived as increasing the value children place on education's future benefits or counteracting the short run costs by instilling an intrinsic value for learning) (Cheung & Pomerantz, 2012; Cunha & Heckman, 2008).

The above discussion thus presents a useful framework for the role of parents in school-age children's education investment decisions. Notably, parents can influence children's likelihood to invest (alternatively, their motivation to learn) through two mechanisms: incentivizing effort or influencing children's preferences for education (Cunha & Heckman, 2008). In both cases, parents should have a preference for their children's education, and where parents use incentives these can be material or non-material and parents should observe effort to make these incentives more effective.

Following this framework, the paper now turns to the empirical literature on parental engagement in learning.

⁵ These include either parent offers of a financial transfer after leaving school (a living allowance), or free accommodation at home after leaving school, both of which are conditional on staying in school.

2.2 Parental Engagement: Methodological and Measurement Challenges

Parental engagement is multi-dimensional. Given that parent-child interactions occur continuously within the home and that learning processes are complex, it is inherently difficult to isolate parental engagement's constituent parts and their specific causal links to children's effort and learning outcomes (Fan & Chen, 2001; Gorard et al., 2012). This notwithstanding, there is a dense literature that attempts to classify types of parental engagement and to form operational constructs to this effect (Epstein, 1988, 1995, 2001; Fan & Chen, 2001; Jeynes, 2007). These efforts attempt to identify how different types of parental engagement affect educational outcomes and to make empirical analyses of these specific types more comparable across studies. The specific forms of engagement within the typology are predominantly categorised as follows (Fan & Chen, 2001; Jeynes, 2007):

- Parental aspirations and expectations
- Parenting style and home structure
- Communication and engagement regarding school
- School involvement

In spite of these efforts, the body of literature has not conclusively isolated the most important components of parental engagement. Firstly, the above constructs are applied inconsistently and incompletely across studies (Fan & Chen, 2001; Gorard et al., 2012). A number of papers classify the same components of parental engagement as falling within different constructs. For example, Fan and Chen (2001: p7) review several parental engagement papers that define homework assistance as falling within 'Parenting style and home structure', and other papers that treat it as 'Communication and engagement regarding school'. Furthermore, many authors do not apply the constructs at all, while others find them too indistinct and therefore define their own simpler constructs. For example, Houtenville and Smith Conway (2008) and Green et al. (2007) only distinguish between 'school-based' and 'home-based' engagement. This has led to divergent conclusions for the same constructs across papers: a meta-analysis by Fan and Chen (2001) finds that parental expectations have the strongest

impact on learner outcomes, and that school involvement has the weakest effect; by contrast, Gorard and See (2012), in a comprehensive literature review, draw the opposite conclusion⁶.

In addition to a lack of agreement in the definition and use of constructs, this literature is limited by the difficulty of measuring parental engagement, much of which occurs within the home. Measures almost exclusively rely on survey data from either parent, child or teacher questionnaires or interviews. These measures are thus vulnerable to bias, as the above parties could have an interest in reporting in a certain way. Several papers even find negative or zero correlations between responses from parents, children and teachers in the same samples (Barnard, 2004; Cheung & Pomerantz, 2012; Grolnick & Slowiaczek, 1994; Hill & Craft, 2003; Reynolds, 1992). As different studies often use different sources to measure the same question (eg. Parent interviews or child interviews), and responses are sensitive to specific survey design, it is difficult to compare results across studies.

Moreover, many parental engagement analyses suffer from weak statistical methods, drawing on simple correlations or regression analyses on administrative data, often with only limited controls, to make causal inferences (Avvisati et al., 2014; Gorard & Cook, 2007; Gorard et al., 2012). Gorard and See (2012) find that the majority of the parental engagement literature fails to meet the Bradford Hill requirements⁷ to determine a causal relationship between parental engagement and learner outcomes. According to the authors, only parental involvement in specific school-related activities fulfilled these criteria (as a ‘type’ of parental engagement). In fact, Gorard and See (2012) and Green et al (2007) indicate that there is probably more evidence to support causality running in the other direction: when learners perform better parents become more engaged.

Parental engagement thus appears to be something of a ‘black-box’, with multiple inter-related components that are difficult to identify, no ‘gold-standard’ for its measurement, and the possibility that causality runs in the other direction. This paper consequently uses the term ‘parental engagement’

⁶ Gorard and See (2012) find that parental involvement in schools was the only component of parental behaviours and attitudes for which the literature could identify a causal link with learner outcomes. They found no evidence that parental aspirations improved children’s education.

⁷ The Bradford Hill requirements state that the following conditions need to be met to make a substantiated causal claim from X to Y: X and Y are associated in different studies, with different researchers, using different methods and differing populations; The frequency of association is substantial compared with the frequency of X or Y in isolation; There is exposure to, or experience of, X before the onset of Y in all cases; X can be used to predict the onset of Y; There is a reduction in Y after the removal of X; There is an increase in Y after intervention X to increase Y; And there is a coherent, plausible, workable agreed mechanism for X to influence Y that is consistent with prior knowledge.” (Gorard et al., 2012, p. 21)

to refer to any participation by parents in the educational processes of their children. This follows the broad definition used by Jeynes (2007) and encompasses parents' active efforts – for example, engaging children in homework and other learning activities, communication about school, and involvement in schools – and the less direct ways that parents could impact learning – for example, house rules, parents' manner of engagement and general parenting style.

2.3 If They Don't Bother, Why Should I?

The literature discussed above does poorly at unpacking parental engagement and identifying the specific types of engagement that effect increased education investments. It also suffers from several methodological shortcomings. In spite of these limitations, however, the full body of evidence supports a positive relationship between overall parental engagement and learner effort and outcomes (Barnard, 2004; Connel et al., 1994; Eccles & Harold, 1993; Epstein, 1995, 2001; Fan & Chen, 2001; Grolnick & Slowiaczek, 1994; Harris & Goodall, 2007; Hill & Craft, 2003; Jeynes, 2010, 2012, 2007; Reynolds, 1992)⁸. Several papers also identify this positive relationship using more robust methodologies, such as randomised controlled trials and sophisticated regression techniques (Fan & Chen, 2001; Gorard et al., 2012; Jeynes, 2012).

Kratochwill et al. (2004) conducted a randomised controlled trial where parents were encouraged to be more involved in their children's schoolwork, and observed a significant positive impact on learner in-class behaviour. Learners in the treatment group were less likely to display aggressive behaviour and also had higher teacher-rated academic competence. In another randomised controlled trial, Avvisati et al (2014) find that children of parents who attended 2-3 short information sessions had significantly fewer school absences and were less likely to face sanctions from teachers; some of these findings persisted 18 months after the intervention.

⁸ Eccles & Harold (1993) and Epstein (1995) review qualitative evidence to suggest that parent involvement is vitally important to academic success. Barnard (2004), Connel, Spencer, & Aber (1994), Grolnick & Slowiaczek (1994), Hill & Craft (2003), and Reynolds (1992) all provide quantitative empirical evidence for a positive relationship between different forms of parental engagement and learner outcomes and behaviours. However, these studies are not sufficiently robust to infer causality. Fan & Chen (2001) and Jeynes (2010, 2012, 2007) conduct meta-analyses that each incorporate a high number of empirical studies on parental engagement and find a significant positive relationship between engagement and positive education outcomes across studies. Harris & Goodall (2007) conduct a case study assessment and qualitative review and find that parental engagement is important for children's learning, in particular their motivation to apply effort.

Several methodologically strong⁹ non-experimental studies find similar results. In these studies, panel data analyses that control for a range of parent and household characteristics, as well as previous education outcomes and parent attributes, find that parental behaviour positively explains learning behaviour and non-cognitive skills, which are closely related to children's capacity to learn (Blondal et al., 2009; Cunha & Heckman, 2008, p. 738). The literature thus appears to support a positive relationship between parental engagement and child investments.

Though the literature does not conclusively identify the types of parental engagement that effect improved learner effort and outcomes, there is evidence of *how* parental engagement affects learners' behaviour and outcomes. Cheung and Pomerantz (2012) make a strong case that parental engagement primarily influences child behaviour through its effect on their motivation. This is consistent with the theoretical framework elucidated in Section 2.1: parents affect motivation through shaping preferences and creating incentives. The authors apply structural equation modelling to a four wave panel data set that has fine-grained data on parent engagement, child motivation, child self-regulated learning behaviour, and test scores for all waves. They find strong evidence that 'parent-oriented motivation'¹⁰ represents a distinct form of children's motivation to learn. Parent involvement in wave 1 was associated with children's 'parent-oriented' motivation in wave 2, which was associated with significantly improved self-regulated learning behaviour in wave 3, and improved test scores in wave 4 (controlling for all these variables from previous waves). Furthermore, parent involvement significantly affected children's intrinsic motivation, such as their own personal feelings of guilt for doing poorly and pride for doing well¹¹. This, in turn, led to improved learner behaviour and test scores.

The above results were found for samples in both the United States and China, indicating that this phenomenon could hold across contexts. This robust modelling design provides some of the strongest evidence of a causal relationship between parental engagement and learner behaviour, with child motivation as the mediating channel. An in-depth qualitative analysis of learners in the UK by Harris

⁹ These papers apply regression analysis to panel data and use sophisticated controls for socio-economic and household characteristics, and for outcome variables and parental engagement variables from earlier time-periods. This effectively removes much of the potential endogeneity that could confound results from less sophisticated analyses, including reverse causality by ensuring that parental engagement from previous time periods is used and is thus causally prior to outcome variables.

¹⁰This includes both explicit incentives from parents, but also parent's 'feelings' towards their children's education

¹¹ The authors refer to this as 'introjected' motivation.

and Goodall (2007) supports this, and finds that children were most likely to cite their parents as their strongest source of motivation to learn. As one of the interviewed learners said: “If they’re not bothered, why should I be?” (Harris & Goodall, 2007, p. 46).

2.4. Why Don’t Parents Engage?

The models described in Section 2.1 classify parents’ capacity to alter children’s preferences and use incentives as the means by which parents can affect children’s learning effort. However, these simplified concepts can be unpacked to explain how and why parents engage with their children. For example, parent conceptions of their parental role, and their feelings of self-efficacy in influencing learner behaviour explain parental engagement (Bandura, 1997; Green et al., 2007; Hoover-Dempsey & Sandler, 1995, 1997). Indeed, Green et al. (2007, p. 538) find that self-efficacy was the strongest predictor of parental engagement in learning outside of school. The above factors are also strongly related to socio-economic status (SES). However, socio-economic factors affect parental engagement through a multitude of other channels discussed further below, with a focus on the South African context (Hoover-Dempsey & Sandler, 1997; Lareau, 1989; Lareau & Mcnamara Horvat, 1999).

2.4.1. Material Barriers to Parental Engagement

Parents’ level of education strongly impacts parental engagement. Parents who had negative or limited experiences of education often struggle to engage with children over schoolwork due to limited knowledge of the school environment, curricula, and a lack of confidence in their ability to engage with academic material (Harris & Goodall, 2007; Singh et al., 2004; Vincent & Martin, 2000). In South Africa, this could be particularly pronounced amongst parents of colour. According to Branson et al. (2012) less than 10% of black adults in South Africa have any tertiary education, with far fewer having completed degrees (compared to nearly 40% of white adults). Furthermore, a very high proportion of black adults were educated in under-resourced and low-performing schools either during apartheid or in its immediate aftermath, and thus the number of years of education often belies its poor quality

(Van der Berg, 2007). Singh et al. (2004) find that many poor black parents in their study were illiterate and consequently struggled to engage their children¹².

Poor parents' negative histories of education not only affect their capacity to engage, but could also affect their concept of parental roles. Singh et al (2004) find that a number of these parents saw education as something that 'happens in school', limiting their sense of their role in facilitating learning.

These parents are often also reluctant to engage schools directly. Parents with little education often feel alienated from school cultures and feel hostility and intimidation from school staff who are usually more educated than themselves (Felix et al., 2008; Harris & Goodall, 2007; Singh et al., 2004). In South Africa, this cultural dissonance and power imbalance could be particularly pronounced. Both Singh et al. (2004, p. 301) and Felix et al. (2008) find that teachers at poorer South African schools consistently viewed parents as 'problems', and positioned them as disinterested parties who did not have the capacity to properly engage their children. Parents of children at these same schools indicated that they felt undervalued and intimidated by teachers and schools (Singh et al., 2004).

Following these insights, several authors argue that how parental engagement is conceptualized and encouraged in certain environments can actively contribute to educational inequalities, as it caters considerably more to middle class, and often white families who are more comfortable in schools, have more favourable educational histories, and are more familiar with the language used by teachers (Crozier, 2001; Crozier & Davies, 2007; Mapp et al., 2010; Vincent & Martin, 2000).

Poorer households face further constraints to parental engagement. Family structures in these households tend to be more variable (Blum et al., 2000; Heaton et al., 2014; McLanahan & Sandefur, 1994). Furthermore, these parents are more likely to have multiple children, additional family members to tend to, and are less likely to be stay-at-home parents (Crozier, 2001; Eccles & Harold, 1993; Heaton et al., 2014; Mullainathan & Shafir, 2013). This negatively impacts the home learning environment and limits the amount of time poorer parents have available for each individual child. Singh et al. (2004) find that a number of poor black South African households required children to work to supplement household income or do chores because adults did not have time, both of which diminish their

¹² Eita (2007) finds the same phenomenon for low-income Namibian parents of colour. Namibia has markedly similar racial dynamics to much of South Africa.

capacity to complete homework successfully. These family characteristics explain a large portion of the attainment deficits for learners from poor black South African households (Heaton et al., 2014).

Overall, it thus appears that poorer parents, and specifically parents of colour in South Africa, face significant constraints to effective parental engagement, often related to their own educational histories and other material constraints.

2.4.2. Behavioural Barriers to Parental Engagement

Behavioural science provides some additional explanations for different levels of engagement between parents and their children. Like all people, parents are subject to a range of cognitive biases that impair their ability to make decisions that maximize their lifetime welfare, and in this case, that of their children (Gilovich et al., 2002). For the poor, a number of these biases are more acute. Firstly, the poor tend to display stronger present-bias and discount future benefits more (Lawrance, 1991; Pabilonia et al., 2009). This could mean that effortful learning activities or school engagements, which yield benefits to children in the future, are foregone for activities that provide immediate gains, such as watching TV with children or socializing. For example, Mayer et al. (2015) find that parents with higher time discount rates read less to their children.

Secondly, several authors argue that the poor face a range of stressors that limit their cognition¹³, attentiveness and self-control; all of which are required to patiently engage children and make important choices related to education (Gennetian & Shafir, 2015; Haushofer & Fehr, 2014; Mani et al., 2013). These stressors include financial scarcity, food scarcity, health challenges, dangerous neighbourhoods, and the burden of taking care of many children, and tend to be more concentrated in poor households. These factors negatively affect parents' engagement with children for two reasons: they physically and psychologically exhaust parents¹⁴, limiting their mental capacity to engage, and they focus parents' attention on the sources of stress rather than on their children (Haushofer & Fehr, 2014; Mani et al., 2013). Furthermore, several stressors often influence parents at the same time, and their negative effects become compounded. Singh et al. (2004) find that poor black South African

¹³ This refers to cognitive capacity; the brain's capacity for deliberate mental effort

¹⁴ Physical and mental exhaustion both diminish cognitive capacity, which limits parents' ability to make good choices and engage in tasks that require deliberate thought (Kahneman, 2011). Exhaustion also reduces self-control, limiting parents' ability to resist activities that are more appealing in the short term compared to engaging children in education.

households face a multitude of similar pressures that serve to both tire parents out and distract them from their children's learning needs.

Lastly, parents (and indeed all people) are biased to the status quo, and are thus unlikely to adopt changes in routine even if these could induce more effective engagement with children (Kahneman et al., 1991; York, 2014). Evidence shows that poorer parents with limited attention are especially prone to habitual behaviours rather than trying new ways of doing things (Haushofer & Fehr, 2014).

In spite of (or perhaps because of) these limitations, several authors show that low-income parents often have a strong desire for greater engagement by schools and assistance in how to engage their children about schools (Epstein, 1995; Singh et al., 2004; Smit & Liebenberg, 2003). Harris and Goodall (2007) show that increasing engagement specifically amongst 'hard to reach' parents can yield large benefits. Furthermore, amongst programmes designed to improve parental or teacher engagement, results are often stronger for more vulnerable children (Cohen et al., 2009; Rosenthal & Jacobsen, 1968; Wagner et al., 2002).

2.5. Helping Parents

From the previous section it appears that the capacity for parents to induce child effort and improve learning outcomes, through parental engagement, differs systematically across parents. In light of this, there have been a significant number of interventions to improve parental engagement, predominantly in the United States, which specifically target parents in more vulnerable groups (Eccles & Harold, 1993; Green et al., 2007). While several interventions have successfully increased parental engagement, they have often been costly and the majority have shown minimal measurable impact (Bergman et al., 2015; Gorard et al., 2012; Mayer et al., 2015; Roggman et al., 2008; Wagner et al., 2002)¹⁵. Evidence from South Africa also suggests that schools' efforts to communicate with parents and encourage their

¹⁵ Gorard et al (2012) review a range of programmes to induce parental engagement and find that, though several had a positive impact, the majority either had no effect or the evaluation was poorly designed and thus could not accurately measure an impact. Wagner et al. (2002) show that home visitation programmes to improve parent engagement, which are typically costly as they are time- and labour-intensive (Zaveri et al (2014) estimate they cost \$6500 USD per family per annum), produce modest impacts. Roggman et al. (2008) find that parents tended to attrite from programmes that were time- or administration-intensive, and Bergman et al. (2016) find that home visitation made no additional impact above a parental messaging intervention, but was significantly more costly than messaging.

engagement, such as parent-teacher conferences and posting quarterly grade reports, are ineffective (Lemmer & van Wyk, 2004; Singh et al., 2004).

Many of these interventions fail to account for poorer parents' behavioural limitations. Several provide extensive and often complicated information, are time-demanding, or require extensive adjustments to parental behaviour (Mayer et al., 2015; York, 2014). Thus, as parents have scarce cognitive resources, a bias toward routine, and suffer from present-bias, they are unlikely to absorb information that is not salient, undergo costly changes to habits without reminders and reinforcement, and commit time and resources to programmes for which the benefits are in the future. This is aggravated when programmes impose material or psychological costs on parents (for example, being intimidated by teachers). Programmes to adapt parent behaviour should thus focus on making positive behavioural changes easier.

2.5.1. Nudges for Learning

A range of initiatives have applied behavioural insights to improve educational inputs, with the majority focusing on directly influencing learners (Angrist et al., 2009; Ariely & Wertenbroch, 2002; E. Bettinger & Slonim, 2007; Fryer Jr, 2010; Kremer et al., 2009; Levitt et al., 2016)¹⁶. However, these insights have more recently been applied to target parent behaviour as well (Banerji et al., 2016; Benhassine et al., 2015; Lavecchia et al., 2014; Mayer et al., 2015)¹⁷.

In an experiment to test how simplified information can improve parents' school choice, Hastings and Weinstein (2008) delivered simple fact sheets about alternative schools directly to treatment group parents during the time that parents could choose a new school for their children. They also made the most important information about these schools salient. By contrast, control group parents could access the same and more information via a website, with the most relevant details separated across

¹⁶ Angrist, Lang and Oreopoulos (2009), Fryer Jr (2010) and Kremer, Miguel, & Thornton, 2009 use a range of pecuniary and non-pecuniary incentives to induce children to apply more effort in learning. Levitt et al (2016) use a combination of incentives, changes in reward-time, and different framing of gains and losses and test how children's effort responds to these features. They find that more immediate and non-financial incentives were more successful, as was negative framing. Ariely and Wertenbroch (2002) allowed learners to adjust their own deadlines for work submissions and found that more consistent and tighter deadlines improve performance.

¹⁷ Banerji, Berry, & Shotland (2014) find that simple literacy and education interventions for mothers can impact learner behaviour. Benhassine et al (2015) find that 'labelled cash transfers' to fathers reduced school dropouts in Morocco. Lavecchia, Liu, and Oreopoulos (2014) provide a comprehensive review of behavioural interventions in education, including a number that target parents.

several different web pages¹⁸. By making information more accessible and salient, and delivering it at a time that focused attention on the choice, parents in the experimental condition were significantly more likely to choose higher scoring schools for their children. Similarly, Bettinger et al. (2012) show that reducing information requirements increased the chances that parents completed university financial aid applications for their children, and consequently increased their children's chances of enrolling in university¹⁹.

Moreover, Mayer et al. (2015) used a raft of behavioural nudges to increase the amount of time parents spent reading to their children. This included short reminders to draw attention to the reading activities, social rewards for improved reading, and goal setting with visual displays of achievement relative to goals (these techniques serve to either focus attention on the task or increase the psychological benefit of completing the reading). Parents in the treatment group read to their children twice as much as those in the control group, and parents that had a high rate of time discounting showed a treatment effect three times more than that of 'more patient' parents.

These studies show that behavioural insights can underline simple and effective interventions to improve actions parents take for their children's education. Given the importance of simple and convenient information and the limited cognition many parents face, the use of electronic messaging, particularly text messaging, has recently become a growing area of interest for behavioural interventions in education.

2.5.2. Messaging to Change Behaviour

Simple messages can help tackle behavioural hurdles to parental engagement for several reasons. Firstly, they can provide desired information about school in a simple format (information that is usually sent in long reports or not at all), make the most important details salient, and deliver the information through a channel that is convenient for parents and part of their everyday communication activities²⁰. This allows parents with limited cognition to focus exclusively on the most relevant information without altering their routine. Secondly, reminder messages can refocus attention to a specific task that may have been neglected, such as engaging children, and can also focus attention

¹⁸ Treatment group parents received a simple table of test scores and other statistics of neighbouring schools specifically at the time that parents had the opportunity to select alternative schools to enroll their children.

¹⁹ Parents were provided with application forms with pre-filled information and were assisted in completing the remaining fields. Treatment group families had significantly higher application completion and university enrollment rates.

²⁰ For example, text messages on cell phones. This is discussed in greater detail below.

on the future outcomes of present actions (Dean Karlan, Margaret McConnell, Sendhil Mullainathan, 2013; Mayer et al., 2015). This provides both a counter to limited cognition and present-bias. Thirdly, if messages provide simple tasks or easy-to-understand actions, they can limit the psychological cost of engaging in an activity that benefits their children – they provide a pathway to action (Richburg-Hayes et al., 2014). Finally, message reminders are most effective when the action they intend to induce is already desired by the recipient (Dean Karlan, Margaret McConnell, Sendhil Mullainathan, 2013; Richburg-Hayes et al., 2014). It is reasonable to assume that in most cases parents have a desire to improve their children’s education (Hao et al., 2014). Given that these messages can be received in the home, they can be actioned by recipients almost immediately, and have the potential to influence home engagement without significantly altering routines.

Messaging has been used to adapt behaviour in the health sector for several years (Barclay, 2009; Lau et al., 2014; Lester et al., 2010; Lim et al., 2008; Pop-Eleches et al., 2011; Vervloet et al., 2012). Health-related behaviour faces similar limitations to education behaviour, where investments yield benefits in the future and where adherence requires attentiveness and up-front costs. The potential of messaging is greatest for medication adherence, where attentiveness is regularly required and where physical barriers to compliance are low – thus simply refocusing attention could significantly improve adherence. Similarly to education, those with lower income tend to face the biggest behavioural challenges to drug adherence (Mullainathan & Shafir, 2013). Text message reminders have made marked improvements in anti-retro viral (ARV) treatment adherence (Lester et al., 2010; Pop-Eleches et al., 2011), while preliminary results show similar improvements in tuberculosis drug compliance (Barclay, 2009). Vervloet et al. (2012) find that of all reminder systems, text messages were the most effective for both drug compliance and attending scheduled appointments. Evidence shows that text message reminders can also induce more time consuming and active investments, such as gym attendance (Calzolari & Nardotto, 2011) and financial savings (Karlan et al., 2010).

2.5.3. Messaging in Education

Text messages have only recently been applied to change education-related behaviour, including both learner behaviour (Castleman & Page, 2015) and parent behaviour. Harackiewicz et al. (2012) used email communication twice over the course of a year to inform parents about the opportunities for their children in science, technology and mathematics (STEM) education, and consequently improved

learner uptake in these subjects in tertiary institutions. This intervention, however, failed to apply a number of specific behavioural elements (information access was less simple and treatment was irregular), and focused specifically on higher income families where behavioural limitations could be less pronounced²¹. By contrast, York and Loeb (2014) used text messages three times per week to improve literacy practices of low-income parents. Messages first prompted parents to engage their children in a simple learning task, then provided a short, simple and highly specific tip for this task, and then reminded parents to employ the tip. This project thus made engagement easy by providing a simple actionable task, was concise in its delivery, ensuring parents could easily acquire the information, and also provided reminders to focus parents' attention to the task. This project showed significant improvements in parent engagement at home (0.22 to 0.34 standard deviations), and in children's language use (0.21 to 0.34 standard deviations). These two projects illustrate the fairly wide range of behaviours and outcomes that parental messaging can target through different information types and intensities.

In addition to these studies, several interventions specifically target parental engagement regarding school activities, notably to improve learner attendance and performance at school. These studies use a range of modes to communicate with parents, such as emails, text messages and phone calls. Kraft and Dougherty (2013) used daily phone calls and text messages to inform parents of their children's behaviour and performance, upcoming assignments, and tips on what their children could improve in school. The intervention produced significant improvements in in-class behaviour, though the paper has several methodological weaknesses²²

Several authors, however, show that simple and less intensive messages can produce similar effects on learner effort and outcomes. One-line weekly messages from teachers to parents, where teachers

²¹ The emails were sent only twice and several months apart and provided both brochures and a link to a website. The irregularity of the messages and the fact that parents had to navigate a large amount of information, and also to another web page, could have made the intervention less effective than if it delivered information that required less cognitive effort to access and served a reminder function as well (Richburg-Hayes et al., 2014). That the intervention was conducted with predominantly higher income households learners could explain the intervention's success in spite of these limitations, as these parents likely had less strain on their cognitive resources and more ready access to computers.

The observation period was exceedingly short, only one week as in the second week treatment was provided to the control group. Furthermore, the component of treatment that was most effective was difficult to disentangle given that both phonecalls and SMS were used and teachers were given scope as to what to include in this communication. This notwithstanding, the intervention produced significant treatment effects on learner behaviour. Given the short treatment and measurement period, and the cost- and labour-intensity of the project, however, the project's sustainability should be questioned.

conveyed either encouraging information or something that required improvement, significantly reduced dropouts at a summer school programme (Kraft & Rogers, 2015). Furthermore, regular messages that provided parents with specific information about their children's school effort, such as grades and attendance details, increased class attendance amongst high school learners (Bergman, 2015; Rogers & Feller, 2016) and led to significant improvements in a range of other behavioural and school effort indicators (Bergman, 2015).

Consistent with behavioural science theory, the messages in these interventions that were more 'actionable' and specific were more effective in changing learner effort and outcomes than those that were more encouraging and general (Bergman, 2015; Kraft & Rogers, 2015; York, 2014). Furthermore, a number of interventions found that messages influenced the nature of engagement between parents and children, and that this in turn produced an impact on learners' behaviour (Kraft & Dougherty, 2013; Kraft & Rogers, 2015). In these cases, interactions between parents and children became more focused on school and the school's specific requirements of learners. In most cases, messages also reduced information asymmetries between parents and children, and this strongly explained the message's impact on learner behaviour (Bergman, 2012; Rogers & Feller, 2016; Bergman et al., 2016). Parents who received messages were more likely to know when learners failed to complete assignments or did not attend class and were thereby more capable of incentivizing these investments.

These interventions thus not only provided salient and simple information, redirecting parent attention to their children's education, but also allowed parents to better observe their children's effort. Indeed, Kraft and Dougherty (2013: p.26) note that parents indicated the communication provided them 'leverage' in their interactions with their children. This supports the literature discussed in Section 2.1, which argues that learner effort is positively related to parents' capacity to observe this effort. Burzstyn and Coffman (2012) are instructive here; they found that parents in Brazilian 'favelas' (very low income neighbourhoods) had difficulty in both monitoring their children's school attendance and in incentivizing such attendance. On average, parents were willing to forego up to 30% of their monthly income for an external device to commit their children to attend school, and nearly this much for a simple text message informing them of their child's attendance (Bursztyn & Coffman, 2012).

In summary, behavioural interventions, and specifically parental messaging, can improve learner effort in schools. Simple messages, and those that convey salient information that specifically assists parents in observing learner effort, appear to have the largest impact on learning behaviour.

2.6. Why Messaging?

The above theoretical and empirical literature inform the approach in this paper. Children are unlikely to invest sufficiently in their own education, and parents can play an important role in motivating their learning effort. The empirical literature on parental engagement supports this claim, but does not provide much insight as to what the most effective types of engagement are. Evidence suggests, however, that parents directly (through explicit incentives and parent attitudes) and indirectly (through children internalizing certain attitudes) affect children's motivation to learn (Becker, 1974; Cheung & Pomerantz, 2012).

Poorer parents tend to face a range of barriers to effective engagement, which are often related to their own limited educational histories and also to limited time and material resources. However, these parents also face additional behavioural constraints. The range of stressors that accompany material scarcity, stronger time discount rates, and other limitations on their cognition, mean that poor parents are often less likely to effectively engage their children in learning activities. Programmes to improve engagement, often initiated by schools, frequently fail to account for these limitations. Parental messaging, however, offers an opportunity to overcome some of these obstacles. Messages can concisely convey salient information and refocus parent's attention to their children without requiring parents to leave their home. Furthermore, messages can improve parents' capacity to observe their children's effort away from home. Through both mechanisms, messages can help parents induce children to invest more in their education.

3. Intervention

3.1. Background

The messaging intervention was conducted on learners attending the Year Beyond (YeBo) after-school programme. The YeBo programme is a government after-school initiative designed to improve

learners' afterschool opportunities and contribute to numeracy and literacy development. At the time of the intervention, YeBo was offered in 22 schools across the Western Cape metropolitan area (Cape Town) in South Africa, including primary schools and high schools, and was implemented by different non-government operating partners in different schools, with some partners operating in multiple schools. YeBo began in 2015 as the academic pillar of a sports after-school initiative – the 'MOD' programme – and thus follows the MOD mandate to support more vulnerable schools (Western Cape Department of Cultural Affairs and Sport, 2013; Western Cape Government, 2016b). As a result, YeBo centres typically operate in lower income areas, often characterized by high crime rates and poorer schooling outcomes.

The programme recruits learners in Grades 1-5 in primary schools and Grades 8-10 in high schools through voluntary enrolment, with a limit of 100 learners per school²³. Learners obtain written consent from parents in order to participate and are mandated to attend at least 65% of sessions or face exclusion. In practice, however, mandatory attendance is not enforced and over the 3-month period for which baseline data was recorded (beginning of April until the end of June 2016), the average attendance rate was 50% and no learners were excluded from the programme. YeBo sessions run for two hours in the afternoons after school, three times a week, and learners attend different time slots between 14h00 and 18h00 on different days depending which grade they are in. The sessions are run by trained volunteers and provide structured e-learning curricula for both mathematics and reading subjects, but also some unstructured time where volunteers and facilitators help learners with homework.

3.2. Intervention Focus

The theoretical and empirical review in Section 2 suggests that parents can play an important role in inducing their children's learning effort, and that parental messaging can influence parents' effectiveness in this role. This paper investigates this proposition in relation to learner attendance (as a measure of learner effort) at the YeBo after-school programme.

The primary question this paper seeks to address is:

²³ In practice this cap is loosely enforced.

Can parental messages induce higher learner attendance at after-school programmes?

The previous section also proposed potential mechanisms through which the messages could positively influence attendance:

- *Parental messages remind inattentive parents to engage their children in learning. Thereby, messages can refocus parents' attention to their children's learning and increase the level of parental engagement.*
- *Parental messages can specifically focus parents' attention on the future benefits of education, and can thereby increase the level of parental engagement.*
- *Parental messages allow parents to better observe their children's learning effort, and thereby improve their capacity to motivate this effort.*

This paper also investigates these proposed channels. As discussed in the previous section, parental engagement is complex and there is no conclusive evidence of which behaviours are most effective at inducing learner behaviour. It is also difficult to measure. 'Parental engagement' in this paper thus refers to the full gamut of parent behaviours and attitudes related to their children's education; this paper makes no ex-ante claims on which forms are most malleable or most effective in inducing learner effort.

Furthermore, Section 2 suggests that parental messages have the greatest potential for a positive impact in low-income settings. For poorer parents, cognitive and material scarcity interact to create barriers to effective parental engagement. Simple text messages could improve engagement in spite of these barriers, in ways that many existing interventions cannot. This study thus targets low-income groups.

The following sub-sections provide details on the parental messaging intervention and how it is used to test the primary question of interest.

3.3. Randomisation

The text messaging intervention was implemented at 18 of the 22 YeBo schools; specifically the YeBo centres run by Action Volunteers Africa (AVA), one of the project's implementing organisations.

These schools were chosen because AVA operated in all but 4 YeBo schools²⁴, and the logistical costs and implementation risks were substantially reduced by partnering with only one implementing organisation²⁵. Furthermore, operating exclusively in AVA schools allowed greater consistency in attendance data records as all facilitators recorded attendance in the same template, were trained according to the same procedures, and were monitored by the same supervisors. This sample provides a useful degree of variation in terms of baseline attendance, demographics, and split between high school and primary school – 10 primary schools and 8 high schools²⁶. These schools are also roughly representative of demographics in lower-middle income and low income areas in the Cape Town metropolitan area, as reflected by 2011 census data (StatsSA, 2012)²⁷.

To assess the impact of parental messaging on after-school attendance, a multiple treatment arm randomised controlled trial was conducted. The final sample consisted of all YeBo learners in these schools who were registered between the 1st of April 2016 and 1st of June, 2016 (at least one month before the intervention), and for whom there were valid contact numbers. This ensured that there was reliable baseline attendance data for each learner. Thus, the final sample included 1107 learners from 1083 households across the 18 schools²⁸.

Learners in the final sample were randomly assigned to either one of two treatment conditions or to a control group. The sample was split between control, treatment 1, and treatment 2 at a ratio of 4: 3: 3 respectively. This ratio optimized the power to determine both an overall treatment effect (both

²⁴ Non-AVA schools were largely similar to AVA schools in terms of school quality, racial demographics, and neighbourhood characteristics. In both cases the significant majority were 'No Fee' schools (all 4 non-AVA schools and 14 out of the 18 AVA schools; no school fees are required at these schools, an indicator that schools are in lower-income neighbourhoods), all learners for both groups were either black or coloured, and average standardised test results were not statistically different across groups (Primary School: Maths Results $p=0.15$, Language Results $p=0.27$; High School: only 1 non-AVA school, no statistical test).

²⁵ This included reduced channels of communication between project organisers and implementing partners, and therefore less opportunity for miscommunication. There were also fewer demands for data sourcing and manipulation as data for different schools were collected at the same source and recorded according to the same conventions.

²⁶ See Table 2 in Section 5.1 for the sample composition according to these characteristics.

²⁷ The sample includes a slightly higher proportion of isiXhosa speakers compared with the demographics of lower-middle and low-income households in the Cape Town metropolitan area. 56% of the sample registered isiXhosa as their primary language compared with 42% of those living in Cape Town and earning less than R76801 in 2011 (the upper bound of the bottom six income categories according to the South African 2011 census). However, the racial identities of the significant majority of both the sample and the demographics of this lower income group in Cape Town were either black or coloured (StatsSA, 2012).

²⁸ In the baseline period 1689 learners registered at the 18 centres, 1363 of whom provided contact details, most at the start of April. All 1363 numbers were sent a text message welcoming them to the programme at the beginning of the period, in order to test if the numbers were still valid: many had not been tested. Of the 1363 numbers, 1107 successfully delivered. This comprised the final sample.

treatments compared to control) and separate treatment effects between each treatment condition (treatment 1 compared to treatment 2) (Duflo et al., 2006). During randomisation, the sample was stratified by school, grade, and baseline attendance, and the groups were checked for balance across a range of observed baseline criteria, including race, gender, baseline test score (for those for which there is data), grade, and age.

Randomisation occurred at the learner level for several reasons. Firstly, there were only 18 schools in the sample, meaning that school-level randomisation would have significantly reduced the statistical power to ascertain treatment effects (Duflo et al., 2008). Schools are highly distinct units, and thus school-level errors could have had a major impact on results given the small number of schools in the sample. Secondly, the number of programme attendees were highly variable across grades and schools, making school-grade an inappropriate randomisation unit. Furthermore, randomising at the individual rather than the household, school, or school-grade level allowed for the measurement of intra-household spillover effects, as in some cases both treatment and control group children were from the same household²⁹. Randomisation at the individual level, however, also created the potential for intra-school spillover effects; this could mitigate measurable treatment effects. As discussed in Section 2.1, the message treatment is hypothesized to predominantly influence attendance through parent-learner engagement, and thus the primary impact should be independent of intra-school spillovers. This notwithstanding, the possibility that parents in the treatment group interacted with control group parents, or that treatment group learners influenced their peers, cannot be excluded. For considerations of statistical power and validity, however, randomisation at the individual level was ultimately preferred³⁰.

[3.4. Messages](#)

The intervention ran for 10-weeks, from July 25th until September 30th 2016. Each treatment group received a simple message once per week, while the control group received nothing.

²⁹ The final number of true control learners living with treatment group learners was 18. This effectively limited this paper's ability to measure spillover effects.

³⁰ See Section 5.1 for results of randomization.

3.4.1. Message Design

Messages were translated into Afrikaans or isXhosa, depending on which home language parents' recorded at baseline, and back-translated to ensure the quality of the translation. The message design drew from similar experiments in the United States (discussed in Section 2.5.3), which found that messages prescribing a simple mode of action (Rogers & Kraft, 2015; York & Loeb, 2014) and those providing specific and salient information (such as grades and specific attendance information) were more effective at inducing behavioural change than positive, encouraging or vague messages (Rogers, 2016; Rogers & Kraft, 2015; Bergman, 2012; Bergman, 2015). Treatment messages in this intervention were thus brief, focused on the number of days that learners attended in the previous week, and requested that parents encourage learners to attend in the present week. The messages thus provided salient and specific information (focusing on attendance details) with an actionable component (call to encourage learners). Messages were slightly adapted depending on the number of sessions learners attended in the previous week³¹.

3.4.2. Treatment 1 and 2

Both treatment conditions included attendance information and elicited parents to encourage learners to attend. They were thus designed to both refocus parents' attention to their children's education and to reduce information asymmetries regarding attendance. The treatment 2 group received an additional short sentence that identified a specific long-run benefit from attending the programme³². A different additional benefit was described each week and each sentence was kept brief so as to preserve the salience of attendance information (see Table 1 for a comparison of the same message between treatment groups; the additional sentence is in red font). Treatment 1 and treatment 2 can thus also be referred to as the 'information' and 'information plus investment value' treatments respectively.

³¹ See Tables A1 and A2 in Appendix 1 for details on all messages, and Section 6.3 for a discussion of the limitations of the message adaptations.

³² These benefits are drawn from findings in the literature on the impacts of afterschool programmes, predominantly that learners who attend after-school programmes are on average better emotionally adjusted, show improved learning behaviour, attend class more often, and in some cases achieve better academic outcomes (B. M. Miller, 2003; Posner & Vandell, 1999). See Table A2 in Appendix 1 for the full list of additional sentences.

Table 1: Treatment 1 vs Treatment 2 Messages

	Treatment 1	Treatment 2
Attended Sessions in Previous Week 1/2	Dear Parent/Guardian of Trevor, Trevor attended 1 out of 2 YeBo sessions last week. Please encourage him to attend all sessions this week! We appreciate your help	Dear Parent/Guardian of Trevor, Trevor attended 1 out of 2 YeBo sessions last week. Children who do better at school are more likely to get a good job in future. Please encourage him to attend all sessions this week! We appreciate your help

Note: Treatment 2 additional sentence highlighted in red. Messages otherwise identical.

In addition to redirecting parents’ attention and reducing information asymmetries, this treatment was designed to focus attention on the concrete long-run benefits of education, and thereby reduce the negative effect of inconsistent time-preferencing on parental engagement.

3.4.3. Behavioural Insights

As alluded to in Section 2.5.2, and consistent with the behavioural economics literature, the message design focuses on framing, which is considered important for inducing behavioural change. This subsection elucidates the specific behavioural insights applied in the messages. In most cases, these features were included in both treatment 1 and treatment 2 messages and are thus not separately tested (the exception is targeting time-preferencing, which is distinct to treatment 2 and specifically tested). Rather, these features were applied to increase the likelihood that parents focused on message content and acted on this information.

Social norms:

Messages were addressed in the first-person and personalized in order to create a sense that the message came from a real and interested person and thus created a form of social pressure or expectation – using parents’ home language should have helped invoke an ‘in-group’ social pressure. That numerous parents responded in the first person suggests this design component was received as intended³³. The messages also suggested an expectation that learners come to ‘all 3’ sessions – which invokes a norm of high attendance. There is an extensive literature that shows that people’s behaviour

³³ Multiple parents responded to the treatment text messages, in all cases addressing the ‘sender’ in the first person. Most messages were ‘warm’ and friendly in tone, and provided thanks.

is very sensitive to and tends towards social norms (Camerer, Loewenstein, & Rabin, 2004; Cialdini & Goldstein, 2004; Akerlof & Kranton, 2010).

Saliency:

The primary information, the number of days attended in the previous week, was the first item in every message and was in number form (for the majority of message designs); the contrast of numbers to words is also more likely to stand out in the message (Kahneman, 2011). The messages were also short, further focusing attention to the attendance information. Given low income parents' often limited capacity for information absorption (Mullainathan & Shafir, 2013), and evidence from previous parental engagement studies (Bergman et al., 2015; Fryer Jr, 2010), saliency is important for effective communication.

Loss aversion:

In messages sent to parents of learners who did not attend any sessions in the previous week, the message focused on the opportunities that were missed rather than what could be gained from attending. This harnesses the tendency of people to place more value on losing something rather than gaining an equivalent item, commonly known as 'loss aversion' (Kahneman & Tversky, 1979; Tversky & Kahneman, 1991)

Efficacy and Channelling:

Messages were intended to provide relatively actionable information. This was done by providing information to make parents more effective at monitoring attendance, but also suggesting a simple action (encouraging attendance) and in some messages providing information on the specific days that learners need to attend. This is what several authors call 'channelling': removing small obstacles to parental engagement (Richburg-Hayes et al., 2014; York, 2014). The messages also reinforce parents' efficacy in increasing their children's attendance. The literature on parental engagement emphasizes the importance of parents' feelings of efficacy for their children's learning outcomes (Harris & Goodall, 2007).

Time preferencing (Treatment 2 Only):

Education is seen as an 'investment good', with significant future payoffs and short-run costs. As discussed in Section 2.4.2, people, especially those in low-income settings (which constitutes most

participants in this intervention), often significantly discount the future and face multiple temptations that reduce investments in education. In treatment 2, the intervention used concrete and relatable examples of future benefits to specifically focus attention to the returns to education. Karlan et al. (2013) find that using concrete and relatable goals in reminder messages make them more effective at inducing investment behaviour.

3.4.4. How and When Messages Were Sent

Treatment messages were scheduled to be sent weekly, between 18h30 and 20h00 every Monday over the 10-week intervention period. This allowed parents to use information from the week directly before to encourage attendance from the start of the new week. Furthermore, sending messages at this time increased the likelihood that parents would be with children when receiving the message. Evidence from experiments in both parental messaging and in other fields suggest that weekly reminders are an effective frequency and have the capacity to induce habit formation as people tend to structure their lives according to a weekly schedule (Bergman et al., 2015; Calzolari & Nardotto, 2011; Sunstein & Thaler, 2008; Vervloet et al., 2012). Kraft and Dougherty (2015), for example, also find that parents became increasingly less receptive to daily communication. Daily messaging also bears negative cost and scalability implications.

All treatment messages were sent by SMS directly to learners' primary contact number. Messages were sent to the same number every week in spite of whether they delivered or not; they were only discontinued if parents expressly requested that they not be sent³⁴. Similar parental messaging interventions in the United States use a range of communication methods to deliver messages to parents, including SMS, email and telephone calls. A number of these studies find that SMS was the most favoured mode of message delivery as per users stated preference (Bergman, 2012; Bergman, 2015)³⁵ and in terms of successful message delivery (York & Loeb, 2014; Rogers & Kraft, 2015)³⁶.

In South Africa, SMS is used three times more than email, and the ratio is far greater for non-business communication and for low-income groups (MMA, 2016). This is largely owing to the roughly 30% computer internet penetration rate (MMA, 2016). By contrast, mobile penetration is at nearly 140%

³⁴ For a discussion of attrition, please see section 6.4

³⁵ Bergman (2012) found that 79% of parents sought text messages as the primary mode for schools to communicate with them, compared with only 13% of emails and 8% for calls.

³⁶ Kraft and Rogers (2015) find that 95% of messages in their intervention delivered compared with a 55% successful phone call pick-up rate.

and 96% of the working population own a cell phone (Techsmart, 2016). SMS reminders are also regularly used in South African banking services (Aker & Mbiti, 2010; MMA, 2016) and health services (Barclay, 2009; Lau et al., 2014; Mukund Bahadur & Murray, 2010). Reminders for anti-retroviral treatment, in particular, have yielded significant improvements in patient behaviours and improved investments in health (Mukund Bahadur & Murray, 2010). This evidence and the discussion in Section 2 of the benefits of SMS for overcoming behavioural barriers underscore the potential and appropriateness of using SMS in this intervention. SMS is also highly cost-effective (See Table A4 in Appendix 3 for details on the SMS procedure and costs).

4. Data

The primary data used in the analysis came from three different sources: baseline and attendance data from AVA, survey data from a telephone interview, and qualitative data from a focus group session with AVA facilitators.

4.1. Baseline and Attendance Data

Baseline data was acquired from AVA's administrative data. This included: attendance data for the 3 months prior to the intervention, scores from a baseline numeracy and literacy test (only for 545 out of the 1107 learners³⁷), and personal learner data on race, gender, age, home language, parent contact number, unique school id, grade and school. The age variable was imputed for 25 learners, however, the variables used in the imputation accounted for 95% of the variation in age, suggesting imputation was reliable. The data included full records for all other baseline variables except test scores.

Ongoing attendance data was acquired from AVA over the course of the intervention, which YeBo facilitators input on an online platform every Friday or Monday. This data was used in the treatment messages (informing parents of their child's attendance) and was thus acquired every Monday afternoon for attendance for the previous week.

³⁷ The remaining 562 learners did not complete the test as it was either conducted before they registered for the programme or on a day for which they were absent from YeBo.

Learner attendance over the observation period, ‘end line’ attendance, is the primary outcome of interest in this paper³⁸. There are three primary outcome variables used to measure end line attendance, and they are as follows:

Outcome 1: Proportion of Sessions Attended

The first outcome is a continuous variable measuring the proportion of scheduled sessions over the observation period that a learner attended. This variable is constructed by adding the number of sessions learners were present at YeBo over the observation period (from July 26th until September 23rd) and dividing this by the number of sessions they were scheduled to attend. The final week of the period was omitted as 16 of the 18 YeBo centres cancelled sessions for this week. In total, 86 learners attended more than their scheduled sessions and these learners had proportional attendance of greater than 1³⁹.

Outcome 2: Non-Zero Attendance

The second outcome is a dummy variable for whether or not a learner attended any sessions during the observation period. This variable equals one if a learner attended one or more sessions over the 9-week period, and zero if they attended no sessions.

Outcome 3: 65% Attendance

The third and final outcome is a dummy variable for whether or not a learner attended the government-mandated 65% of sessions (which is not enforced in practice). This variable equals one if a learner attended 65% or more of the scheduled sessions over the 9-week period, and zero if they attended less.

³⁸ Though messaging was targeted at YeBo attendance, an interesting outcome could have been school attendance, which may also be affected by both messaging and YeBo attendance. Unfortunately, the schools in this sample did not collect reliable attendance data over this period and so this could not be tested.

³⁹ The variable is thus continuously distributed between 0 and 1.7. (Figure 4 in Section 5.3.2 displays this distribution). Given that all government metrics and attendance objectives work with attendance as a fraction of scheduled sessions, it was considered useful to maintain this basing.

4.2. Survey

In the final week of the observation period, a structured telephone interview with parents was scheduled to gather data on parental behaviours and parents' attitudes towards their children, YeBo, and the intervention message. This data was intended to provide insights into the mechanisms through which the messages affected learner attendance.

The interview questions focused on several features of parental engagement. The specific focal points were as follows:

- Frequency of Parent-child engagement regarding YeBo
- Nature of this engagement and content of discussion
- Whether parents create clear incentives for children regarding their attendance or behaviour.
- Perceptions of the value of YeBo and YeBo attendance.
- Perceptions of parents' role and efficacy in reducing absenteeism.
- Parent and Learner expectations of learner achievement and perceptions of learner potential.
- Parents' awareness of learner attendance and thus their capacity to monitor attendance.

The interviews were also designed to gather information on message delivery and parent's perceptions of the message.

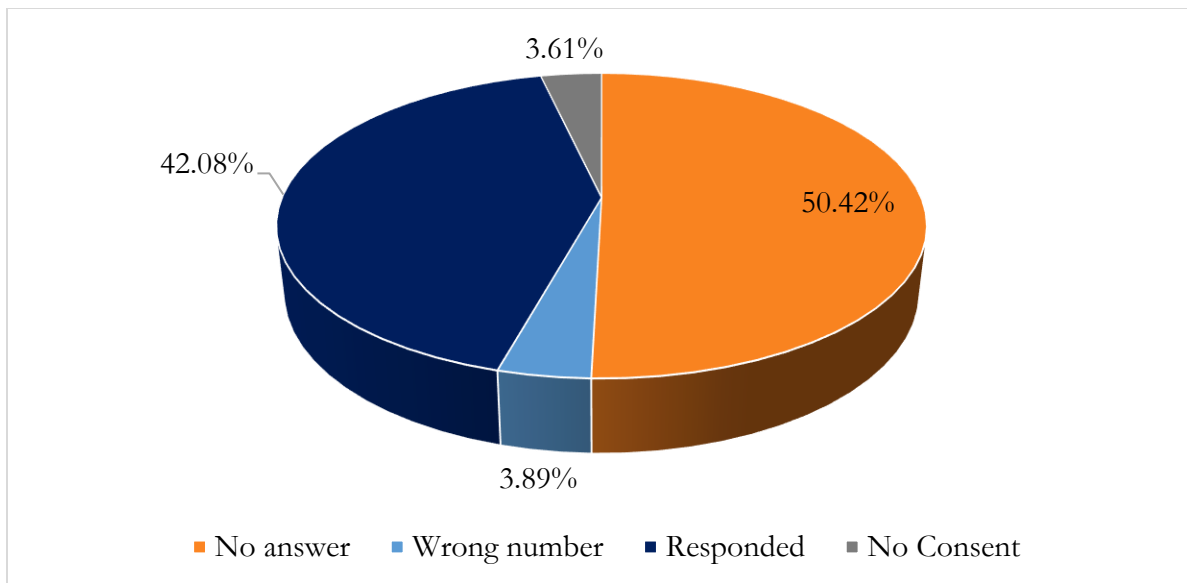
Due to logistical difficulties related to the University shutdown and student protests in late 2016, the research team conducted the interviews a week later than scheduled, between the 29th of September and the 11th of October.

Research assistants called and interviewed parents each day over this period; each interview consisted of 27 questions and were conducted in either isiXhosa, Afrikaans, or English, depending on the home language learners selected at baseline (See Appendix 9 for the Interview questions and script). The majority of questions offered discrete response options, mostly yes/no options and several on a Likert 5-point scale, and thus the significant majority of the interview was structured. Research assistants were also encouraged to record any elaboration on questions, though never to invite these additional comments. This information provides some useful qualitative data to supplement the structured responses, but can only serve as anecdotal or at best suggestive given its unstructured formulation.

The research assistants were trained according a uniform script, which was simple and replicable and emphasized the confidentiality of parents' responses. Several additional measures were also taken to protect the rigour of and reduce potential bias in data capturing. Calling lists were randomly ordered, thus ensuring no specific research assistant would make proportionally more calls to any specific type of parents. Moreover, research assistants were unaware of parents' treatment status, and questions specifically referring to the message treatment were reserved for the end of the interview to ensure parents didn't associate the phone calls with the messages while answering questions.

Research assistants initiated calls to 1083 parents from all experimental groups⁴⁰. However, calls were only successfully completed for 454 learners across the three groups (41% of the full sample). Figure 1. shows that parents answered approximately half of all calls (49.58%), and of these, most parents were willing to be interviewed (42.08% of all calls), while 3.16% refused and 3.89% of all calls were to wrong numbers. This response rate presents potential selection issues, further discussed in Section 6.2.

Figure 1. Breakdown of Telephone Survey Call Results



⁴⁰ In the cases where multiple learners came from the same household, only one learner was selected for which to direct interview questions (this learner was randomly selected). This was because parents who had more than one learner in the sample would be more likely to conflate responses for both learners if asked about both in the same interview.

4.3. Focus Group

The final means of data collection was a focus group with the YeBo facilitators from AVA, who worked in the YeBo centres in our sample and engaged with learners on a daily basis. The focus group was conducted on the 4th of October 2016 with the express consent of all facilitators. The format was an informal discussion, where facilitators were asked guiding questions in order to direct discussion towards the major points of interest: parental engagement with YeBo, the source of learner motivation to attend and participate in YeBo, and whether or not the message intervention had any observable influence. The full session was recorded and transcribed (see Appendix 9 for the full transcript). This data provides invaluable qualitative insights to supplement the quantitative data.

5. Analysis and Results

This section's primary imperative is to test if the parental messaging intervention influenced learner attendance at the YeBo centres. Secondly, the section aims to identify if treatment 2 produced a different effect to treatment 1. The section applies a range of statistical techniques and presents output towards these objectives. All results measure an 'Intention-to-Treat' (ITT) effect, measuring the impact as per assignment to the treatment conditions at baseline, rather than on the degree to which the messages were received. The section also analyses whether there were heterogeneous treatment effects across different types of learners, and how the treatment effect changed over the intervention period. Finally, the section investigates the potential mechanisms through which the message influenced learner attendance and provides an analysis of the qualitative data. Firstly, however, the section describes the randomisation process and whether the intervention was implemented successfully.

5.1. Did Randomisation Work?

Result 1: Randomisation was successful; experimental groups were balanced across all observable baseline characteristics.

Table 2 summarises the composition of each experimental group, and the T-test column indicates that there are no significant differences in observable baseline characteristics between groups. To further

test for balance, treatment status was regressed on all baseline variables for both treatment conditions⁴¹. In both regressions, no baseline attributes are individually significant, and an F-test confirms that the collection of baseline observables do not predict treatment status ($P = 0.97$ for both treatment groups). Thus, the experimental groups are balanced across observable characteristics.

Table 2: Summary Statistics Across Experimental Groups

VARIABLE	N	Control	Pooled Treatment	T-Test¹ (Pooled Treat and Control)	Treatment 1	Treatment 2
Black	1107	0.560	0.572	-0.389	0.564	0.581
Female	1107	0.636	0.633	0.115	0.615	0.650
Age	1082	11.080	11.070	-0.136	11.190	10.960
Baseline Attendance (Proportion of sessions attended)	1107	0.504	0.504	-0.015	0.512	0.496
Baseline Test Score (%)	545	50.120	50.430	-0.174	49.680	51.210
Grade						
Grade 1	200	0.179	0.182	-0.161	0.176	0.188
Grade 2	171	0.161	0.151	0.463	0.146	0.155
Grade 3	133	0.118	0.122	-0.164	0.122	0.122
Grade 4	113	0.100	0.102	-0.075	0.103	0.100
Grade 5	64	0.063	0.055	0.544	0.052	0.058
Grade 8	28	0.190	0.187	0.117	0.185	0.188
Grade 9	123	0.112	0.111	0.034	0.116	0.106
Grade 10	95	0.078	0.091	-0.760	0.100	0.082
Home Language						
Afrikaans	228	0.210	0.203	0.262	0.200	0.207
English	254	0.232	0.228	0.176	0.236	0.219
isiXhosa	619	0.554	0.563	-0.309	0.561	0.565
Other	6	0.004	0.006	-0.357	0.003	0.009
N	1107	448	659		330	329

Note: Primary Statistic is sub-sample mean for Control, Pooled Treatment, Treatment 1 and Treatment 2 columns.

¹In T-test column, primary statistic is T-stat for the T-test of Pooled Treatment mean – Control mean;*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Additional T-tests, not reported, also show no significant differences between Treatment 1 and Treatment 2 means, and between each of Treatment 1 and Treatment 2 and the Control group means ($p > 0.5$ for all)

⁴¹ See Table A5 in Appendix 4 for full regression results.

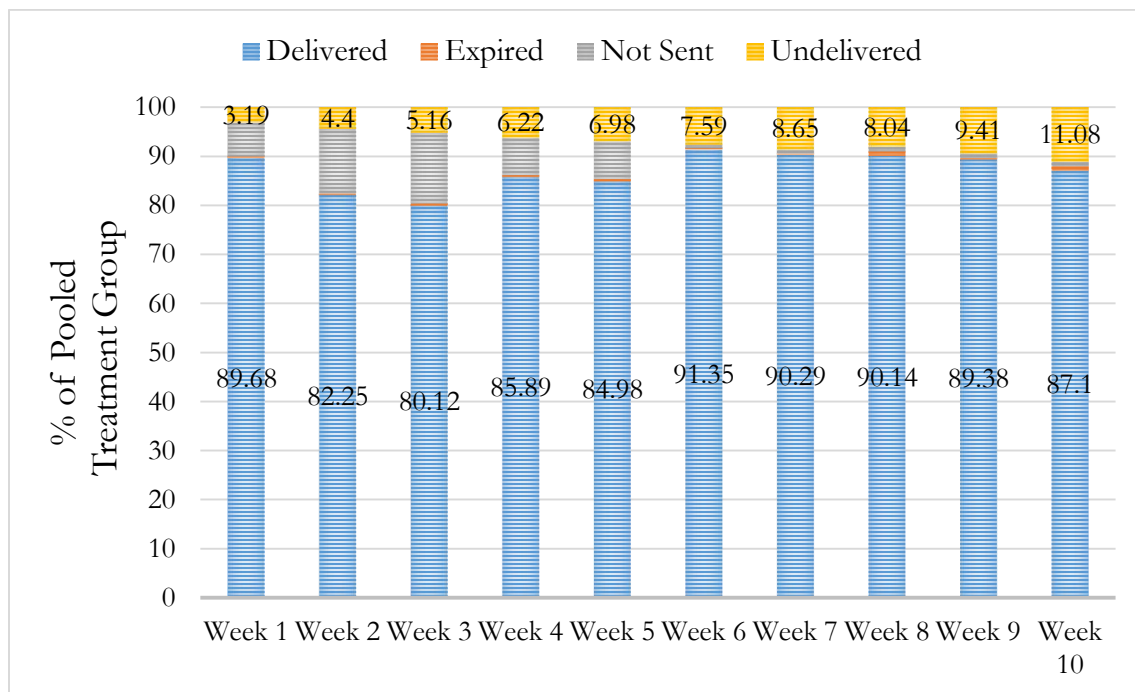
5.2. Was Implementation Successful?

Result 2: The intervention was implemented successfully; the majority of messages were successfully sent and delivered.

Overall, most treatment group parents received nearly all 10 messages: on average, parents received 8.7 messages each and 91% of all messages sent over the 10 weeks⁴².

In the first week, over 96% of messages successfully delivered. However, Figure 2. shows how this rate slowly declined over the course of the observation period, with an approximately 89% delivery rate by week 10. Anecdotal evidence from AVA facilitators suggests that parents change their numbers regularly, often due to lost or stolen phones or sim cards⁴³. This poses a challenge to the sustainability of the messaging intervention; as time wears on the need to update contact details may increase.

Figure 2. Message Delivery Details per Week



⁴² This is similar to, but slightly lower than the 95% delivery rate found by Kraft and Rogers (2014). However, their intervention was shorter, and the first weeks of the intervention in this paper had the same delivery rate as Rogers' and Fellers' first weeks.

⁴³ This suggests these parents could have slightly different characteristics than those that received the message, the implications of which are discussed in Section 6.4.

Messages were scheduled for sending between 18h30 and 20h00 every Monday. However, in week 1, on Monday the 25th of July, the internet connection at AVA malfunctioned for several schools and there were several communication difficulties between AVA and the research team. Attendance data from the previous week was thus only accessible late on Tuesday and the first treatment message was only sent on Wednesday 27th of July 2016 between 19h30 and 20h30 to both treatment groups

However, from week 2 until week 10, the significant majority of messages were sent during the scheduled period. There were several exceptions to this, however, most were minor and related to public holidays and internet challenges⁴⁴ (See Table A3. In Appendix 2 for the full details on message delivery).

Several parents also responded to the messages, most offering thanks but several indicating a wrong number or asking to be removed from the intervention. In total, 7 numbers were removed from the pooled treatment groups⁴⁵. Several responses also offered questions, and received a warm but generic response redirecting them to AVA administrators for more information.

5.3. YeBo Attendance

The following sub-sections present comparisons of means and multivariate regression results to identify treatment effects on YeBo attendance. Following this, the section investigates possible heterogeneous effects and analyses how treatment effects change over the intervention by using the time-component of a weekly attendance panel data set.

5.3.1. Comparison of Means

Result 3: Both treatment groups attended significantly more than the control group by all measures of attendance.

⁴⁴ Downville, one of the primary schools, received no treatment messages for the first 4 weeks as gang violence caused the YeBo centres to shut down over this period; this was the most significant complication in implementing treatment.

⁴⁵ Attrition is discussed in Section 6.4

Figure 3. shows that, on average, those in treatment 1, the ‘information’ treatment, attended the highest proportion of sessions over the observation period: 51.9% of scheduled sessions. Those in treatment 2, the ‘information + investment value’ treatment, attended slightly less (50.3%) than treatment group 1, but significantly more than the control group (45.9%). Given the experimental design and the strength of the randomisation process (see Section 5.1), it is likely that the messaging intervention generated these differences. There is no statistically significant difference between treatment 1 and treatment 2 ($t=0.509$, $p=0.689$).

Figure 3. Mean Proportion of Sessions Attended by Group

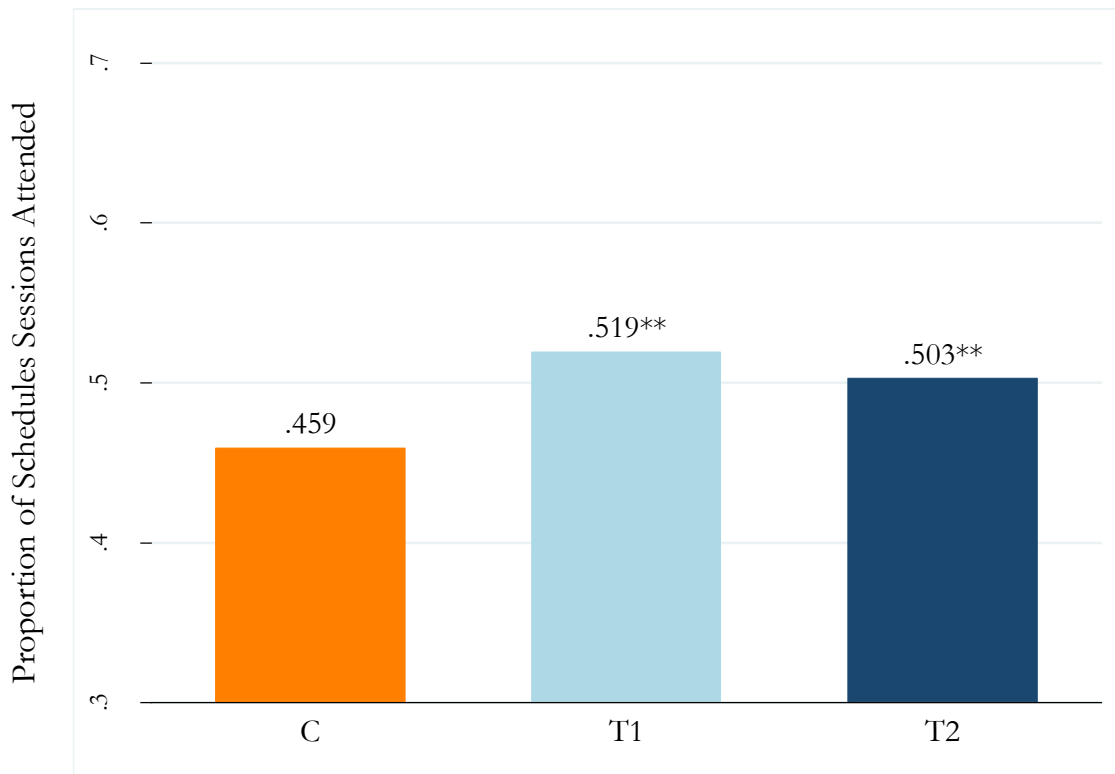


Table 3 shows that when accounting for baseline attendance, the differences in Figure 3 hold. The Control group experienced a 4.4% decline in proportion of sessions attended (from 50.3% to 45.9% of available sessions) over the observation period, whereas each treatment group experienced a very

slight increase over the same period⁴⁶. Learners in the pooled treatment, treatment 1 and treatment 2 groups were also significantly more likely to attend any sessions during this period ($p < 0.03$)⁴⁷ and to attend at least 65% of sessions ($p < 0.083$)⁴⁸. Most notably, only 21.9% of the pooled treatment group did not attend any sessions in the period compared to 28.1% of the control group. For all of these measures, there is no difference between treatment 1 and treatment 2 ($p > 0.48$).

Table 3: Attendance Summary by Experimental Group

	Control	Treatment 1	Treatment 2	Pooled Treatment
Baseline Attendance: Mean Proportion of Sessions Attended	0.503 (0.348)	0.512 (0.336)	0.496 (0.335)	0.504 (0.335)
Endline Attendance: Mean Proportion of Sessions Attended	0.459 (0.415)	0.519** (0.418)	0.503* (0.405)	0.511** (0.412)
Change in Proportion of Sessions Attended	-0.044 (0.348)	0.007** (0.339)	0.007** (0.328)	0.007*** (0.335)
Endline Attendance: Proportion of Learners with Non- Zero Attendance	0.719 (0.450)	0.785** (0.412)	0.778** (0.412)	0.781*** (0.412)
Endline Attendance: Proportion of Learners that Attended 65% or more	0.366 (0.499)	0.415* (0.493)	0.416* (0.493)	0.416** (0.493)

Note: Sample mean reported as primary statistic, standard deviation in parentheses.

Stars refer to results of T-test of mean relative to Control Group mean *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

T-test between Treatment 1 and Treatment 2 means for Endline attendance – Proportion of Available Days, (Treatment 2 – Treatment 1): T-stat = -0.509; $p = 0.695$. There is no statistical difference between means.

⁴⁶ Over the course of the YeBo programme, there is typically a degree of attrition amongst learners as the year wears on, while new learners are recruited to replace those that leave. Overall attendance thus remains fairly constant, however, attendance for any specific cohort declines as members attrite. Given that the sample includes a specific cohort, and does not replace those that attrite with those that joined over the observation period, it is unsurprising that attendance for the sample declined overall over the observation period.

⁴⁷ T-test results: Pooled treatment vs Control: $t = 2.39$, $p = 0.009$; Treatment 1 vs Control: $t = 2.10$, $p = 0.018$; Treatment 2 vs Control: $t = 1.88$, $p = 0.031$.

⁴⁸ T-test results: Pooled treatment vs Control: $t = 1.66$, $p = 0.049$; Treatment 1 vs Control: $t = 1.39$, $p = 0.083$; Treatment 2 vs Control: $t = 1.42$, $p = 0.078$

5.3.2. Multivariate Regression

In order to further test for treatment effects, the following models are applied to the different attendance outcome variables

Model 1: OLS – Two Treatment groups.

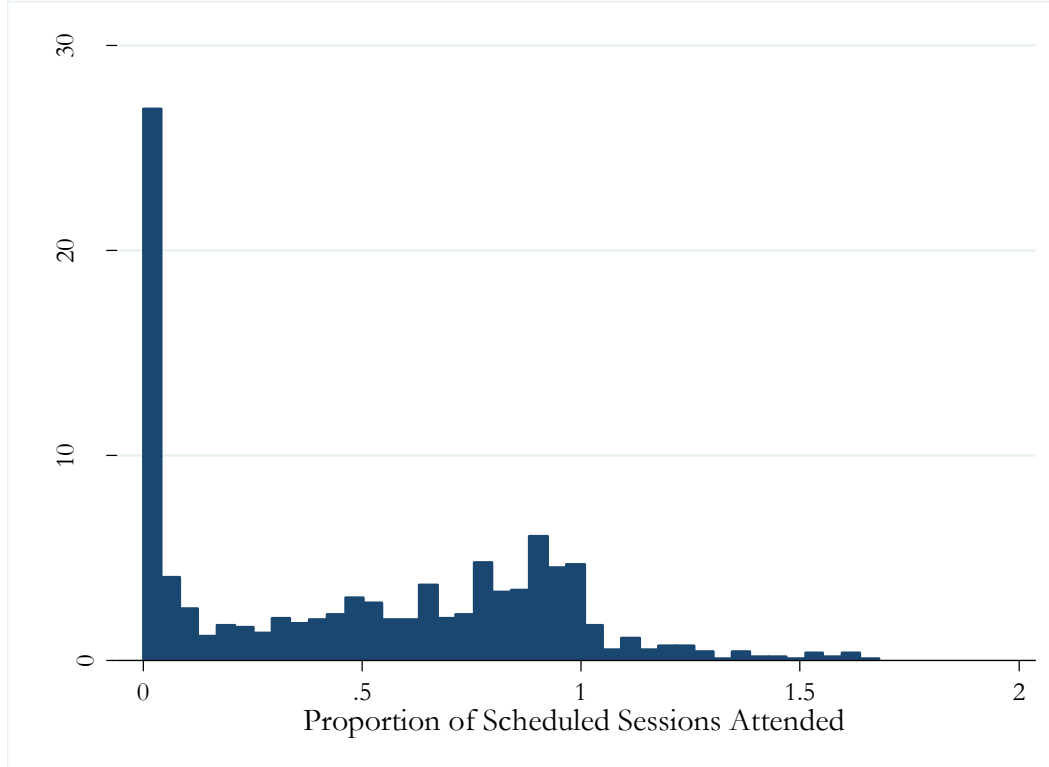
$$y_i = \alpha + \beta_1 Treatment1_i + \beta_2 Treatment2_i + X'_i \gamma + e_i \quad (1)$$

Where y_i is the proportion of available YeBo sessions that learner i attended over the 9-week observation period, α is a constant, X' is a vector of control variables for learner i , γ represents the vector of co-efficients for the control variables, and e_i is the error term for learner i . The control variables include learner age, race, language, gender, baseline attendance, a quadratic baseline attendance term, a dummy variable for whether or not learners attended during the period immediately before the intervention, and a dummy variable for each grade. $Treatment1_i$ and $Treatment2_i$ each represent a dummy variable for each treatment group, treatment 1 and treatment 2 respectively, which equals 1 if learner i is assigned to that treatment group and equal to zero otherwise. β_1 and β_2 , thus represent the treatment effects on the proportion of YeBo sessions that learners attended, and are the variables of interest. This model is estimated using OLS.

Model 2: Tobit Marginal Effects – Two Treatment Groups

In addition to OLS, this paper estimates a Tobit model to test the treatment effect on attendance. The continuous outcome variable (the proportion of scheduled sessions attended) is clustered at zero, as 270 out of the 1107 learners did not attend any sessions in the observation period.

Figure 4. Distribution of Outcome 1: Proportion of Sessions Attended



The sample is thus censored, implying that OLS could produce biased estimates⁴⁹ (Long, 2001; Wooldridge, 2009). The Tobit model applies a latent variable approach to account for this, the model for which is described below⁵⁰:

$$y_i^* = \alpha + \beta_1 Treatment1_i + \beta_2 Treatment2_i + X_i'\gamma + e_i \quad (2)$$

y_i^* is the latent variable for attendance, which is equal to the observed attendance y_i for all values $y_i^* > 0$, and which is continually distributed ≤ 0 when $y_i = 0$. The latent variable is thus not clustered and

⁴⁹ For an elaboration, see Long (2001).

⁵⁰ The Tobit model in this paper does not account for censoring at 1 (where learners attended 100% of sessions), as 85 learners attended more than their scheduled sessions and all 18 centres allowed learners to attend additional sessions. In fact, 17 of the 18 schools had learners that attended more than 100% of their sessions and the one school that did not had zero learners attending 100%, thus showing little sign of censoring at 1. Furthermore, removing the additional attendance information could have reduced the efficiency of regressions in this paper. However, attendance does cluster slightly near 1. In order to ensure that censoring did not affect results, a Tobit model is estimated that censors at 1 and is presented in Tables A6, A7, and A8 in the Appendix for all analyses using the Tobit model. Estimates are not statistically different, though in some cases are slightly smaller. Censoring at 1 does not change the statistical or practical significance of any estimates in this paper.

produces unbiased estimates of β_1 and β_2 (Long, 2001). The Tobit model estimates the above equation; however, given that β_1 and β_2 represent the treatment effect on the latent variable, y_i^* , they are adjusted to calculate the marginal treatment effect on observed attendance, y_i . Equation (3) represents the Tobit marginal effects on observed attendance, y_i , which this paper estimates and reports alongside the OLS estimates (Wooldridge, 2009):

$$\frac{\partial E(y)}{\partial T_k} = \Phi\left(\frac{X'_i\beta}{\sigma}\right)\beta_k \quad \text{for } k=1,2 \quad (3)^{51}$$

This effectively combines two statistics for the treatment effect on attendance: the probability that a learner will attend YeBo at least once, and the marginal increase in attendance if they do attend.

Model 3: Probit Model – Two Treatment Groups

Both the *Non-zero Attendance* and *65% Attendance* outcome variables are binary. The treatment effect is therefore the marginal effect of being assigned treatment status on the probability that these outcomes equal one; that is, how does treatment status affect the probability that a learner attends any sessions or attends 65% or more sessions respectively. This paper estimates a Probit model to determine this marginal effect for both variables:

$$\Pr(y_i = 1) = \Phi(\alpha + \beta_1 \textit{Treatment1}_i + \beta_2 \textit{Treatment2}_i + X'_i\gamma + e_i) \quad (4)$$

Where y_i is the *Non-zero Attendance* or *65% Attendance* binary outcome, and the other variables are the same as in equations (1) and (2). Similarly to the Tobit model (equation 2), this represents a non-linear function of the explanatory variables, and so β_1 and β_2 do not represent the treatment effect. The following marginal effects equation (Long, 2001, p. 72) is therefore used to estimate the treatment effect throughout this section:

$$\frac{\partial \Pr(y_i=1)}{\partial T_k} = \phi(X'_i\beta)\beta_k \quad \text{for } k=1,2 \quad (5)^{52}$$

⁵¹ For notational simplicity, in this equation T is shorthand for *Treatment* and $X'_i\beta$ represents the full vectors of explanatory variables and coefficients, including *Treatment1*, *Treatment2*, and β_1 and β_2 respectively.

⁵² For notational simplicity, again, T is shorthand for *Treatment* and $X'_i\beta$ represents the full vectors of explanatory variables and coefficients, including *Treatment1*, *Treatment2*, and β_1 and β_2 respectively.

Regression Results

Result 4: After controlling for baseline characteristics, both treatment conditions significantly increased YeBo attendance for all measures.

Table 4 presents the output from the Tobit and OLS models. These results indicate that both treatment 1 and treatment 2 significantly explain the proportion of YeBo sessions learners attended after controlling for baseline attendance and individual characteristics. This holds for both models.

The co-efficients on the *Pooled Treatment* variable⁵³ equal 0.05 for OLS and 0.057 for Tobit Marginal Effects. As the dependent variable represents the proportion of scheduled sessions attended⁵⁴, these coefficients imply that receiving either treatment causes learners to attend 5% or 5.7% more of the scheduled sessions on average (given the control group average is 45.9% of sessions, this represents an increase of 11-12% relative to the control group).

To calculate an effect size comparable across studies, this paper also reports Glass's Delta for the primary treatment effect, which is defined as the difference in the means of the outcome variable between the treatment and control groups divided by the standard deviation of the control group (Glass, 1977), and is given by the equation below:

$$\frac{\mu_{Treatment} - \mu_{Control}}{\sigma_{Control}} \quad (6)$$

The measure presents the effect size in units of standard deviation, allowing for improved comparability across studies. The Glass Delta effect sizes were 0.121 and 0.138 standard deviations for OLS and Tobit estimates respectively.

⁵³ This is calculated in both Model 1 and Model 2 by replacing *Treatment1_i* and *Treatment2_i* with a single dummy variable *Treatment_i*, equal to 1 if learner *i* is assigned to either Treatment group or equal to 0 if assigned to the Control group. A coefficient β , represents the effect of being in either treatment group on attendance.

Table 4: Regression Results for Proportion of Sessions Attended: OLS and Tobit

VARIABLES	OLS	OLS	Tobit: Marginal Effects	Tobit: Marginal Effects
Treatment1	0.055** (2.647)		0.062*** (3.306)	
Treatment2	0.046** (2.480)		0.053*** (2.608)	
Pooled Treatment		0.050*** (3.137)		0.057*** (3.633)
Baseline attendance	0.932*** (4.950)	0.933*** (4.979)	1.185*** (6.614)	1.185*** (6.649)
Baseline Attendance squared	-0.000 (-1.435)	-0.000 (-1.439)	-0.000*** (-3.096)	-0.000*** (-3.101)
Black	0.070 (1.449)	0.070 (1.446)	0.066 (1.459)	0.066 (1.455)
Female	-0.025 (-1.118)	-0.025 (-1.133)	-0.029 (-1.305)	-0.030 (-1.324)
Grade2	-0.080** (-2.216)	-0.080** (-2.212)	-0.057* (-1.770)	-0.057* (-1.768)
Grade3	-0.097** (-2.367)	-0.097** (-2.364)	-0.068* (-1.883)	-0.068* (-1.879)
Ggrade4	-0.007 (-0.127)	-0.007 (-0.124)	-0.007 (-0.125)	-0.006 (-0.121)
Grade5	0.022 (0.208)	0.022 (0.208)	0.011 (0.112)	0.011 (0.111)
Grade8	-0.100* (-1.750)	-0.100* (-1.754)	-0.108* (-1.881)	-0.108* (-1.885)
Grade9	-0.054 (-0.929)	-0.054 (-0.929)	-0.061 (-1.070)	-0.061 (-1.071)
Grade10	-0.106** (-2.254)	-0.105** (-2.256)	-0.104* (-1.934)	-0.104* (-1.933)
Constant	0.104 (1.647)	0.103 (1.650)		
Observations	1,106	1,106	1,106	1,106
R-squared	0.398	0.398		

Note: Robust t-statistics in parentheses *** p<0.01, ** p<0.05, * p<0.1

Baseline Attendance is calculated as the proportion of available days learners attended YeBo in the 3 month before the intervention started.

F-Test to check the difference between treatment 1 and treatment 2 co-efficients used in OLS and Tobit Model ($\beta_2 - \beta_1$). OLS F-stat=0.16, p=0.693; Tobit F-Stat=0.15, p=0.694. There is no statistical difference between treatment 1 and treatment 2

The results from the Probit model regressions, presented in Table 5, show that treatment status also significantly increased the likelihood that learners attended at least one session, effecting a probability increase of the order of 6% for both treatment groups and for the pooled treatment group. Put differently, the treatment messages reduced the proportion of learners that attended zero sessions from 28.1% to 22% (regression adjusted means)⁵⁵. Only treatment 2 significantly increased the likelihood that learners attended more than 65% of sessions, albeit this was only slightly significant ($p=0.091$).

Result 5: There is no significant difference in the treatment effect on attendance between treatment 1 and treatment 2.

From Table 4 and Table 5, the coefficients on *Treatment 1* and *Treatment 2* appear very similar across specifications. Only for the *65% Attendance* outcome is there any noticeable difference between groups, where *Treatment 2* is slightly significant and *Treatment 1* is insignificant. However, a formal test between these co-efficients cannot determine any statistical difference ($F\text{-stat}=0.04$, $p=0.84$). For all other specifications, F-tests of $\beta_1 - \beta_2$ show that the treatment effects are not statistically different between treatment groups (results reported in notes in Tables 4 and 5).

⁵⁵ Adding the regression co-efficient to the control group mean.

Table 5: Regression Results of Non-Zero Attendance and 65% Attendance Dummy Variables on Treatment Status

VARIABLES	Probit: Non-Zero Attendance	Probit: Non-Zero Attendance	Probit: 65% Attendance	Probit: 65% Attendance
Treatment1	0.060*** (3.056)		0.058 (1.239)	
Treatment2	0.062** (2.045)		0.066* (1.692)	
Pooled Treatment		0.061*** (2.813)		0.062 (1.625)
Baseline attendance	1.036*** (6.552)	1.036*** (6.598)	1.200*** (4.901)	1.199*** (4.906)
Baseline Attendance squared	-0.000*** (-3.325)	-0.000*** (-3.330)	-0.000 (-1.602)	-0.000 (-1.601)
Black	0.065 (1.496)	0.065 (1.498)	0.107 (1.368)	0.107 (1.370)
Female	-0.045 (-1.315)	-0.044 (-1.322)	-0.030 (-0.880)	-0.030 (-0.878)
Grade2	-0.055 (-0.675)	-0.055 (-0.675)	-0.065 (-1.027)	-0.065 (-1.026)
Grade3	-0.036 (-0.358)	-0.036 (-0.358)	-0.089 (-1.519)	-0.089 (-1.518)
Grade4	-0.094 (-1.547)	-0.094 (-1.553)	-0.069 (-0.795)	-0.070 (-0.797)
Grade5	-0.169 (-1.512)	-0.169 (-1.512)	0.013 (0.100)	0.013 (0.101)
Grade8	-0.202*** (-2.586)	-0.202*** (-2.594)	-0.154 (-1.493)	-0.154 (-1.492)
Grade9	-0.169** (-2.327)	-0.169** (-2.338)	-0.090 (-0.780)	-0.090 (-0.790)
Grade10	-0.179* (-1.784)	-0.179* (-1.791)	-0.155 (-1.486)	-0.156 (-1.493)
Observations	1,106	1,106	1,106	1,106

Note: Robust t-statistics in parentheses *** p<0.01, ** p<0.05, * p<0.1

F-Test to check the difference between treatment 1 and treatment 2 co-efficients used in Probit model for each outcome variable ($\beta_2 - \beta_1$). Non-zero attendance F-stat=0.01, p=0.94; 65% attendance F-Stat=0.04, p=0.84. There is no statistical difference between treatment 1 and treatment 2

5.3.3. Robustness

Tables 6 and 7 below report results for alternative specifications of the above models in order to account for deficiencies in these models and test the robustness of results. Specifically, this section specifies models to account for hierarchically structured error terms and potential heteroscedasticity and non-normality in the Tobit Model.

Hierarchical Data

The above analyses are conducted at the learner level. However, learners are nested within schools. It follows then that several features of the school could affect learner attendance, implying that the error terms in Models 1, 2, and 3 have a hierarchical structure. Below is an adapted version of Model 1, where each learner i is nested in school j , and the school level error term is represented by u_j .

$$y_{ij} = \alpha + \beta_1 Treatment1_{ij} + \beta_2 Treatment1_{ij} + X'_{ij}\gamma + u_j + e_i \quad (7)$$

Thus, error terms from learners at the same school correlate, failing the OLS assumption that error terms are independent across observations (Clarke et al., 2010). One of the typical problems with this underlying model is that school level error terms are correlated with explanatory variables and thus produce biased estimates. In this case, however, treatment is exogenously determined and thus bias from the unobserved school effect is unlikely. However, the correlation between error terms could still cause bias in standard error estimation and thus in the statistical inference in the previous subsection. Random Effects GLS estimation and Fixed Effects estimation is thus applied to account for the hierarchical structure in the errors and results are compared to the original estimates in Tables 6 and 7.

Homoscedasticity and Non-normality in the Tobit Model

Tobit estimation on the sample in this analysis is superior to OLS in the sense that it accounts for the censored dependent variable. However, if the homoscedasticity and normality of the error terms assumptions⁵⁶ fail, then estimates could be both biased and inconsistent (whereas under OLS, the failure of these assumptions implies that the standard errors could be misestimated).

This paper thus applies both the Box-Cox (Box & Cox, 1964; Drukker, 2002) transformation and the method proposed by Cameron and Trivedi (2010) to test for homoscedasticity and normality in the latent variable model error terms. In both cases, the tests reject the normality and homoscedasticity assumptions ($p < 0.00$). Thus, the standard Tobit model could produce biased and inconsistent estimates. In order to account for this, the semi-parametric SCLS (symmetrically censored least squares) estimator proposed by Powell (1986) and refined by Santos Silva (2001) is applied, which produces unbiased and consistent estimates of censored data under conditions of heteroskedastic and non-normal errors. Table 6 also compares these results with those of Model 1 and Model 2

Result 6: The treatment effect on learner attendance is robust across different estimators

In Table 6, for the *Proportion of Sessions Attended* outcome, both Random Effects and Fixed Effects estimates are similar to those for the original models (Model 1 and Model 2) and remain significant ($p < 0.01$), but are marginally stronger in magnitude. In Table 7, for the binary outcome variables, the Random Effects Probit estimates are similar to the original treatment effects, though are slightly lower in magnitude for the *Non-Zero Attendance* outcome, while the pooled treatment effect becomes significant ($p = 0.034$) for the *65% Attendance* outcome.

Both variations of the SCLS specification, displayed in Table 6, produce very similar results to the original models and are still significant for the pooled treatment and treatment 1 groups (treatment 2 becomes slightly insignificant under this specification).

Overall, treatment effects do not change significantly for alternative specifications. Tables 6 and 7 thus show that the primary findings in this paper are robust across estimators. More specifically, homoscedastic, non-normal, and hierarchically structured error terms did not confound inference in the previous sections.

Table 6: Robustness Check – Continuous Attendance: Random and Fixed effects, and SCLS Correction

VARIABLES	OLS	Tobit	Random Effects	Fixed Effects	SCLS Santos	SCLS Powell
Treatment 1	0.055** (2.647)	0.062*** (3.306)	0.062*** (2.769)	0.069** (2.384)	0.063** (1.987)	0.063** (1.987)
Treatment 2	0.046** (2.480)	0.053*** (2.608)	0.058*** (2.591)	0.060** (2.288)	0.050 (1.597)	0.050 (1.597)
Pooled Treatment	0.050*** (3.137)	0.057*** (3.633)	0.060*** (3.169)	0.064*** (2.707)	0.056** (2.097)	0.056** (2.097)

Note: Robust t-statistics in parentheses *** p<0.01, ** p<0.05, * p<0.1

Variables for baseline attendance, baseline attendance squared, black dummy, female dummy, and dummies for each grade included in the regression but not reported.

Table 7: Robustness Check – Non-Zero Attendance and 65% Attendance

VARIABLES	Probit: Non-Zero	Probit: 65%	Random Effects: Non-Zero	Random Effects: 65%
Treatment 1	0.060*** (3.056)	0.058 (1.239)	0.050** (2.065)	0.047 (1.630)
Treatment 2	0.062** (2.045)	0.066* (1.692)	0.052** (2.190)	0.056* (1.951)
Pooled Treatment	0.061*** (2.813)	0.062 (1.625)	0.051** (2.535)	0.051** (2.114)

Note: Robust t-statistics in parentheses *** p<0.01, ** p<0.05, * p<0.1

Variables for baseline attendance, baseline attendance squared, black dummy, female dummy, and dummies for each grade included in the regression but not reported.

5.3.4. Heterogeneous Effects

This sub-section looks at potential differences in treatment effects for different sub-samples, focusing on differences across race, gender, primary and high school, and high and low baseline attendance. Given South Africa's highly racialized society and the racial delineation of schools within this sample (and most Cape Town schools (Lemon & Battersby-Lennard, 2010)), heterogeneous effects across

race could exist and provide interesting insights. Furthermore, education interventions have previously produced differences in treatment effects across genders (Anderson, 2008), while the parental engagement literature shows that parent-child dynamics and parents' capacity to influence learner effort differs between primary and high school learners (Eccles & Harold, 1993). Finally, the YeBo programme includes learners with a wide range of baseline attendance rates. Whether the intervention affected those who hardly attended at baseline differently from those who attended more often is of policy relevance to programme administrators. Thus, there is either a theoretical or a policy-related basis for analysing heterogeneous effects between these specific sub-groups.

Result 7: Treatment increased attendance across all observed sub-groups.

Table 8⁵⁷ shows that the treatment group attended significantly more sessions than the control group across all sub-samples of interest⁵⁸. Treatment thus appears to increase attendance across different types of learners. Similarly, the probability of a learner attending at least one session was higher for treatment compared to control for all sub-samples, and statistically significant for all except primary school learners and learners with high baseline attendance ($p=0.14$ and 0.15 respectively). The treatment group mean was also greater than control for the *65% attendance* binary outcome, though only significant for black, high school, and male learners, and learners with low baseline attendance.

⁵⁷ Here too, only the pooled treatment is used given the limited difference between each and also the limited statistical power when running analyses on sub-groups.

⁵⁸ Assessed as having attended less or more than half of the scheduled sessions in the three months prior to intervention.

Table 8: Comparing Means of Attendance Outcomes Across Treatment Conditions and Sub-Groups

Category	N	% Sessions Attend: Continuous		Non-Zero Attend: Dummy		65% Attend: Dummy:	
		Control	Pooled Treatment	Control	Pooled Treatment	Control	Pooled Treatment
Black	628	0.487 (0.401)	0.542** (0.406)	0.745 (0.437)	0.806** (0.395)	0.390 (0.480)	0.459** (0.489)
Coloured	478	0.423 (0.420)	0.469** (0.416)	0.685 -0.466	0.748* -0.435	0.335 -0.473	0.358 -0.48
Female	701	0.464 (0.424)	0.498* (0.416)	0.709 (0.455)	0.763* (0.426)	0.372 (0.484)	0.407 (0.492)
Male	405	0.451 (0.399)	0.533** (0.404)	0.736 (0.442)	0.814** (0.390)	0.356 (0.480)	0.430* (0.496)
Primary School	680	0.571 (0.387)	0.61** (0.376)	0.863 (0.344)	0.891 (0.312)	0.482 (0.501)	0.524 (0.500)
High School	426	0.277 (0.394)	0.355** (0.418)	0.482 (0.501)	0.609*** (0.489)	0.176 (0.382)	0.246** (0.432)
Low Baseline Attendance	534	0.222 (0.329)	0.279** (0.341)	0.498 (0.501)	0.608*** (0.489)	0.102 (0.304)	0.169** (0.376)
High Baseline Attendance	572	0.678 (0.361)	0.729** (0.348)	0.923 (0.268)	0.944 (0.230)	0.609 (0.489)	0.647 (0.479)

Note: Table reports mean values for each outcome variable (as indicated by the column title) for each sub-group (as indicated by the row title). For dummy outcome variables, means are equivalent to the proportion of learners in the sample with Non-Zero attendance or attending 65% of sessions or more respectively. Stars represent significance of T-test between Pooled Treatment group mean and the Control group mean for each sub-group. *** p<0.01, ** p<0.05, * p<0.1 Standard deviations are reported in parentheses.

Treatment thus appears to effect higher attendance across all sub-groups, at least for some measures of attendance. However, some treatment effects appear greater than others. Notably, high school learners in the treatment group were 12.7% more likely to attend at least one session than high school learners in the control, with means of 0.609 and 0.482 respectively (p=0.005). By contrast, the difference between treatment and control for primary school learners was not statistically significant.

Learners with low and high baseline attendance showed similar differences between treatment and control for the same measure.

Result 8: There are no statistically significant heterogeneous effects.

In order to provide a more robust test of heterogeneous treatment effects, Models 1, 2, and 3 are estimated including interaction terms between each sub-group of interest and the pooled treatment dummy variable (Brookes et al., 2004). The results, displayed in Table 9 and 10, indicate that none of the heterogeneous treatment effects suggested in Table 8 are statistically significant. This presents evidence that treatment did not affect different sub-groups differently for this measure of attendance

For the *Proportion of sessions attended* outcome variable, the pure treatment effect remains significant for all models in Table 9 and all interaction terms are insignificant. This presents evidence that treatment did not affect different sub-groups differently for this measure of attendance. However, for the *Non-Zero Attendance* outcome in Table 10, the interaction terms for both low baseline attendance and being a high school learner substantially reduce the magnitude and significance of the coefficient on the treatment variable. The high school interaction term is also near significance ($p=0.16$). Though this cannot be considered evidence of heterogeneous effects, it suggests there *could* be heterogeneity, but that the sample might not provide sufficient power to determine its presence. Interaction terms typically significantly reduce the power of regression models to determine effects (Brookes et al., 2004). However, in this case it is impossible to determine whether this is the case or whether there is an absence of heterogeneity. Therefore this paper can only conclude that there are no significant heterogeneous effects.

Table 9: Heterogeneous Effects: OLS and Tobit Estimates with Interactions Terms for Continuous Attendance Variable

VARIABLES	OLS: Male Interaction	Tobit: Male Interaction	OLS: High School Interaction	Tobit: High School Interaction	OLS: Black Interaction	Tobit : Black Interaction	OLS: Low Baseline Interaction	Tobit: Low Baseline Interaction
Pooled Treatment	0.035* (1.857)	0.043*** (2.600)	0.042** (2.462)	0.040** (2.491)	0.052* (1.92)	0.058*** (2.75)	0.048* (1.911)	0.042** (1.994)
Male*Treat	0.042 (1.370)	0.039 (1.389)						
High School*Treat			0.018 (0.523)	0.047 (1.389)				
Black*Treat					-0.003 (-0.10)	-0.002 (-0.05)		
Low Baseline Attendance*Treat							0.015 (0.382)	0.045 (1.160)

Note: Robust t-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Variables for baseline attendance, baseline attendance squared, black dummy, female dummy, and dummies for each grade included in the regression but not reported. For the 'Low Baseline Interaction' a dummy variable for low baseline attendance was included instead of the continuous baseline attendance variable and the squared baseline attendance.

Table 10: Heterogeneous Effects: Probit Estimates with Interactions Terms for Non-Zero and 65% Attendance Dummy Variables

VARIABLES	Non-Zero: Male interaction	65%: Male interaction	Non-Zero: high school interaction	65%: high school interaction	Non-Zero: Black interaction	65%: Black interaction	Non-Zero: Low Baseline interaction	65%: : Low Baseline interaction
Pooled Treatment	0.052** (2.294)	0.053 (1.372)	0.035 (1.310)	0.052 (1.139)	0.067*** (2.703)	0.043 (1.022)	0.044 (1.194)	0.036 (0.919)
Male*Treat	0.026 (0.745)	0.023 (0.416)						
High School*Treat			0.053 (1.399)	0.034 (0.410)				
Black*Treat					-0.012 (-0.308)	0.034 (0.480)		
Low Baseline Attendance*Treat							0.031 (0.758)	0.086 (1.513)

Note: Robust t-statistics in parentheses *** p<0.01, ** p<0.05, * p<0.1

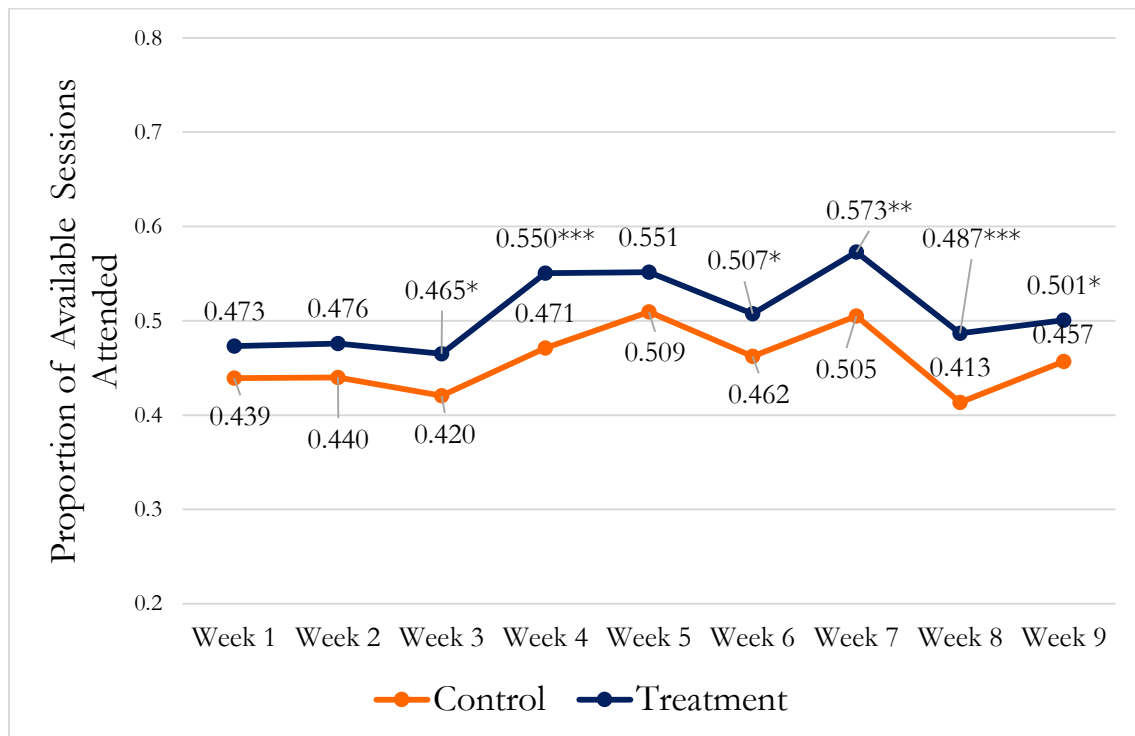
Variables for baseline attendance, baseline attendance squared, black dummy, female dummy, and dummies for each grade included in the regression but not reported. For the 'Low Baseline Interaction' a dummy variable for low baseline attendance was included instead of the continuous baseline attendance variable and the squared baseline attendance.

5.3.5. Dynamic Analysis

Result 9: The treatment effect was sustained and fairly consistent throughout the observation period.

Figure 5. shows that for each week of the attendance period, the treatment group attended more sessions than the control group on average (the difference was statistically significant in weeks 3, 4, 6, 7, 8, and 9)⁵⁹. The treatment effect (the difference between the treatment and control group mean attendance) is smallest in the first week (3.4% more of the scheduled sessions attended), but steadily increases until week 4, where the treatment group attended 7.9% more of the scheduled sessions. This is the largest difference between treatment and control for any of the weeks. However the treatment effect sustains over the period, fluctuating around 5% of scheduled sessions from weeks 2 until 9 (week 8 again produces a treatment effect of 7.4% of scheduled sessions).

Figure 5. Weekly Mean Proportion of Sessions Attended by Group



⁵⁹ This is calculated using a T-test to test the difference in the mean attendance for the treatment group compared with the control group.

In order to check the robustness of this result, a panel dataset was created using weekly attendance figures for the primary outcome variable⁶⁰: learners were the cross-sectional units, whereas weeks constituted the time dimension, consisting of 9 different time periods (each week of the observation period)⁶¹. This paper uses the Random Effects⁶² estimator to account for the panel structure in the data in regression analysis. A Random Effects regression is then run on the full set of controls in Model 1, dummy variables for each week of the observation period, and on weekly interaction terms (the pooled treatment dummy interacted with a dummy for each week) in order to determine the weekly treatment effects. The results from this regression are not statistically or practically different from those presented in Figure 5, confirming these findings (See Table 11 below).

⁶⁰ The *Proportion of Sessions Attended* is the only outcome variable used. The *65% Attendance* outcome is omitted as it loses meaning when using attendance over a single week to determine each observation, as several learners were only scheduled to come twice or three times per week. Furthermore, the *Non-Zero Attendance* dummy is highly correlated with the *Proportion of Sessions Attended* variable and also takes on a very different meaning when looking at weekly attendance, as even high attendees could register some weeks with no attendance. To ensure that omitting these variables does not disguise different treatment dynamics, results for regressions with these variables are included in Table A. 11 in Appendix 8.

⁶¹ The sample thus expanded to 9963 observations; 9 weeks for each learner.

⁶² The Random Effects GLS estimator removes the component of the error term that is correlated across observations over time, in this case the unobserved learner effect, thus removing serial correlation and allowing consistent estimation of the standard errors (Bell & Jones, 2015). Furthermore, the most contentious assumption of the Random Effects model, that the higher level error term (the unobserved learner effect) is orthogonal to our independent variable is met given that our variable of interest, the message treatment, is exogenously determined.

Table 11: Weekly Treatment Effects: Difference in Means Compared to Treatment Co-efficients

VARIABLES	Descriptives	Regression	
	Difference in Mean Attendance per week (Treatment-Control)	Pooled OLS: Weekly Proportion of Sessions Attended	Random Effects: Weekly Proportion of Sessions Attended
Week1 Treatment	0.034 (1.00)	0.030 (1.100)	0.031 (1.167)
Week2 Treatment	0.036 (1.26)	0.038 (1.455)	0.039 (1.471)
Week3 Treatment	0.044* (1.45)	0.043* (1.657)	0.045* (1.670)
Week4 Treatment	0.079*** (2.53)	0.075*** (2.787)	0.075*** (2.847)
Week5 Treatment	0.042 (1.28)	0.037 (1.392)	0.036 (1.382)
Week6 Treatment	0.045* (1.52)	0.042* (1.674)	0.042 (1.601)
Week7 Treatment	0.068** (1.96)	0.060** (2.152)	0.060** (2.278)
Week8 Treatment	0.073*** (2.56)	0.071*** (2.885)	0.071*** (2.709)
Week9 Treatment	0.044* (1.422)	0.040 (1.585)	0.039 (1.499)
Observations	9,735	9,735	9,735
Number of learners in Panel			1,107

Note: Column 1 reports differences in mean attendance per week between the pooled treatment and control groups. T-statistics from a T-test of this difference are in parentheses. Column 2 reports results from a pooled OLS regression, and column 3 reports results from a Random Effects regression where learners are treated as the group or panel units. Robust t-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Variables for baseline attendance, baseline attendance squared, black dummy, female dummy, dummies for each grade, and also dummies for each week of the intervention period are included in the regressions for columns 2 and 3 but not reported.

Qualitatively, each ‘third’ of the observation period (each of weeks 1-3, weeks 4-6, and weeks 7-9) was distinctive in how the programme was effectively implemented. Firstly, weeks 1-3 included several public holidays for which sessions were cancelled, and Downeville School had all sessions cancelled over this period. There was thus minimal continuity over these weeks. By contrast, weeks 4-6 were relatively uninterrupted and enjoyed the most reliable overall attendance, whereas weeks 7-9 included some public holidays and the school exam period. It is thus possible that attendance showed different

patterns and that treatment had different effects over these three distinct periods. This paper tests this by estimating the Random Effects model using the weekly panel data set, this time interacting a dummy variable for each of the three periods with the pooled treatment dummy variable⁶³. Table 12 shows that on average learners from all experimental groups attended more often in the middle third of the observation period relative to the other periods (for both measures of attendance). The table also shows that the treatment interaction terms were relatively large for each period, however, they were larger and only statistically significant in the final two thirds of the observation period. This supports the findings in Figure 5: that the treatment effect strengthened after the first few weeks and then sustained until the end of the observation period.

Table 12: Impact of Treatment over course of Observation Period: Random Effects Model

VARIABLE	Proportion of Sessions Attended	Non-Zero Attendance
Middle Third	0.031*** (2.58)	0.066*** (4.65)
Final Third	0.004 (0.38)	0.016 (1.17)
First Third*Treatment	0.041 (1.56)	0.029 (1.23)
Middle Third*Treatment	0.053** (2.05)	0.061*** (2.58)
Final Third*Treatment	0.059** (2.28)	0.057** (2.46)

Note: Only co-efficients on period and treatment variables are included.*** p<0.01, ** p<0.05, * p<0.1

Variables for baseline attendance, baseline attendance squared, black dummy, female dummy, and dummies for each grade included in the regression but not reported.

Base group in the model is attendance in the first period for the control group.

⁶³ Given the reliance on interaction terms in this section, the pooled treatment variable is used to allow for maximum power in determining treatment effects. This is further justified by the previous section which showed that no difference appeared between each treatment condition.

This suggests that the messages did not affect learner attendance purely through novelty, nor did parents change their behaviour in a necessarily unsustainable way. Rather, it suggests that whatever behavioural adjustments the messages encouraged could become habit; however, a longer observation period is needed to determine this more concretely. The behavioural changes could very well wane over time, but they could also strengthen as the behavioural adjustments become less costly over time through habit formation.

5.4. Mechanisms

The above sub-sections indicate that the message treatment had a sustained positive impact on learner attendance at YeBo. The following sub-section uses the results of the phone call survey to provide insights into potential mechanisms for this effect, particularly focusing on parental behaviours and attitudes regarding YeBo, and parents' capacity to observe attendance.

5.4.1. Survey Responses

Table 13 compares the observable characteristics between survey respondents and non-respondents, and finds that according to baseline characteristics, and end line attendance, there are no significant differences between groups. However, respondents and non-respondents differ on the extent to which they successfully received treatment messages. Thus, survey respondents are largely representative of the full sample according to most observable characteristics, but this data could suffer from endogenous selection on characteristics correlated with message delivery. This is further discussed in Section 6.2.

Table 13: Summary Statistics of Children of Survey Respondents and Non-Respondents

VARIABLES	Non-respondent	Survey Respondent	T-test
Treatment1	0.299 (0.458)	0.297 (0.458)	0.045 (0.963)
Treatment2	0.296 (0.457)	0.3 (0.459)	-0.143 (0.886)
Control	0.406 (0.491)	0.403 (0.491)	0.091 (0.927)
Proportion of messages delivered	0.484 (0.471)	0.58 (0.484)	-3.278*** (0.001)
Baseline Attendance - Proportion of Available Days	0.493 (0.338)	0.518 (0.343)	-1.202 (0.229)
Endline Attendance - Proportion of Available Days	0.487 (0.416)	0.494 (0.41)	-0.272 (0.785)
Female	0.626 (0.484)	0.645 (0.479)	-0.646 (0.518)
Black	0.58 (0.494)	0.548 (0.498)	1.055 (0.292)
Coloured	0.42 (0.494)	0.452 (0.498)	1.055 (0.292)
Age	11.15 (3.342)	11.03 (3.218)	0.574 (0.566)
High School	0.386 (0.487)	0.383 (0.487)	0.089 (0.465)
Primary	0.614 (0.487)	0.617 (0.487)	0.089 (0.465)

Note: Primary statistic is sub-sample mean, Standard deviation in parentheses.

In T-test column, primary statistic is T-stat, p-value in parentheses. *** p<0.01, ** p<0.05, * p<0.1

5.4.2. Survey Results and Parental Engagement

Table 14 presents a summary of the most relevant survey responses in each major category of interest and tests whether these responses differ between the pooled treatment and control groups.

Result 10: Treatment group parents appear more likely to be aware of children’s enrolment and attendance at YeBo, and more likely to engage their children regarding YeBo.

Firstly, treatment and control groups are evenly represented in the survey sample, with 41.1% and 40.8% of each group respectively providing survey data. Most notably, parents in the Treatment condition were far more likely to know about the YeBo programme and their child’s attendance at the programme. In the control group, 27.68% of parents did not know their child’s attendance at YeBo in the week prior to the survey⁶⁴, compared to only 10.23% of parents in the Treatment group. Parents in the Treatment group were also far more likely to engage with their children about YeBo. Out of the Treatment group parents, 62.5% reminded their children to attend YeBo in the week prior to the survey, compared with 38.1% of Control group parents, and were liable to talk to their children 45% more in that same week than control parents (1.65 vs 1.13 times during that week). Furthermore, Treatment group parents were significantly more likely to provide explicit incentives to attend YeBo as compared to the control group, through both rewards and punishments. All of these results are statistically significant after controlling for learners’ baseline characteristics.

⁶⁴ Selected ‘don’t know’ when asked how often their child attended the week before.

Table 14: Summary of Parent Survey Responses by Treatment Condition

Category	N	Control	Treatment	OLS t-statistic ¹
General Characteristics				
N	454	183	271	-
% of total experimental group	454	40.80%	41.10%	0.07
Baseline attendance	454	50.35	52.91	0.80
Programme Knowledge and Attitude				
Did not know about YeBo programme	440	9.60%	2.60%	-3.51***
Did not know about learner's attendance	441	27.68%	10.23%	-5.40***
Average difference between perceived and actual attendance (in days) ¹	366	5.55	4.61	-1.13
In the question, "Attending YeBo has a positive impact on learner school performance": % that Agreed or Strongly Agreed	404	81.29%	82.63%	0.95
Parent Engagement - YeBo				
Reminded child to attend YeBo in previous week	415	38.10%	62.75%	4.14***
Asked child what they learned at YeBo in previous week	416	50.00%	59.27%	1.61
Reward child for attending YeBo	424	9.94%	16.21%	1.79*
Punished child for not attending YeBo	407	15.34%	25.00%	2.47**
Number of times in the previous week parent talked to child about YeBo	428	1.13	1.65	3.41***
Parent Engagement - General				
Parent helps with homework (yes/no)	427	80%	83.27%	0.55
Frequency of parent help (# times per week)	426	2.03	2.16	0.69
Talked to learner about School in previous week	425	87.57%	89.45%	0.57
Talked to learner about Homework previous week	430	81.18%	84.23%	1.07
Talked to learner about Friends previous week	430	60.00%	61.90%	0.73

Parent Efficacy and Role

In the question, “How important is your role in ensuring that the child attends YeBo”: % that indicated it as ‘Important’ or ‘Very Important’	410	54%	79%	3.24***
On a scale of 1-10, strength of Parents' perception of their impact on learner's school performance	421	8.10	8.30	0.93
% that cited themselves as the most important contributor to learner success	426	38.01%	37.25%	-0.36
SMS				
Did parents receive an SMS	444	0%	93.10%	-
If received an SMS, found it useful	237		94.94%	-

Note: Control and Treatment columns provide mean scores for control and pooled treatment groups respectively for survey variables as indicated in the row title; row titles describe form of variable. Dummy variables are reported in “%” terms.

¹T-Statistics are from the co-efficient on the treatment variable from a regression of each survey response on the treatment dummy (the extent that treatment status explains the survey response), applying the same set of controls as in Model 1. Essentially, this provides a statistical test for the difference between treatment and control for each survey response, but removes the effect of any difference in baseline characteristics.

Parental engagement with their children about topics outside of YeBo (referring to conversations regarding homework and school, and the structure of household activities), however, appeared to be the same across experimental groups. None of these responses showed any statistical, or indeed even noticeable, difference. Many of these responses were also generally very positive, indicating that helping with homework or talking about school are either somewhat ubiquitous activities within these households or that there could be a degree of social desirability bias in parents’ responses. This is very possible given the nature of these questions, as putting effort into a child’s schooling could be viewed as a normatively desired action for parents. This notwithstanding, there is no evidence whatever to suggest that the message treatment made any impact on parental engagement beyond YeBo-specific

engagement. This was similar for measures of parental self-efficacy and parents' concept of their parental role, where the only difference between treatment and control was in parent's concept of their role specifically regarding YeBo attendance (79% indicated that they played an important or very important role in ensuring their child attends YeBo, compared to 54% in the control group).

The evidence thus suggests that the message treatment influenced the dynamics between parents and children specifically regarding YeBo, but did not effect any noticeable changes in parental behaviour and attitude outside of this. The survey results further show that parents who received messages were better able to monitor YeBo attendance, more likely to engage their children in order to encourage attendance, and more likely to provide explicit incentives to attend.

In order to identify the specific causal channels through which the message influenced attendance, a 'mediation analysis' is conducted, treating the above variables derived from the survey as potential 'mediators' of the treatment effect on attendance.

5.4.3. Mediation Analysis

According to Baron and Kenny (1986) and applied mediation analysis in the parental engagement literature (Hill & Craft, 2003; Connel, 1993), evidence of mediation is based on three criteria:

1. The independent variables (assignment to treatment conditions) are related to the dependent variable (attendance).
2. The independent variables (assignment to treatment conditions) are related to the mediators (parental behaviours as described in survey data), and
3. Mediators are related to the dependent variables (attendance) and reduce the relationship between the dependent (attendance) and independent variable (treatment) when added to a regression model.

If these conditions are met, it is likely that the treatment effect on attendance was mediated through specific parent behaviours and attitudes. Section 5.3 suggests that the data meets condition 1 for the *Proportion of Sessions Attended* and *Non-Zero Attendance* outcomes: treatment is significantly associated with more attendance. Tables 15 and 16 below show that this largely holds for the survey sub-sample⁶⁵.

⁶⁵ It remains significant for the Tobit model for the Proportion of Sessions Attended, and for the Non-Zero Attendance. However, becomes insignificant for the OLS model. The sample size here reduces from 1107 to 454, which could indicate that the insignificance of OLS is related to low power. The 65% Attendance outcome, however, does not satisfy condition 1 ($p=0.4$ for the treatment effect in survey sub-sample) and is thus omitted from mediation analysis.

Several mediator variables also meet condition 2, as indicated in the final column in Table 14: these parent attributes are significantly related to treatment status. In order to determine whether these variables meet condition 3 and specifically mediate the impact of the treatment intervention on learner attendance, Models 1, 2, 3 are estimated for the *Proportion of Sessions Attended* and *Non-Zero Attendance* outcomes including each of the potential mediator variables that meet condition 2⁶⁶.

Result 11: Treatment appears to increase learner attendance through increasing parents' capacity to monitor YeBo attendance and inducing parents to talk more to their children about YeBo.

In columns 2 and 1 of Tables 15 and 16 respectively, treatment status is a significant predictor of attendance in the Tobit and Probit specifications. As mediating variables are added to the analysis, the treatment co-efficient both loses significance in all models and often reduces in size, suggesting a mediating effect. Only the variables for rewarding and punishing attendance produce a very limited reduction in the treatment co-efficient across models. Of those variables that noticeably reduce the co-efficient on the treatment variable, two also significantly explain attendance: talking about YeBo and parents' capacity to observe attendance⁶⁷. These two variables thus appear to mediate the message's impact on learner attendance. It is also noteworthy that these variables are highly significant and noticeably reduce the treatment co-efficient across all models in both tables. Parent's capacity to observe attendance appears to produce the strongest mediation effect, and is highly significant in all specifications ($p < 0.000$). Given the composite nature of the variable, the coefficient on *Capacity to Observe Attendance* in the Tobit and Probit models respectively implies that if parents knew about learner's enrolment at YeBo, knew about attendance over the week prior to assessment, and knew

⁶⁶ A composite variable to capture parent's capacity to monitor is created, combining dummy variables for whether or not parents were aware that their children were enrolled at YeBo, aware of their attendance over the term, or were aware of their attendance in the week prior to the survey (Cronbach's alpha = 0.75). Otherwise, the other parent behaviours are included in their pure form as in Table 14. Composite measures for parent communication and for explicit incentives to attend did not pass for internal consistency ($\alpha = 0.48$, $\alpha = 0.28$).

⁶⁷ Though the variable 'Rewards Attendance' also significantly explains attendance, it only marginally decreases the co-efficient on treatment, and in the case of the Probit model, the treatment variable remains significant. Thus, though it explains attendance, it does not appear to have a strong enough relationship with treatment status to mediate the impact of treatment.

about attendance over the term, the learner would attend 37.9% more sessions, or would be 21% more likely to attend at all, *ceteris paribus*.

Therefore, messaging parents appears to influence parents' engagement with their children regarding YeBo and improves their capacity to observe YeBo attendance. These changes in behaviour and capacity in turn appear to positively influence learner attendance. Given that this analysis represents only a self-selected sub-sample, however, the findings in this section should only be taken as suggestive. Section 6.2 provides a more detailed discussion on the validity of these results.

Table 15: Mediation Analysis for Proportion of Sessions Attended Outcome: Tobit and OLS Models

VARIABLE	OLS:	Tobit	OLS	Tobit	OLS	Tobit	OLS	Tobit	OLS	Tobit	OLS	Tobit	OLS	Tobit	OLS	Tobit
Pooled Treatment	0.035 (1.23)	0.045* (1.68)	0.009 (0.28)	0.021 (0.54)	0.03 (0.84)	0.047 (1.11)	0.03 (1.02)	0.053 (1.43)	0.028 (1.00)	0.049 (1.33)	0.017 (0.62)	0.029 (0.94)	0.009 (0.30)	0.029 (0.76)	-0.012 (-0.33)	-0.012 (-0.29)
Capacity to Observe Attendance			0.220*** (4.07)	0.379*** (4.29)											0.322*** (3.74)	0.554*** (-4.62)
Regularly Reminds to Attend					0.015 (0.32)	0.048 (0.84)									-0.034 (-0.81)	-0.018 (-0.37)
Rewards Attendance							0.082** (2.12)	0.128*** (2.68)							0.068* (1.84)	0.109*** (-2.65)
Punishes Non-attendance									-0.022 (-0.35)	0.006 (0.07)					-0.036 (-0.57)	-0.03 (-0.39)
Freq. of talk about YeBo											0.045** (2.86)	0.067*** (3.31)			0.038* (2.02)	0.055** (2.33)
Efficacy Regarding YeBo Attendance													0.079 (1.66)	0.105 (1.53)	0.015 (-0.32)	0.005 (-0.08)
N	454	454	441	441	415	415	424	424	407	407	428	428	410	410	362	362

Note: Primary Statistics are regression co-efficients for the OLS and Tobit model regressions on the *Proportion of Sessions* outcome variable. Robust t-statistics in parentheses *** p<0.01, ** p<0.05, * p<0.1

Variables for baseline attendance, baseline attendance squared, black dummy, female dummy, and dummies for each grade included in the regression but not reported.

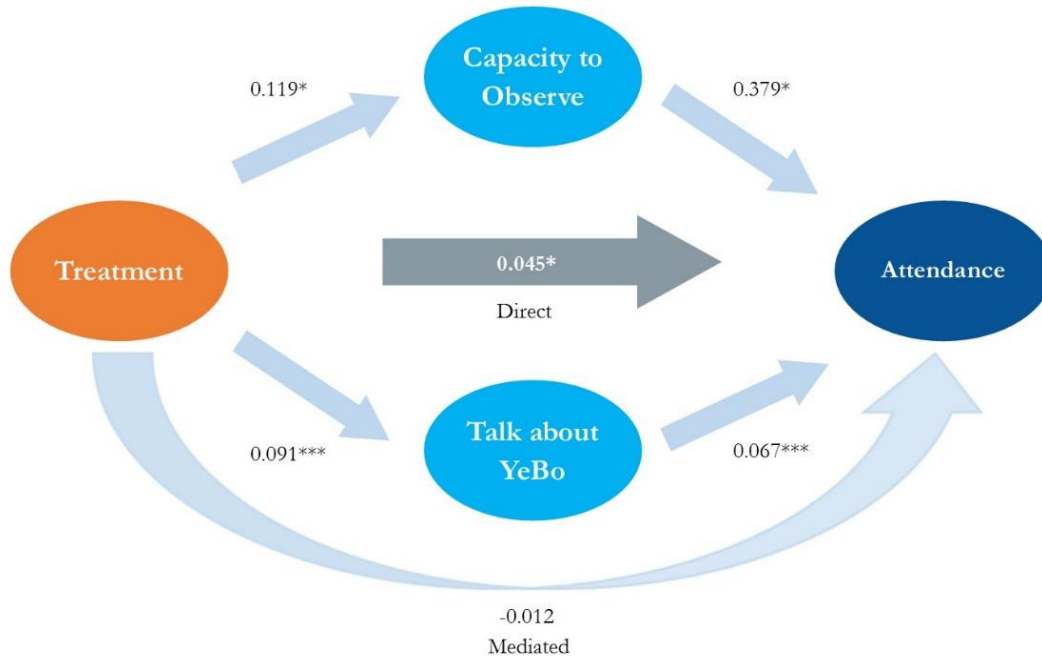
Table 16: Mediation Analysis for Non-Zero Attendance Outcome: Probit Model

VARIABLE	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Pooled Treatment	0.080** (1.98)	0.059 (1.392)	0.070 (1.585)	0.079* (1.817)	0.067 (1.586)	0.036 (1.088)	0.078* (1.816)	0.028 (0.633)
Capacity to Observe Attendance		0.210*** (3.677)						0.264*** (3.497)
Regularly Reminds to Attend			0.054 (1.054)					-0.031 (-0.811)
Rewards Attendance				0.113** (2.022)				0.067* (1.859)
Punishes Non-attendance					0.061 (1.065)			0.047 (0.941)
Freq. of talk about YeBo						0.070*** (4.017)		0.070*** (4.221)
Efficacy Regarding YeBo Attendance							0.035 (0.573)	-0.039 (-0.840)
N		441	415	424	407	428	410	362

Note: Primary statistics are regression co-efficients for the Probit model regressions on the *Non-Zero Attendance* outcome variable. Robust t-statistics in parentheses *** p<0.01, ** p<0.05, * p<0.1

Variables for baseline attendance, baseline attendance squared, black dummy, female dummy, and dummies for each grade included in the regression but not reported.

Figure 6. Mediation of Treatment Effect on Proportion of Sessions Attended: Tobit Estimate



Note: This Diagram illustrates the mediating effect of parent characteristics. Arrows and figures represent relationships between variables as per regression coefficients in Table 15; the dark arrow represents the direct treatment effect on attendance and the curved light arrow represents this effect after adding mediating variables.

5.5. What Did Parents Say?

During the phone call survey parents provided additional insights outside of the quantitative data analysed above. Furthermore, a focus group session was conducted with YeBo facilitators to examine their own experiences and insights regarding the message treatments (See Appendix 9 for the full transcript). These two sources provided valuable qualitative insights that expand on and in some cases support the quantitative findings.

Firstly, the most common reference from both parent comments and focus group comments was that messages provided information regarding learner attendance that parents did not previously have. Parents frequently cited cases of children lying about their attendance, and their incapacity to monitor this, particularly parents who also reported having to work late. Similarly, many parents appreciated

the message because their incapacity to monitor children in the afternoon led them to worry that their children were roaming the streets in the dangerous areas around the schools. Out of the 44 parents who made additional comments, 22 specifically referenced difficulties in monitoring attendance. The following pair of parent comments illustrate these themes:

Learner ID 155, Father: *“I love the messages, because I know she isn't walking around on the street and that she is safe. I also like them because they show the teachers at YeBo care.”*

Learner ID 167, Father: *“I really appreciate the messages. Who's going to just do that for you, tell you your kid is going or that he must go? I didn't know he wasn't attending on Thursday and now the messages told me”*

The facilitators in the focus group confirmed these phenomena, stating that some parents had come to YeBo sessions themselves and called facilitators directly; they were usually very surprised that their children were not attending when they were under the impression that they were. This strongly resonates with Burzstyn and Coffman's (2012) and Bergman's (2012) findings that parents demand tools to observe true school attendance.

Furthermore, and as alluded to in the parent comments above, several parents indicated that they appreciated messages because they gave the impression that the school, or YeBo, 'cared' for them. Many parents also alluded to difficulty communicating with schools, whether due to time-constraints or some form of personal resistance (they sometimes found schools unwelcoming). These findings could indicate that the school engagement these parents experience is limited, or that typical channels of school communication are ineffective.

Expanding on both of the above findings, several parents indicated that they desired more communication. One control group parent captured this in the following statement:

Learner ID 1092, Mother: *“We really would like more information from YeBo and about YeBo - we only get feedback at the end with reports and it isn't enough”*

The strong indication that parents appreciated and desired messages (95% of recipients in the treatment group found them useful – see Table 14), and the frequent reference to a lack of information, particularly regarding attendance, support the notion that parental communication,

particularly via text messages that can target ‘hard to reach’ parents, can be a powerful medium to better engage parents.

The Focus group also alluded to an unintended consequence of the intervention. One facilitator referred to a child who did not want to attend YeBo but was forced to, as the message alerted their parents to their non-attendance and they indicated that they would be punished if they left (see Table 14: parents in treatment group were more likely to punish children). This child was often disruptive and did not engage with the material. Several other facilitators confirmed that some learners attended in spite of strong reluctance. However, facilitators noted that in the majority of cases learners who returned to the programme after a long absence remained productive in class. They further noted that cases where children disrupted class or were patently there against their will were the exception, and that most learners who returned re-engaged with YeBo. Facilitators perceived the messages as net beneficial.

6. Limitations and Caveats

In spite of the care taken to protect the study’s rigour in the experimental design, intervention implementation, and in statistical analysis, several caveats and limitations of the study must be noted.

6.1. Spillovers

Randomisation occurred at the individual and not the household level, and thus in several cases control group learners shared a household with learners in the treatment group. In these cases, parents who received a treatment message could have changed their behaviour and attitudes towards both treatment and control group children within their household, and thus generated intra-household spillover effects. Of the control group, 18 learners’ shared a household with a treatment group learner. In spite of this small number, these 18 learners experienced significantly greater end line attendance than the rest of the control group after controlling for baseline attendance ($t=1.58$, $p=0.064$). Indeed, once these contaminated control observations were removed from the full sample the OLS estimate changed from 0.50 to 0.56, the Tobit estimate from 0.57 to 0.61, and the Probit estimate for the 65%

Attendance variable from 0.067 to 0.071⁶⁸. This suggests that intra-household spillovers occurred, but that given the small number of control students in treatment households, the impact on treatment effect estimates was small. In a similar intervention, Rogers and Feller (2016) find that parental messages affected control group learners almost as much as their treatment group siblings, in spite of information only being pertinent to the treatment child.

School level spillovers could have also affected results: learners from the treatment groups could have influenced their control group peers, as all YeBo centres had balanced proportions of both treatment and control group learners; unfortunately, this experimental design makes it impossible to measure these spillover effects. Avvisati et al. (2014) used an experimental design to test intra-class spillovers from an intervention to increase parental engagement, and found that spillover effects on learner attendance amounted to approximately half of the total effect on treatment group learners. It is very possible that the messaging intervention could have experienced similar spillovers, as it is likely that a child's decision to attend YeBo is to some extent contingent on others attending, whether through peer pressure or simply because attending YeBo is more appealing when friends attend. This could also have understated the treatment effect, though there is no way to test this empirically with the given data.

6.2. Survey Selection

The survey was conducted via telephone interview and only 41% of the total sample provided responses. Whilst any telephonic survey is subject to the problem of social desirability bias⁶⁹, a more serious issue to consider in this analysis is that of sample selection bias. Parents who answered phones and opted to respond may be different from those who did not, making it difficult to generalise survey findings to the full sample. However, as indicated in Table 13 above, baseline and demographic characteristics between survey respondents and non-respondents were not significantly different. The

⁶⁸ The co-efficient for *65% Attendance* changed from insignificant ($p=0.104$) to significant ($p=0.062$), however, the co-efficient on *Non-Zero Attendance* remained unchanged once the contaminated observations were removed. See Table A9 in Appendix 6.

⁶⁹ Interviewers were instructed not to mention the SMS treatment until the final question and were ignorant of treatment status, and both control and treatment group parents received phonecalls and other communication from YeBo employees (who were also blind to treatment status) over the course of the year. Thus, the systematic differences in response by treatment status are unlikely to be the effect of reporting bias.

same applied for end line attendance ($p=0.392$). However, those that responded to the survey were more likely to have received treatment messages: 96% of treatment messages delivered to survey respondents against 86% for non-respondents ($p<0.000$). Furthermore, 42 answered calls in the survey (7.4% of the total 567 answered calls) were to wrong numbers. This group falls entirely within survey non-respondents; if a number was incorrect, the survey was stopped immediately. It is also reasonable to assume that a similar proportion of parents that did not answer the calls (540 parents) also had incorrect contact details – this group also falls within non-respondents. The effective level of treatment (the number of treatment messages parents received on the correct contact number) is thus far lower for non-respondents than respondents. In spite of this, however, non-respondents did not experience a diminished treatment effect⁷⁰.

Thus, the survey sample selection appears non-random and determined by unobserved criteria that are distinct from those that determine attendance, but are correlated with having incorrect contact details and non-functioning phones. Survey results should thus be interpreted with caution.

6.3. Different Message Designs

Though the core information and design features of treatment messages (greeting to parents, attendance information, and plea to encourage attendance) were consistent for all messages within treatment conditions, there were slight differences in wording between messages depending on how often learners attended during the previous week (see Table A1 in Appendix 1). For 4 of these 5 variations the wording was very similar. However, in the message sent when learners missed all sessions from the previous week, loss aversion was also invoked and parents were informed of the specific days of the week that learners should attend. These features were included to enhance the message's capacity to refocus parents' attention to YeBo and to induce behaviour change, and were not designed to be specifically tested. This is similar to features such as the timing of sending messages and addressing parents in the first person⁷¹, which were also intended to increase the message's impact

⁷⁰Model 1 and 2 were estimated including an interaction term, *treatment*survey response*. The term had a positive co-efficient, indicating that non-respondents could have actually experienced a slightly larger treatment effect; however this was not significant ($p=0.92$).

⁷¹ Messages were sent at the beginning of the week to ensure that the previous week's attendance information was still applicable and referred to a period parents could easily recall, and apply information to the coming week. Also, sending

and are also not separately tested. Therefore, this paper makes no specific claims as to the efficacy of different message variations and additional message features (other than from adding an additional sentence focusing on afterschool programme benefits, which is tested in treatment 2). Some extra analysis suggests that all message wordings could have induced higher attendance.⁷² However, given that receiving these different variants is endogenously determined, this cannot be robustly tested.

Both treatment 1 and treatment 2 groups received the same proportion of the ‘loss aversion’ style message (40.6% and 40.9% respectively; $p=0.789$), suggesting that this specific variant did not affect comparison across treatment groups. Furthermore, both groups received statistically similar proportions of all message variants.

6.4. Additional Limitations

As discussed in Section 5.2, the majority of messages were sent on time and successfully delivered to parents. The major exception to this is that no messages were sent to Downeville in the first four weeks of the intervention period. Furthermore, seven contacts either indicated that their details were incorrect and that they were not parents of the relevant treatment group child, or opted not to continue receiving the message. These seven represent the only attrition in the sample, and are evenly distributed across treatment groups⁷³. Given that the analysis in this paper measures the ‘Intention-to-treat’ (ITT) effect, all the above observations remain in the analysis, and there is no reason that they should have differentially influenced each treatment group.

messages in the evening increased the likelihood parents would be with children when receiving messages and therefore could spur an immediate engagement. The first person address was intended to invoke social norms more strongly and to be perceived as ‘warm’ in tone.

⁷² Learners in the treatment group that received none of the ‘loss aversion’ variation of message (they attended at least once in every week) showed higher attendance than similar control group learners (using propensity score matching) after controlling for baseline characteristics ($t=3.874$, $p<0.01$). Propensity score matching paired these treatment group learners with control group learners with the same baseline attendance and other baseline characteristics. However, any characteristics that affect attendance that are not identified in baseline data could cause endogeneity in this result (Caliendo & Kopeinig, 2005).

Treatment group learners who received the ‘loss aversion’ variation of message in the first treatment week (the only week for which this variation is not endogenous to treatment) attended significantly more sessions than control group learners who also did not attend the first week ($t=2.20$, $p=0.04$). This shows that this specific message variation could have had a positive effect on attendance. However, this is only tested for those who received it at least once although there were nine treatment weeks in total, which significantly limits this finding.

⁷³ This included 4 contacts from treatment 1 and 3 contacts from treatment 2.

Section 5.2 indicates that the majority of messages were successfully delivered: approximately 91% of messages sent over the course of the intervention. However, as Figure 2. shows, this proportion declined over the course of the intervention. Anecdotal evidence from engaging YeBo administrators suggests that acquiring parent contact details is difficult, and also that parents in these low-income environments have a high rate of contact number turnover, exacerbating the problem. Similarly, as alluded to in the previous section, many parents' contact details were incorrect, suggesting that many parents in the treatment groups did not receive the messages. The phone call survey yielded 24 wrong numbers from amongst the 567 sampled parents, while it is likely that were more incorrect numbers amongst the 540 parents who were not sampled. The above findings indicate two features of the intervention: it is likely that the treatment effect of the messages on those who received them was understated⁷⁴; and that the sustainability of similar interventions crucially depends on the accuracy and frequent update of contact details.

Finally, a lack of information on parent and household socio-economic characteristics limited the analysis. Minor socio-economic differences across groups could have influenced the intervention's outcomes; however, this is unlikely. YeBo schools were chosen precisely because they fit a specific socio-economic profile (low-income areas where after-school facilities are limited and scarcity conditions limit parental engagement). Given South Africa's spatial inequality, the learners from these types of schools tend to come from homes with similar socio-economic characteristics (Lemon & Battersby-Lennard, 2010; Van der Berg, 2007). Furthermore, stratifying the randomised groups by school ensures that each area (with markedly similar socio-economic characteristics) is equally represented in each experimental group. Samples were further balanced across other observables (some of which are typically correlated with socio-economic status, such as race and baseline attendance). The nature of the sample and the success of randomisation thus make it reasonable to assume differences at end line were not attributable to differences in SES. However, the lack of SES data limited this paper's capacity to measure heterogeneous effects across SES characteristics. Given

⁷⁴ The treatment effect on the treated (TOT) is estimated using treatment status as an instrumental variable for the number of treatment messages received, and find that the treatment effect is 0.058 (comparable to the OLS estimate of the pooled treatment effect of 0.050) suggesting that those who received all messages, after controlling for endogenous selection, experienced a slightly higher treatment effect (though this co-efficient is not statistically different from the original OLS estimate). See Table A10 in Appendix for full results.

that the intervention is hypothesized to function in scarcity contexts for specific behavioural reasons, this additional data could have provided valuable insights.

7. Discussion

The intervention reported in this paper used weekly text messages to parents to increase learner attendance at the YeBo after-school programme. Overall, messages increased attendance according to several measures. Learners in the treatment group attended 5.6% - 6.1% more sessions after controlling for baseline characteristics and intra-household spillover effects, and were 6.1% more likely to attend any sessions over the observation period. These results were highly significant and robust to multiple specifications.

These results represent a slightly larger treatment effect than similar parental messaging interventions in the US and the UK. Several comparable interventions find no significant effect on attendance (Balu et al., 2016; S. Miller et al., 2016), while others find effect sizes ranging between 1% and 3.6% for different attendance measures⁷⁵ (Bergman, 2015; Rogers & Feller, 2016). Kraft and Rogers (2015) provide the exception to this, as messages in that intervention reduced dropouts by 6.1%⁷⁶, the same as in this paper (using the measure for whether or not learners attended any sessions).

Though there is a strong case that treatment messages increased both the chances that learners attended any sessions and the proportion of sessions that learners attended, it is less clear whether they increased the probability of achieving the government-mandated 65% attendance rate. Overall, the evidence suggests that there was a small positive effect⁷⁷.

The telephone survey and mediation analysis provide some explanation of potential mechanisms behind these effects. Parents who received treatment messages were more likely to talk to their children about YeBo and more likely to observe their true attendance record. In turn, these children

⁷⁵ Using the same basing as used in this paper. Several papers use treatment effects as measured as a % change relative to the control group mean, whereas this paper measures treatment effect as a percentage of the overall available sessions.

⁷⁶ The authors do not present treatment effects according to total or the proportion of days attended and it is thus difficult to compare findings with other measures of attendance in this paper.

⁷⁷ In the original probit models, treatment 2 was statistically significant, but at a low level ($p=0.091$), while in the random effects specification the pooled treatment group was also significant ($p=0.034$). Table 8 also shows that for certain sub-groups learners receiving treatment were more likely to attend 65% of sessions.

had higher attendance rates. Anecdotal evidence from the YeBo focus group and from the telephone survey suggest that reducing information asymmetries between parents and learners was a key feature of the intervention, and that several parents were unaware of or misinformed of their children's true attendance. This is consistent with the literature reviewed in Section 2.1 that finds that parents' capacity to observe attendance is important for successfully incentivising children to invest in education (Bursztyn & Coffman, 2012; Hao et al., 2014; Weinberg, 2001). Other messaging interventions also find that messages reducing information asymmetries were positively related to parents using incentives to encourage learning (Bergman, 2015; Rogers & Feller, 2016). The finding that talking to children more about YeBo could have positively affected attendance is also consistent with much of the parental engagement literature, which finds a positive relationship between engagement and learner investments (Desforges & Abouchaar, 2003; Houtenville & Conway, 2008; Mayer et al., 2015).

As discussed earlier, however, survey results should be read with caution given potential endogenous selection in this sub-sample. Additionally, relying on parent self-report makes it difficult to isolate discrete parent behaviours. Though the survey measures 38 indicators of parent behaviours or attitudes, and only two qualify as mediators of the treatment effect, the parental engagement literature shows that engagement is highly complex and includes subtle behaviours that may not be captured in the self-reported survey. Some of these subtle behaviours could also be correlated with the parental engagement measures in this paper. For example, the frequency with which parents talk to their children about YeBo may correlate with other parental behaviours, such as playing learning games, which could also influence attendance. Thus, similarly to the rest of the parental engagement literature, this paper cannot definitively determine the true parental behaviour responses that affect attendance.

Treatment 2 produced similar effects to treatment 1 for most measures of attendance⁷⁸. The extra sentence focusing attention on concrete future benefits therefore appears to make little impact on learner attendance. There are several possible explanations for this. Firstly, messaging in itself could be insufficient to counteract a high rate of time-discounting. By contrast, Karlan et al. (2010) show that messages focusing on concrete savings goals increased savings more than simple reminder

⁷⁸ In the original estimate for the *65% Attendance* outcome treatment 2 was significant and treatment 1 was not, however, these co-efficients were not statistically different. For all other outcomes there was no practical or statistical difference between treatment 1 and 2.

messages, suggesting that a focus on future benefits can increase investments. However, this has not been tested for education investments.

Secondly, the additional sentence could have reduced the salience of the information in treatment messages. The average number of words per message for treatment 2 was 44.3 compared to 30.3 for treatment 1, suggesting that this could be the case. The information on future benefits may have especially lacked salience as this came towards the end of the message.

Finally, parents could have already been acutely aware of the future benefits of education, and thus not require reminding. Several authors show that low-income parents often place a high value on education (Bursztyn & Coffman, 2012; Edmonds, 2006). For example, Bursztyn and Coffman find that some of Brazil's poorest parents were willing to spend up to 30% of their monthly income on a mechanism to commit children to attending school. Results from the telephone survey suggest that parents in this sample place a similarly high value on education across both treatment and control groups⁷⁹. These explanations cannot be tested in this analysis, but provide suggestions for the lack of additional impact in treatment 2 and possible areas for future research.

Though the messaging intervention increased learner attendance at YeBo in the short run, the question arises of whether this intervention is sustainable and scalable. Section 5.3.5 shows that treatment effects increased after the first few weeks of the intervention and then remained consistent for the remaining weeks, oscillating around 5.5%. Over this same period, message delivery rates declined from 96% to 89%. That treatment effects did not diminish in spite of declining message delivery suggests that messages could have induced positive habit formation, where the costs of engaging learners became lower as it became part of parents' routines. This suggests that the intervention has potential to be sustainable. However, it is difficult to determine how treatment effects could change if the delivery rate dropped to lower levels. It could be that treatment only induces certain behaviours above a threshold level of received messages. A longer intervention period and a post-intervention follow-up is necessary to properly determine how both message delivery and treatment effects change over a longer period.

⁷⁹ 98.5% of parents surveyed in this paper indicated that they preferred their children to attend tertiary education rather than work immediately after high school. No significant difference between the treatment and control groups ($p=0.22$)

The relatively low marginal cost of implementing this intervention also makes it conducive to scaling. Marginal costs include the cost of sending the SMS via the bulk SMS platform and weekly labour of approximately three hours per week, which amounts to R0.55 and R0.46 per learner per week respectively⁸⁰. These per learner costs should remain close to this fixed ratio as the intervention grows. Moreover, fixed costs are largely insensitive to scaling⁸¹. The incremental cost of this intervention is therefore R1.03 per learner per week. Using a conservative treatment effect of 5%, it therefore costs R7.98 (\$0.59US; \$1.14US PPP adjusted) for each extra day learners attend due to the intervention⁸². This compares favourably to similar interventions in the US (Rogers and Feller (2016) found it cost approximately \$5 per extra day).

From a cost and implementation perspective, scaling this intervention thus appears highly feasible. However, successful scaling also depends on the external validity of this paper's key findings. Several features of the intervention design and analysis suggest that it has potential across multiple contexts. Firstly, the targeted areas were all low-income and share similar characteristics to most at-risk areas and schools in Cape Town⁸³. Secondly, the selected cross section of schools are representative of racial demographics amongst Cape Town's low-income groups. Thirdly, the heterogeneous effects analysis shows that treatment effects are significant across all sub-groups within the study⁸⁴.

YeBo participants, however, are self-selected, as learners must actively register and parents must provide written consent to participate in YeBo. This group could thus have different characteristics to the general population of parents and learners in these areas, such as higher motivation.

⁸⁰ See Table A. 4 in Appendix 3 for a summary of costs.

⁸¹ Initial set up required 9 hours of work from research assistants at R120 ph. Further set up costs included R1000 on translation fees and R1529 on test and welcome messages. Total set-up costs thus came to R3609. The per message fixed cost should tend towards zero as the intervention grows in scale and over time (in only ten weeks, the cost per message was down to R0.55). Given that messages are centrally distributed from an online platform and that system set-up and translation costs are once-off, the fixed costs of extending the intervention time-frame and adding learners should be near zero. Adding new schools or new learners would require a small once-off labour costs to add their details to existing lists.

⁸² Using the marginal cost, R1.03 per message and treatment effect of 5%, and the average number of available sessions per learner per week over the observation period of 2.53 sessions.

⁸³ Average mathematics standardised test scores range from 36-52% for primary schools (Grade 6 scores) and from 17-34% for high schools (grade 9 scores) in the sample, with a sample mean of 40.8% and 26.2% respectively. These are similar to most schools in Cape Town's low-income areas and are lower than the provincial averages, at 45.8% and 33.9% for grades 6 and 9 respectively (Western Cape Government, 2016a). Furthermore, the areas in which these schools are situated have a mean annual income per capita far below the Cape Town average of R160000, ranging from R35700 pc in Phillipi to R112000 pc in Mitchell's Plein (StatsSA, 2012). In fact, 16 of the 18 schools are in areas with an average annual income less than one-third of the city average.

⁸⁴ For the *Proportion of Sessions Attended* outcome, and for *Non-Zero Attendance* for most sub-groups. The *65% Attendance* outcome also showed significant treatment effects for several sub-groups.

Furthermore, learners were only included in the study if they provided valid parent contact details. This comprised 1107 of the 1689 YeBo participants. Differences in baseline attendance indicate that these learners were different from those in the sample (sample group learners attended 5% more at baseline; $p=0.007$). Following this, parental messaging could have a different impact for groups where enrollment is mandatory, such as school classes, compared to where learners self-select. The impact could also be different for learners who are less likely to provide parent contact details; in many cases, parents may not have any valid contact details, which would totally mitigate the potential of messaging these parents. Moreover, the success of the intervention in this paper depended on the availability of reliable administrative data and timely attendance data throughout intervention. Applying the same intervention in another setting would therefore also require well-functioning data collection systems.

Overall, the core findings in this paper could hold in similar messaging interventions with low-income urban parents where learner enrollment is voluntary. These interventions would require valid parent contact details and existing data collection systems to be effective. Future research could test the effect of parental messaging on school attendance, where enrollment is compulsory and where the impact could be greater, as children spend most of their formal education in school classes. In fact, Motala (2011) finds that a 'lack of parental interest in education' is the largest single reason given for learner absenteeism in South African schools, while most other reasons are related to low-income status. There thus appears to be potential for using messaging to improve school attendance. Legally, schools are required to keep attendance records, and in a 2007 report Weideman et al. (2007) find that most schools surveyed kept attendance records. However, this report also found that these records are disaggregated and there is little recent evidence of the reliability of school attendance records. This could prove a challenge to the expansion of messaging into schools.

Given that attendance is a simple and unidimensional indicator of learner effort, future research should also test the effect of parental messaging on a broader range of outcomes. This should include in-class learner behaviour, homework completion, and other indicators of learner effort, as well as learner outcomes, such as test scores. This research could also make greater efforts to measure how messaging impacts intra-household dynamics, though this would be subject to many of the challenges faced in this paper regarding measuring parental engagement. The strength and significance of the findings in this analysis suggest that messaging could materially affect other behaviours and outcomes, and thus future research on parental messaging could provide invaluable policy insights.

8. Conclusion

This paper focuses on the important role that parents can play in encouraging learner investments in education. In South Africa, low-income parents face a range of challenges that stifle their ability to engage their children and which consequently help to sustain the education gap between rich and poor. This paper shows that these parents can benefit from a nudge to engage their children. Parental messaging provides such a nudge, and in this intervention significantly increased learner attendance at the YeBo after-school programme. While many RCTs suffer from limited external validity, this intervention shows potential across low-income urban areas in the Western Cape for a number of reasons, including its relatively low cost. Parental messaging could thus be inexpensively scaled to other after-school centres in the province. Future research should also test whether messaging can effect a wider range of improved behaviours.

This intervention's capacity to reach poorer parents, its low cost, and positive effect on learners' education investments make it a policy candidate to raise the prospects of low-income learners. Parental messaging could thus go a small way towards improving education outcomes for the poor and eventually help chip away at the edifice of South Africa's educational inequality.

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Appendix 1. Messages

Table A. 1: Messages: Both Treatment 1 and Treatment 2

Number of Sessions Attended in Previous Week	Message
Zero	Dear Parent/Guardian of [Trevor], YeBo provides important learning experiences, which [Trevor] missed because [he] did not attend YeBo last week. Please encourage [Trevor] to attend YeBo on [Tuesday and Thursday] afternoons. We appreciate your help
1/3	Dear Parent/Guardian of [Trevor], Trevor attended 1 out of 3 YeBo sessions last week. We know [he] can do better, and appreciate that you encourage [Trevor] to attend more sessions starting this week! Thank you for your continued help”
1/2	Dear Parent/Guardian of Trevor, Trevor attended 1 out of 2 YeBo sessions last week. Please encourage him to attend all sessions this week! We appreciate your help
2/3	Dear Parent/Guardian of [Trevor], [Trevor] attended 2 out of 3 YeBo sessions last week. Please encourage [him] to attend all 3 sessions this week! We appreciate your help.
All	Dear Parent/Guardian of [Trevor], [Trevor] attended all 3 YeBo sessions last week! Thank you for your support and for helping [him] keep up the good work.

Table A. 2: Treatment 2 Additional Sentences for Messages

Children who attend after-school programmes are more likely to stay out of trouble in school.

Children who attend after-school programmes are more likely to behave better at home.

Children who attend after-school programmes are more likely to go to school.

Children who attend after-school programmes are more likely to do better at school.

Children who attend after-school programmes are more likely to listen to teachers and parents.

Children who do better at school are more likely to get a good job in future.

YeBo can help Trevor succeed at school.

YeBo can help give Trevor the skills he needs for a successful life.

YeBo is an investment in a better life for Trevor.

Example of Treatment 2 for previous week attendance of 1/3 sessions

Dear Parent/Guardian of Trevor,

Trevor attended 1 out of 3 YeBo sessions last week. Children who do better at school are more likely to get a good job in future. Thank you for encouraging [his] attendance on a weekly basis! We appreciate your help

Appendix 2. Intervention Timeline and Record of Implementation

Table A. 3: Intervention Timeline and Record of Implementation

Date	Message type	Recipient	Details	Treatment 2 - Additional Sentence	Number Sent
14/07	Opening Message	All	Message sent to full group for which we originally had contact numbers (1357) to ascertain how many had valid numbers and to serve as an introductory message		1357
17/07	2nd Opening message	All	Second message sent to full group - second number test and second introduction. Finally, 1077 numbers function. After removing duplicates and wrong numbers from original lists, the final sample includes 1041.		1357
25/07	Opening Message	New Contacts	Same as opening message sent to additional 89 numbers acquired from updated attendance lists. Most are not on original April list and include learners who registered between May1 and June 1.		89
27/07	Treatment message 1	Treatment Groups	Message sent to treatment groups only; all schools; full experimental group of 1041 to begin; messages sent one day late owing to delays in attendance data updates - this was something of a teething exercise, however, internet malfunctioning at AVA contributed to delays; messages sent between 7h30pm and 8h30pm.	"YeBo can help give Trevor the skills he needs for a successful life."	620
28/07	Replies	Replies	3 contacts attrite - wrong numbers		
01/08	Treatment Message 2	Treatment Groups	Message sent to treatment groups ; Downeville school left out due to gang violence at school and thus no YeBo sessions; No errors; messages sent between 7h30 and 8h40	"Children who attend after-school programmes are more likely to listen to teachers and parents."	576
02/08	Replies	Replies	2 contacts attrite - wrong numbers		

04/08	Opening Message	New Contacts	Same as opening message, but sent to 29 new numbers, acquired from asking learners for updated numbers. New numbers pooled with 89 numbers acquired from May and June lists. Out of the total of 118 new numbers, only 75 delivered, and only 66 were for new learners (9 were already included in the original sample as we had contact details for them from April; the 66 were newly acquired from May and June attendance registers). Thus the experimental groups were expanded by 66, to form a final treatment of 1107 before attrition. This additional 66 were stratified and randomised and added to treatment and control groups. All participants were registered as of at least June 1st, as per attendance lists, and thus had at least one month of baseline attendance.		
10/08	Treatment Message 3	Treatment Groups	Message sent to treatment groups, including new numbers - all groups adding up to 1107 before attrition; Downville excluded due to no YeBo sessions resulting from gang violence, Vukukhanye also omitted due to attendance data not being submitted in due time. Due to the public holiday and other delays due to logistics, the messages only sent 2 days late (on Wednesday rather than Monday) and were only sent between 8h30 and 9h30 pm.	"YeBo is an investment in a better life for Trevor."	564
15/08	Treatment Message 4	Treatment Groups	Message sent to treatment groups; Downville excluded due to gang violence again; Tafelsig and ID Mkize registers were also omitted as registers were not completed up to this date. Given previous week had two days without school, the message variations depending on number of days attended were reduced from 5 to 3 (all attended, none attended, and one out of two days attended); Messages sent between 5: 40 and 6pm	"Children who attend after-school programmes are more likely to succeed at school."	534
16/08	Treatment Message 4 (late)	Treatment Groups	Message sent to treatment groups from only Tafelsig and ID Mkize, as these registers were submitted late. Given previous week had two days without school, the message variations depending on number of days attended were reduced from 5 to 3. Messages sent between 7 30 and 8 15		74

22/08	Treatment Message 5	Treatment Groups	Message sent to treatment groups; Downeville excluded due to gang violence again. Messages sent between 7:15 and 7:45pm	"YeBo can help Trevor succeed at school."	608
23/08	Replies	Replies	1 attrition - wrong number		
29/08	Treatment Message 6	Treatment Groups	Message sent to treatment groups; Downeville included again after 4 weeks exclusion due to gang violence. Messages sent between 7:15 and 7:45pm	"Children who attend after-school programmes are more likely to stay out of trouble in school"	653
5/09	Treatment Message 7	Treatment Groups	Message sent to treatment groups; Messages sent between 7:15 and 7:45pm	"Help Trevor invest in a brighter future."	653
06/09	Replies	Replies	1 attrition - very irate receiver		
13/09	Treatment Message 8	Treatment Groups	Messages sent one day late due to multiple schools not having complete attendance data owing to the Eid religious holiday. Messages finally sent off successfully on Tuesday between 7: 45 and 8: 25	"Children who do better at school are more likely to get a good job in future"	652
19/09	Treatment Message 9	Treatment Groups	Messages sent to all schools except ID Mkize - bad internet meant that this school could not be done on the correct date. Messages were sent between 6: 45 and 7: 15pm	"Children who attend after-school programmes are more likely to go to school."	621
21/09	Treatment Message 9 (late)	Treatment Groups	ID Mkize sent two days late as registers were incomplete in previous days. Messages sent between 6: 45 and 7pm	"Children who attend after-school programmes are more likely to go to school."	31
28/09	Treatment Message 10	Treatment Groups	Messages sent to all schools successfully between 7 and 7: 30pm.	"Children who attend after-school programmes are more likely to behave better at home"	652

Appendix 3. Message Cost and Procedure

SMSes in the parental messaging intervention were sent via a bulk SMS platform: Sendeasy.co.za. This platform charged R0.26 per 165 character message, inclusive of VAT, however with some discounting for larger messages. In total, including welcome messages to all YeBo participants, test messages, generic replies, the messaging cost R4576 over the 10-week intervention period and the 2-weeks preceding the intervention (R3037.98 for treatment messages, at R0.46 per learner per week, and R1529.02 for test and welcome messages). Each week the sample was split into language groups, then within language groups (isiXhosa, Afrikaans and English) into treatment conditions (treatment 1 and 2), and then within treatment conditions into how many sessions learners attended in the previous week (owing to slight differences in messages across these criteria). Thus, each week 30 separate message lists were created each for a distinct language, treatment condition, and number of sessions attended combination. Each message was then sent to each of these lists. This process began as soon as attendance data from the previous week was attained, usually the Monday afternoon. The process took approximately 2-3 hours each time, including to send the messages. In total, the intervention cost R10 247. The breakdown of costs is below.

Table A. 4: Message Cost Summary

Marginal Costs	
Treatment message total cost	3037.98
Labour Cost ¹	3600.00
Total Marginal Costs	6637.98
Marginal cost per learner per week	1.01
Fixed Costs	
Welcome and Test Messages	1529.02
Set-up Labour Costs ²	1080.00
Translation Services	1000.00
Total Fixed Costs	3609.02
Fixed Cost per learner per week	0.55
Total Costs	10247

Note: All costs are reflected in 2016 South African Rands (ZAR). All 'per learner per week' costs divide totals by the 659 treatment group learners and 10 weeks.

¹This includes the 3 hours per week over 10 weeks

²This includes 9 hours to develop messages and load them onto the system and prepare initial contact lists.

Appendix 4. Balance Checks

Table A. 5: Sample Balance Check: Probit Regression of Treatment Status on Observables

VARIABLES	TREATMENT1	TREATMENT2	POOLED TREATMENT
Baseline attendance	0.413 (0.857)	0.072 (0.149)	0.417 (0.902)
Baseline Attendance squared	-0.000 (-0.752)	-0.000 (-0.541)	-0.000 (-1.177)
June Attendance Dummy	0.016 (0.123)	0.047 (0.354)	0.060 (0.454)
black	-0.194 (-0.445)	0.292 (0.807)	0.067 (0.171)
Afrikaans	-0.206 (-0.467)	0.282 (0.766)	0.049 (0.123)
English	-0.173 (-0.394)	0.233 (0.636)	0.033 (0.084)
Other language	-0.466 (-0.768)	0.547 (1.065)	0.181 (0.340)
female	-0.075 (-0.892)	0.058 (0.692)	-0.015 (-0.186)
age	-0.002 (-0.036)	-0.038 (-0.701)	-0.035 (-0.671)
grade2	-0.007 (-0.050)	-0.007 (-0.047)	-0.011 (-0.074)
grade3	0.049 (0.260)	0.058 (0.307)	0.097 (0.533)
grade4	0.074 (0.314)	0.067 (0.278)	0.127 (0.549)
grade5	-0.035 (-0.121)	0.131 (0.441)	0.094 (0.328)
grade8	0.094 (0.236)	0.206 (0.510)	0.272 (0.695)
grade9	0.155 (0.335)	0.209 (0.448)	0.327 (0.714)
grade10	0.236 (0.470)	0.243 (0.484)	0.433 (0.875)
Observations	1,106	1,106	1,106
F-Test: p-value	0.997	0.997	0.999
Pseudo-R-Squared	0.0037	0.0033	0.0025

Robust z-statistics in parentheses *** p<0.01, ** p<0.05, * p<0.1

Appendix 5. Tobit Model Results Censoring at both Zero and One

Table A. 6. Tobit Model: Censoring Outcome Variable at Zero and One

VARIABLES	Tobit: Treatment 1 and Treatment 2	Tobit: Pooled Treatment
Treatment1	0.054*** (3.839)	
Treatment2	0.046*** (2.595)	
Pooled Treatment		0.050*** (3.897)
Baseline attendance	0.989*** (6.698)	0.989*** (6.731)
Baseline Attendance squared	-0.000*** (-2.674)	-0.000*** (-2.681)
Black	0.069* (1.745)	0.069* (1.741)
Female	-0.028 (-1.465)	-0.028 (-1.484)
Grade2	-0.056* (-1.748)	-0.056* (-1.746)
Grade3	-0.060* (-1.864)	-0.060* (-1.859)
Ggrade4	-0.034 (-0.954)	-0.033 (-0.950)
Grade5	-0.005 (-0.049)	-0.005 (-0.050)
Grade8	-0.105** (-2.082)	-0.104** (-2.086)
Grade9	-0.053 (-1.003)	-0.053 (-1.003)
Grade10	-0.090* (-1.915)	-0.090* (-1.912)
Observations	1,106	1,106

Note: Robust t-statistics in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table A. 7: Heterogeneous Effects: Tobit Model Censoring Outcome Variable at Zero and One with Interaction Terms

VARIABLES	Male Interaction	High School Interaction	Black Interaction	Low Baseline Interaction
Pooled Treatment	0.040*** (2.909)	0.036** (2.545)	0.052*** (3.160)	0.039** (2.192)
Male*Treat	0.028 (1.047)			
High School*Treat		0.042 (1.493)		
Black*Treat			-0.004 (-0.146)	
Low Baseline Attendance*Treat				0.031 (0.982)
Observations	1,106	1,107	1,106	1,106

Note: Robust t-statistics in parentheses *** p<0.01, ** p<0.05, * p<0.1

Variables for baseline attendance, baseline attendance squared, June attendance dummy, black dummy, female dummy, and dummies for each grade included in the regression but not reported.

Table A. 8: Mediation Analysis: Tobit Model Censoring Outcome Variable at Zero and at One

VARIABLES	(1) y1	(2) y1	(3) y1	(4) y1	(5) y1	(6) y1	(7) y1	(8) y1
Pooled Treatment	0.041* (1.794)	0.014 (0.526)	0.034 (1.206)	0.037 (1.499)	0.034 (1.473)	0.020 (0.988)	0.023 (0.898)	-0.007 (-0.230)
Capacity to Observe Attendance		0.266*** (4.772)						0.386*** (5.306)
Regularly Reminds to Attend			0.034 (0.851)					-0.014 (-0.425)
Rewards Attendance				0.089*** (2.691)				0.080*** (2.598)
Punishes Non-attendance					0.002 (0.035)			-0.022 (-0.424)
Freq. of talk about YeBo						0.048*** (3.919)		0.041*** (2.708)
Efficacy Regarding YeBo Attendance							0.068 (1.515)	-0.008 (-0.225)
N	454	441	415	424	407	428	410	362

Appendix 6. Results after Accounting for Intra-Household Spillovers

Table A. 9: Treatment Effects after Removing Intra-Household Spillover Observations

VARIABLES	OLS: Proportion of Sessions	OLS: Proportion of Sessions	Tobit: Proportion of Sessions	Tobit: Proportion of Sessions	Probit: Non- Zero Attendance	Probit: Non- Zero Attendance	Probit: 65% Attendance	Probit: 65% Attendance
Treatment1	0.060** (2.813)		0.066*** (3.386)		0.058*** (2.999)		0.067 (1.434)	
Treatment2	0.051** (2.875)		0.057*** (2.851)		0.060** (2.010)		0.076** (1.962)	
Pooled Treatment		0.056*** (3.465)		0.061*** (3.816)		0.059*** (2.766)		0.072* (1.883)
Observations	1089	1089	1089	1089	1089	1089	1089	1089

Note: regression co-efficients for OLS, Tobit and Probit models reported, after removing control group observations that were exposed to possible intra-household spillover effects. Robust t-statistics in parentheses *** p<0.01, ** p<0.05, * p<0.1

Variables for baseline attendance, baseline attendance squared, black dummy, female dummy, and dummies for each grade included in the regression but not reported.

Appendix 7. Treatment Effect on the Treated

Table A. 10: Treatment Effect on the Treated: IV Regression of Proportion of Sessions Attended on Message Delivery

VARIABLES	IV Regression	IV Regression	Random Effects IV Regression	Random Effects IV Regression
Message Delivered: Treatment 1	0.057** (2.186)		0.058** (2.196)	
Message Delivered: Treatment 2	0.053** (2.060)		0.054** (2.047)	
Message Delivered: Pooled Treatment		0.055** (2.526)		0.056** (2.516)

Note: Regression co-efficients from instrumental variable regression of *Proportion of Sessions Attended* on effective treatment – using a dummy variable for whether messages delivered or not as the indicator of treatment. The dummy variable for assignment to a treatment group is used as an instrumental variable as it is exogenously determined and is highly correlated with delivered messages (treatment messages are exclusively delivered to treatment group learners, and so this is by definition correlated). *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$ Robust t-statistics are in parentheses. Variables for baseline attendance, baseline attendance squared, black dummy, female dummy, dummies for each grade, and also dummies for each week of the intervention period are included in the regressions for columns 2 and 3 but not reported.

Appendix 8. Weekly Treatment Effects: Alternative Outcome Measures

Table A. 11: Weekly Treatment Effects on Non-Zero and 65% Attendance Dummy Outcomes

	Pooled OLS: Non-Zero Attendance	Random Effects: Non-Zero Attendance	Pooled OLS: 65% Attendance	Random Effects: 65% Attendance
Week1 Treatment	0.016 (0.475)	0.012 (0.478)	0.022 (0.680)	0.018 (0.693)
Week2 Treatment	0.048 (1.391)	0.038 (1.455)	0.027 (0.812)	0.019 (0.722)
Week3 Treatment	0.027 (0.802)	0.020 (0.756)	0.063* (1.806)	0.046* (1.726)
Week4 Treatment	0.102*** (3.010)	0.078*** (2.981)	0.080** (2.415)	0.067** (2.530)
Week5 Treatment	0.086** (2.567)	0.064** (2.471)	0.016 (0.506)	0.014 (0.527)
Week6 Treatment	0.044 (1.298)	0.033 (1.249)	0.053 (1.592)	0.042 (1.563)
Week7 Treatment	0.070** (2.063)	0.053** (2.024)	0.050 (1.505)	0.042 (1.569)
Week8 Treatment	0.093*** (2.851)	0.071*** (2.731)	0.052 (1.589)	0.042 (1.569)
Week9 Treatment	0.044 (1.377)	0.033 (1.260)	0.001 (0.047)	0.001 (0.045)
Observations	9,954	9,954	9,954	9,954
Number of Learners in Panel		1,106		1,106

Note: Table reports co-efficient results from a pooled OLS regressions and Random Effects regression where learners are treated as the group or panel units. Robust t-statistics in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Variables for baseline attendance, baseline attendance squared, black dummy, female dummy, dummies for each grade, and also dummies for each week of the intervention period are included in the regressions for columns 2 and 3 but not reported.

Appendix 9. Interview Script and Focus Group Transcript

Telephone Interview - Parents:



Hello. My name is [Caller Name], I am calling from the University of Cape Town as part of a project with the Year Beyond, or YeBo, after-school-programme. Are you the guardian or parent of [Student Name]?

[If no, thank them for their time and end call]

I would just like to ask you a few questions about yourself, what you think of the YeBo programme, and how you interact with [Student Name]. The survey should only take 4 minutes. We will also ask some identifiable information to link your answers with information that you gave to YeBo earlier in the year. However, nobody outside of the research team will be given access to any information you share. That means that we won't share this information with [School Name], the YeBo staff, or with [Student name], and it will not affect [Student name] in any way. It is important that you answer as

honestly as possible. Participation in the study is voluntary and you can choose not to answer any questions I ask and you may stop at any time for any reason. Are you happy for me to ask the questions?

1. What is your relationship to [Student Name]?

1. Mother
2. Father
4. Aunt
5. Uncle
3. Grandmother
4. Grandfather
5. Sister
6. Brother
7. Foster Parent
98. Other – Specify
99. No Answer

2. Are you [Student Name]'s primary carer (the key person responsible for looking after him at home, organizing his meals, making sure he has clothes etc.)?

1. Yes
2. No
99. No Answer

3. What is your gender?

1. Male
2. Female
3. Other
98. Prefer not to answer

99. No Answer

4. What is your date of birth?

1. [Open Field]

99. No answer

Below are a few questions about [Student Name]'s experience of YeBo. Remember there are no right or wrong answers, we are just interested in what you think and what your experiences have been.

5. Are you aware that [Student Name] is registered to attend the YeBo after-school programme?

1. Yes

2. No

99. No Answer

6. In the past two weeks, how many YeBo sessions did [Student Name] attend?

1. [Open Field]

2. Don't Know

99. No answer

7. [Student Name] is scheduled to go to YeBo three times per week. So this term there have been about 20 YeBo sessions that [Student Name] could have attended. How many out of the last 20 sessions do you think [Student Name] attended?

1. [Open Field]

2. Don't Know

99. No answer

8. In the past week, have you talked to [Student Name] about any of the following: His friends?
Sports? Homework? Politics? His future? School? Family matters?

1. Yes

2. No

99. No Answer

9. How many times in the past week did you talk to [Student Name] about YeBo?

1. [Open Field]

2. Don't Know

99. No answer

10. When you talk about YeBo, what do you talk about?

1. [Open Field]

99. No answer

11. What activities does [Student Name] typically do after-school – in the afternoons and
evenings?

1. Homework

2. Watches TV

3. Reads (Is read to)

4. Socialises with Family

5. Sport

6. Socialises with Friends outside

7. Socialises with friends inside

97. Don't Know

98. Other – Specify

99. No Answer

12. Do you ever help him with his school homework?

1. Yes

2. No

99. No Answer

13. If yes, how often?

1. Never

2. Less than Once a week

3. Once a week

4. Twice a week

5. Between twice and 4 times a week

6. Every day

99. No answer

14. To your knowledge, what is the name of the volunteer or teacher in charge of [Student Name] at the YeBo centre? [Open-ended question]

1. [Open Field]

2. Don't Know

99. No Answer

15. In the past week, have you asked [Student Name] about what he learned at YeBo?

1. Yes

2. No

99. No Answer

16. In the past week, have you reminded [Student Name] to attend YeBo?

- 1. Yes
- 2. No
- 99. No Answer

17. Do you offer [Student Name] any sort of reward for attending YeBo e.g. money, sweets. If yes, please specify.

- 1. Yes (specific reward)
- 2. No
- 99. No Answer

18. When [Student Name] misses YeBo, is he ever punished or are any of his privileges taken away?

- 1. Yes
- 2. No
- 99. No Answer

19. Would you like to know more about what [Student Name] does while at YeBo?

- 1. Yes
- 2. No
- 99. No Answer

20. When [Student Name] finishes high school, it's most important for him to:

- 1. Get a job
- 2. Study further?
- 99. No Answer

21. In your opinion, out of the following what is the most important factor contributing to [Student Name]'s success at school?

1. Teachers
2. Parents/Caregivers (You)
3. School Principal
4. School Resources and Facilities
99. No Answer

Below are some statements. We would like you to tell us whether you agree or disagree with the statements below. Once again, there are no right or wrong answers, so please just tell us what you think.

22. You (the parent/caregiver) play an important role in making sure [Student Name] attends YeBo.

1. Strongly Disagree
2. Disagree
3. Neutral
4. Agree
5. Strongly Agree
99. No Answer

23. Attending YeBo does not make an impact on [Student Name]'s school performance.

1. Strongly Disagree
2. Disagree
3. Neutral
4. Agree
5. Strongly Agree
99. No Answer

24. On a scale of 1-10, where 1 is small and 10 is large, how large do you think is the impact that you have on [Student Name]'s success at school.

Below are the final few questions!

25. Have you received any SMS communication regarding [Student Name]'s attendance at the YeBo programme?

1. Yes

2. No

99. No Answer

26. Have you found these text messages about [Student Name]'s attendance useful?

1. Yes

2. No

99. No Answer

27. Did these messages help you to remind [Student Name] to attend his YeBo sessions?

1. Yes

2. No

99. No Answer

Thank you very much for your time, and have a great day.”

End

Transcript from Focus Group with Year Beyond Facilitators - 04/10/2016

All facilitators identities are kept anonymous. Each facilitator is assigned a letter to know who made the same comments.

Nick: Do the kids ever talk about what happens at home with you guys?

A: sometimes

Nick: quite a lot

A: No

B: Maybe more with the volunteers

B: At Masiphumelele there was one girl and she was very emotional and we had to ask what was wrong, and so went into another room and she explained that she was being abused at home. But most of the time kids just bottle it up inside until they break. It's like their afraid to talk about it, up until that time they break you would just never know what was happening, but there is a lot happening. Even though they are young there is a lot happening in these homes. It's only when they start to talk about things that you can really know what's happening, but most of the time they just keep quiet. And you will also notice their behaviour in class it will be different from other learners up until you follow up and if they trust you enough they will tell you. But those learners are very difficult to deal with, they demand so much attention, for example if a volunteer shouts at them they will start crying and stuff maybe that's like what happens at home they think that will happen there at school

Nick: So they become very sensitive

B: Volunteers often don't know what's going on and then they shout at learners and then the learner starts crying because there is more going on.

Nick: Oke, so when you guys are at the sessions, I just want to get a sense of how you engage with the learners. So the volunteers engage with the kids directly, and you more oversee the volunteers and make sure that they do the right thing?

Multiple responses: yes

Nick: So you guys don't have as much direct contact with the kids?

Multiple responses: no

B: For me, when I am at school I take a few learners to do Shine and stuff just to avoid them just sitting down there.

Nick: And the parents? Do you ever speak directly to the parents? Do they sometimes come?

A: They usually come to the school. But I know one or two of the parents have come to speak to the volunteers.

Nick: And hat have they said?

A: One parent was concerned about their child, because he usually came home late so she wanted to find out the exact time we release the learners and that. One parent came to observe what was happening in the afternoon space, what was the child doing and all that, but other than that the parents go to the teachers to ask.

Nick: They go to the teachers to ask about YeBo?

A: Yes. Some came because of the message

Nick: Did they say they specifically came because of the SMSes?

A: Yes, they wanted to ask teachers what they are for, why are they sending, and the teachers tell them about the SMSes and all that.

B: And also, like the principal at Isikhokelo was actually very angry because eight parents went to her office to ask about those messages.

Nick: Eight parents? At Isikhokelo?

B: Yeah. She was frustrated because we didn't tell her, so she didn't know what to tell parents.

Nick: Did she give any indication what the parents were saying to her?

B: No, she [the parents] was just curious and was asking about those [messages]; it was nothing major, but just concerned because you know sometimes parents will just sign forms without knowing what they are signing or, so it was one of those cases, and the principal was just concerned because she didn't know about the SMSes.

Nick: yes that makes sense. The parents were coming for information, and then the principal looks stupid, right? She is supposed to be the source of information.

A: There was also [an issue] with teachers actually. Because one of the teachers concerned didn't know that learners were not attending, and so we had to explain that it wasn't that all learners who got messages didn't attend; some do attend. They were saying that parents were coming to them and questioning them and they don't know what to say to the parents. So they want to be informed. What is actually going on and what do they say to the parents about the SMSes. Because the parents think that message is coming from the teachers.

Nick: The teachers at the school actually, not Year Beyond?

A: They saw Year Beyond, but they see it as part of the school.

Nick: So they think it's all the same?

Multiple responses: yes

Nick: So do the parents go to the teachers in these cases?

B: The principal and the teachers.

Nick: And what schools were this at

D & A: Isiphiwo and Isikhokelo

Nick: And at the other schools, did you have any similar experiences?

C: So it's only recently that the parents have been coming since the SMSes [started], to check up on their children that they have been attending. In most cases they weren't attending, and parents were aware that they were [attending].

Nick: They thought that they were [attending] the whole time?

C: Yes

Nick: So now as a result of the message, it's giving parents information they never had before and so they are coming to the school.

C: Yes

Nick: What schools was that at?

C: Phoenix and Heideveld

Nick: Phoenix and Heideveld? Those are both high schools, right? And Phoenix is the one with the very low attendance?

C: Yes

Nick: So has there been a lot of that?

C: Yeah, but, there's constant attendance now from those that have come back. There's little [few people], but it's constant.

Nick: And the parents, is it quite often that they ask.

C: Like every second week or third [for each parent]. There's at least one every week.

Nick: Ok, do they directly to you, or to the teachers

C: To the volunteers. But they know where the space is that they.....[unintelligible]

Nick: And has there been any sense of....So you know they have been coming to ask about the messages, but what have they been saying; are they surprised, are they enquiring about why the kid hasn't been coming, why haven't I been told this before, or....

D: No, one parent came to me, in fact she phoned and she asked me why did she get the SMS. And I was like 'your child is not attending'. 'But she comes home late everyday, she says she is going to Year beyond wadawada wada!' [parent, simulated dialogue], and I said that we keep a register and she is not attending, we can see that, so that's why we send the SMSes. And now she's been keeping

contact with me every time she gets an SMS she will call me 'I got an SMS, was she there? I got an SMS, thank you' and all that stuff.

Nick: Has the SMS been correct. For example if it says she's going once, then she is going once?

D: yes

Nick: From you guys, has it caused any difficulties? Have the kids responded? Have the kids said, like 'why are these things going'.

E: At one of my schools, at Intlanganiso, this one child said to me her mother doesn't like getting the SMSes. So whenever her mother gets the SMS she doesn't even read it, she just deletes it.

F: sometimes parents say these are not correct, they are saying they are supposed to be coming on Tuesday and Thursday, but...

Nick: Right, sometimes this part of the message is tough to get right because I'll construct it from the week before, but sometimes in that week they had a weird week and came at different times to how they were scheduled the month before, so I've been having some difficulty with that. So I think from now on I won't mention days.

D: Yeah I think it's better not to mention days. For example at Manyano when they are studying for exams they are coming everyday, so now with the SMSes the parents will be concerned and might say 'well why did you go to Year Beyond when the SMS said you must just go Monday, Thursday Friday.'"

Nick: So it can actually make them come less

D: yes

Nick: I'll remember that, thank you. So the kids have mentioned it but they haven't been overall angry about it.

C: Sometimes. Some have, like when they came back and they were like 'why are you SMSing my mommy'. And then I'm like 'why are you angry' and then they say, 'because I have to come'...[unintelligible]...but of course, it was just like for that moment, it wasn't like they were keeping it against myself or the volunteers.

Nick: Ok, so they didn't seem bitter.

C: No

D: But for my one learner at Vukukhanye, he honestly doesn't want to attend the programme, so after his mother received the SMS she would force him to come, so whenever he was in the programme he would just distract other learners, which it would cause chaos, or he would just sit there and do nothing. And he wouldn't want to go home because his parents would call us and ask 'did he come'.

B: Because there are those learners, who don't wana come especially the grade fours. They just don't wana come. We've tried our best to actually go and talk to them, but they just don't wana come. They are more interested in going [unintelligible] or playing games, so it's just one of those cases where learners don't really want to be there.

Nick: and that's mostly grade 4s

Single respondent: Grade 4s and Grade 5s

B: They are at that age were they are mostly involved with everything, so it's one of those times where they could just be taken to go swim or play a board game, and Year beyond has become quite easy for them, especially for those who are bright in class, it has become quite easier for them.

Nick: is it also maybe a case of most of the E-learning stuff is tailored to younger people.

A: Well my grade 5s say they are too old for the programme. For Year Beyond. Most of them have been involved in Year beyond for three years now and so they are saying they are too old for it.

Nick: Are they doing sessions with people in their same grade or also with children in younger grades?

A: They are only doing E-learning.

Nick: But when they are actually there is it only grade 5s or are there any other grades.

A: Grade 4s and 5s

Nick: Oh, Ok. You should tell the Grade 8s also do Year beyond, they're not too old.

A: But they are more into drama, singing, acting.

Nick: Right, so it's more at that age where they are into other things and so you have that conflict.

B: There's a lot happening for them Grade 4 and grade 5 there's a lot.

Nick: So the motivation levels for the junior schools are quite low then. So are all you guys, junior school?

Several responses: No

Nick: Oh right, of course, you're Heideveld and Phoenix.

G: The two primary school facilitators the rest are all high school

[Mumbling, laughter.

G: Sorry, they have just been promoted to the primary school [joke.]

[laughter]

G: So it's interesting just listening to some of the comments, in terms of the research, two unintended consequences, the one is that, children who are bunking or pretending to,....using Year Beyond as an excuse for not being home, so there's exposure around that and parents have cottoned onto that. The other thing is that now, some learners are being instructed to go by their parents, and it's very important in year Beyond that it's actually a voluntary effort, that they attend on a voluntary basis. So that's actually an interesting issue.

Nick: So there is, the funny thing is, and you guys can maybe tell me what you think of this, but sometimes there is this sense that like younger kids, maybe not just younger kids, need a little judge from the parents to go, and maybe actually they don't mind being there, they do benefit, and they need a little nudge. But there also seems to be cases where they don't want to be there and they're being forced to go. So, overall, do you think it's been useful.

Many responses: yes

E: At some schools yes. At Intlanaganiso they actually, especially the grade 9, they will just come to me and say 'I got the SMS but I'm not coming',

Nick: [laughter] before class?

E: Because we get there early, they will come before the session and just say that they got the SMS but they still are not coming.

H: Same here with Leiden, it hasn't made any....Grade 9s, even Grade 8s, it hasn't made any difference. But in ID [Mkize] it did.

Nick: That's weird, so different schools....I don't know why that is. How important do you think it is that the parents know about Year Beyond and are engaged in Year Beyond.

G: So, just coming back to your question, a large part, or certainly I think a large part relies on the culture of the school and the culture of the home. You know schools are very different, the context the cultures are very different if you go from school to school and I think that can play a big role.

Nick: You know, I've even noticed that, specific schools and with specific demographics the results have been very different, so, you know, you really have to look at that. So overall there's a results but for some of the schools it's been prominent. For some it's been a flatline. And it's just interesting to know what the dynamics inside that are. Is it that the kids are becoming frustrated by it and they don't agree, or is it that the parents are not used to any school communication and that they don't care, or not that they don't care, but that they don't appreciate this SMS, they don't want it. Like your school, which school was that specifically?

E: Intlanganiso

Nick: Intlanganiso. And what was your school. Manyano?

B: The other thing is, with Ikhwezi attendance has been very good lately, we have over 65 learners attending 100%, ever since the SMS started. Usually it was like a learner would attend once in a week, but now they are coming every time. So now we have 65 learners attending regularly, like 100%. So it has been quite good. Even with the grade 2s, I remember I had low attendance with grade 2s but now they are always there.

Nick: Really, with grade 2s?

B: Yeah, like yoh the grade 2s they were giving us problems. But now, yeah, it has been very good. Whenever I check my registers whenever I'm doing my weekly reports and stuff and always up to like 59-65 learners attending regularly 100%

Nick: And that's good?

B: Yeah. But it's only the grade 4s....So it has been good. But even though, the parents, they are unhappy with the schools, they are telling the learners to come and stuff all the time.