Solving a social dilemma using behaviourally framed text messaging to increase school fees contribution in public schools in South Africa

Emilio Titus

TTSEMI001

14 March 2021

A submission in fulfilment of the Degree of Master of Economics by dissertation

School of Economics

Commerce Faculty

University of Cape Town

Supervisor: Professor Justine Burns

Department of Economics

University of Cape Town

Abstract

This paper presents the results from a randomised controlled trial conducted in two Section 21 schools in Cape Town, South Africa, to test whether text messages can improve the fee-payment behaviour of parents.

Parents who were randomly assigned to one of two treatment groups received a monthly behaviourally framed message reinforcing the affective and financial benefits of education. Included in the message is a prompt to pay school fees by the month-end due date. Parents were segmented into those who historically pay fees well (Cooperators) and those who pay inconsistently or don't pay any fees at all (Defectors).

The results show that parents in the cooperator group, respond positively to both affective and finance-framed messages, and they pay between 1% and 5.2% more than parents who received just a reminder or no message. Surprisingly, the parents in the Defector group respond negatively to the affective and finance-framed messages and they pay up to 14% less than parents who received a reminder message or no message. The learning here is that text messaging can make things worse, so be careful!

The paper also confirmed that Cooperators pay a higher proportion of their school fees compared to Defectors, and the level of defection is strongly influenced by how well other parents are paying their fees, especially if many parents are benefiting from a fee exemption, or are just not paying any school fees.

Text messaging to promote cooperative parental fee payment behaviour shows promise as a low-cost mechanism that can be used by schools towards sustaining the financial robustness of existing Section 21 schools. Going forward, its efficacy can be tested by experimenting with different messages that can connect with the fee-paying preferences of Defectors and possibly help to improve the financial situation in schools that have already passed through the tipping point.

Acknowledgements

Declaration

I declare that this thesis is an original report of my research study, has been written by me and has not been submitted for any previous degree. The experimental work is entirely my own work in collaboration with the participating schools, and their contribution have been clearly acknowledged. Due references have been provided on all supporting literature and resources.

Signed by candidate

Emilio John Titus

Table of Contents

List of Tables

List of Figures

1.   Introduction

Over the past two decades, education institutions and systems throughout the world have evolved at a significant rate in response to constant changes in social, political and economic contexts within which education takes place (Rizvi and Lingard, 2010). Given this level of change, the central question to this global education policy is, " How do we make education institutions work better, and sustain the effectiveness of delivering the desired outcomes for all stakeholders?"

One of the aims of the eight United Nations Millennium Development Goals (MDG) was *"to ensure that, by 2015 children everywhere, boys and girls alike will be able to complete full courses of primary schooling"*. This has been followed by the Global Education 2030 Agenda (UNESCO[1], 2019), aiming to deliver the coordination of goal 4 of the Sustainable Development Goals (SDG) i.e. *ensure inclusive and equitable quality education and promote lifelong learning opportunities for all*. The Education for Sustainable Development (ESD) imperative is understood to be an integral part of quality education and lifelong learning. All educational institutions ranging from preschool to tertiary education and including both non-formal and informal education are being asked to take ownership and responsibility to address sustainable development and to build competencies related to sustainability. ESD is geared to equip people in all countries with the competencies to engage as informed citizens in promoting the transformation to a more sustainable society (UNESCO, 2017). The ESD advocates a whole-institution approach[2], which is more than teaching sustainable development and adding new content to courses and trainings. It challenges schools and universities, to orient all their processes towards principles of sustainability. It is asking educational institutions to transform all aspects of the educational approach

---

[1] Issues and trends in Education for Sustainable Development, Education on the Move, United Nations Educational, Scientific and Cultural Organisation

[2] The Whole-institution approach has four pillars, i.e. Curriculum teaching and learning, Facilities Schools operation, Community Partnerships and Relationships, Governance Policy and Capacity Building

to rethinking the curriculum, campus operations, organizational culture, student participation, leadership and management, and community partnerships/relationships. The critical factors which governs education policy globally include new forms of governance, access and equity of learners, curriculum and pedagogy, especially the teaching of English and technology, the balance between public and private funding of education, and the global trade in education.

Institutions focusing on educational attainment and the successes and barriers have traditionally taken the view that education is about human capital development (Mincer, 1958), and that people make an investment of resources into education, which provides knowledge and skills to ensure lifetime earnings. Teachers and parents are key stakeholders into the education outcomes, and empirical studies have found positive effects of parent involvement (Andersen & Nielsen, 2016) as well as both short and long run effects of teachers (Jackson, Rockoff, & Staiger, 2014; Chetty et al., 2014) on education outcomes. The result here showed that teacher who scored high on a value-added metric[3] (Meghir and Rivkin, 2011) has a direct positive impact on learner test scores, as well as on the outcomes other than test scores can improve return on human capital in the longer term. In many countries' education outcomes are driven by a political agenda to reduce student dropout, and improves outcomes using underperformance benchmark tests e.g. PISA tests in European, ANA tests in South Africa (Taylor, Muller & Vinjevold, 2003).

The past 10–20 years have seen a steady increase in the use of behavioural economics (Samson, 2015) to inform intervention design across a wide range of education research and policy areas. Governments around the world have established "Behavioural Insights Units" with the aim to use an evidence-based behaviourally informed approach to policy formulation and decision making. The economics of

---

[3] Teach for America (TFA), rates admissions of teaching staff on eight criteria used to make program selection decisions. Scores on each criterion (academic achievement, leadership experience, perseverance, critical thinking, organizational ability, motivational ability, respect for others, and commitment to the TFA mission) forms part of the value-added rating scale.

education which has traditionally relied heavily on the human capital development model, has been shifting its focus to incorporate the insights of behavioural economics, to improve the effectiveness of education and student outcomes from preschool through higher education (Damgaard and Nielsen, 2018). Escueta, Quan, Nickow, and Oreopoulos (2017) review interventions to understand how effective nudging can be used to improve the use of new education technology and concluded positive responses in IT-assisted learning in Maths and Hindi and mixed results in online learning outcomes.

Several authors have for example tested the effectiveness of parental messaging, including text messages, to induce parental behaviour changes (Kraft & Dougherty, 2013) used text messages three times per week to improve literacy practices of low-income parents and find that parental engagement in the learning activities for their children increased, leading to increased learning gains for the children. Several authors have also tested the impact of regular messages that provide parents with information regarding their children's schooling, such as grades and attendance information (Bergman, Edmond-verleyy, & Notario-Riskz, 2018; Kraft & Rogers, 2015). These studies show that children do not share enough information on status of their assignment and their progress with their parents. By providing parents with these updates via text messaging, improved the children's' standardised test scores.

 Compared to other interventions, text message reminders appear more effective at reaching all parents from all income groups, and may mitigate any material or socio-psychological costs parents face when personally interacting with schools. Text messages convey specific and salient information through a channel that is part of how parents communicate on an everyday basis. This allows all parents to focus exclusively on the most relevant information without altering their routine. Reminder messages can refocus attention to a specific task that may have been neglected, such as engaging children, and focus attention on the future benefits of these actions (Mayer et al., 2015). An intervention by Bergman and

Rogers (2017) targeted parents in the USA who have children in middle and high school. They were given a choice to opt in vs. opt out of text messaging service which provides feedback on their children's progress and grades. The number of courses that the students failed to earn credits in reduced significantly for the students. However, despite the positive findings associated with text messaging, Damgaard and Nielsen (2018) contend that few interventions to improve education outcomes produce positive effects for everyone and some even have negative effects. Successes of behavioural interventions are more likely for specific groups constrained by a specific behavioural barrier which has a clearly defined theory of change. Moreover, most of the focus for improvement in education policy has been on the benefactors i.e. students, pedagogy, curriculum changes, technology and very little on the financial aspects of governance, and how education is funded in a sustainable way.

Yet, the Governance of Education Institutions and the management of resources is an important pillar of the ESD whole-institution approach. In the UK, the approach to strategic management and school planning (Bell, 2002), resulted in the increased accountability for resource management assigned to schools, so that they can create an educational marketplace based on competition for pupil numbers. It required School Principals to define the aims and objectives of the school[4] as part of a school development or improvement plan, and this became the governance mechanism to hold Principals accountable for all resource management.

The challenge for the ESD whole-institution approach is that it does not provide a solution to the funding dilemma i.e. the balance between public and private funding of education. It only provides guidelines on financial models for ESD initiatives which still has a reliance on government grants, private donations or grants, linked to the implementation of specific projects. The choice of available

---

[4] The Education Reform Act (DES 1988) in the UK linked the introduction of local financial management of schools, the delivery of the new National Curriculum and new patterns of accountability to the school development plan which thus became central to each school's resource management process.

funding source varies by country. In countries with public education sectors and where no education market exists, the national or local government is an important source of funding for ESD initiatives. In cases where an initiative has positioned itself as an enabler to help implement government policies and programmes, it will be more likely to successfully mobilize government funding. For development/global education (Scheunpflug and Asbrand, 2006) there is far less funding than what is needed, and available funds are prioritised for project-related initiatives only. For that reason, the challenge of sustainability for education institutions is about access to funding structures and instruments. Going forward, better financial support for the education sector and clearer guidelines for funding would be an important imperative for the field of global education.

For the above reasons, education policy in many developing countries has been and will continue to be the subject of intense debate (Banerjee & Duflo, 2011). The key education debate is not only about whether educational institutions are delivering good or bad quality education, but rather it is about who should fund this. There was a call (NORRAG[5], 2014) that the world needs post-2015 financing targets for education so that policymakers can be held to account for financial commitments to achieve identified outcomes. In many developing countries where government resource constraints have created dysfunction in national and local governance, the financial sustainability of the education institutions will continue to be a challenge. In the post-Apartheid South Africa era, there has been a remarkably high focus and hence financial resource allocation to solve for equal access to education for all learners and to improve learning outcomes for skills development, to address inequalities of the past. This has been done by government placing increased responsibility on parents to fund education institutions through the payment of school fees. This step has challenged the financial sustainability of

---

[5] NORRAG is an independent network whose Secretariat is located at the Graduate Institute of International and Development Studies (IHEID) in Geneva, Switzerland and since 1985, NORRAG has established itself as a multi-stakeholder network of researchers, policymakers, members of NGOs, foundations and the private sector seeking to inform, challenge and influence international education and training policies and cooperation.

fee-paying schools, especially as a large number of schools who started out with parents cooperatively paying the school fees, have been converted to non-fee-paying schools which has reverted the burden to the SA Government for funding.

This research seeks to understand the factors which can solve for this financial resourcing dilemma in South African fee-paying schools, through using text messaging to understand the behavioural drivers for parents' commitment to pay school fees. This of course is done in an environment where fee exemptions due to economic affordability is available to all households i.e. Section 21 schools in the South African Schools Act (SASA). This research explores text messaging as a solution to improve and sustain the school fee payments in two Section 21 Schools in Cape Town, South Africa. As such, it is important to understand the school fee payment dilemma that threatens the sustainability of public schools in South Africa.

1.1   Funding in Education Policy - South Africa

In the 2018 national budget[6], the government allocated R792 billion for basic education, which including R35 billion for education infrastructure, to be spent over the medium term to build new schools, upgrade and maintain existing infrastructure, and provide school furniture. It also includes R15.3 billion that was allocated to improve the effectiveness of curriculum delivery over the medium term, through the provision of printed and digital content for learners and students, teacher support aides, and increased access to information and communication technology. These allocations are prioritised across the various schools in South Africa, and government acknowledges that additional contributions from the private sector and especially parents, are needed to support the maintenance of teaching and facilities infrastructure at the local school level.

---

[6] Department of National Treasury, South Africa 2018 www.treasury.gov.za

For this reason, Section 21 schools in South Africa as defined by The South African Schools Act (SASA), gives authority to the School Governing Body (SGB) which consists of parents and school management, to set and collect fees annually. Formal annual approval from parents is needed as part of the annual school budget cycle and the financial governance of this funding is aligned with a School Improvement Plan (SIP) which sets the teaching agenda for the school year. To address vast pre-Apartheid educational inequality, SASA prohibits learners from being excluded from admission to fee-paying schools if they meet educational entry criteria e.g. academic, sport and location etc., but they cannot afford the prescribed school fees. In these instances, SASA allows qualifying households to apply for full or partial exemption from paying fees. However, the government does not reimburse the exempted fees to the school. It is expected that existing fee-paying parents pay this shortfall and therefore the SGB adjusts the prescribed school fees to ensure a balanced budget. Families or children, who receive a social grant, qualify for full school fees exemption automatically.

1.2   Why solve the school fee-payment dilemma in South Africa?

Of the approximately 28 000 schools in South Africa, only about 5 000 Section 21 schools are considered as "performing schools of excellence" as they produce the majority of matriculants who enter tertiary institutions. In 2017, the Western Cape had 574 public ordinary fee-paying Section 21 schools, as confirmed by a media release[7], which also indicated that the WCED compensates 96.5% of fee-paying schools for over 80 000 learners whose parents struggle to pay fees. What it does not say is that the compensation is a nominal payment, which does not fully compensate the school for the exemption that has been granted. The existing fee-paying parents pay this shortfall when the budget is set for the following year.

---

[7] WCED Media Release 23 November 2017 by Minister of Education, Debbie Schafer

The fee exemption model is based on a formula, which relates annual school fees to total household income. Parents qualify for an exemption if the annual school fees are more than 10% of the parents' combined household income. They can apply for partial exemption if the fees commitment is between 2% and 10% of their annual household income depending on the number of children they have at a fee-paying public school. The school management and Governing Body act as agents to administer the fees system, and deal with these governance matters. The challenges in the need for parent cooperation is best evidenced in a newspaper article which challenged school fee increases of 8% (Argus Newspaper November 2018), where a school principal is quoted as saying, that at his school, less than 50% of pupils were paying fees and the rest of their pupils paid partial fees or were subsidised, and the school still struggled to recuperate fees from parents. Another principal shared the following in the same article, "Our biggest challenge is getting parents to come in and talk to us and make arrangements. We want to step up with regards to that because we end up with a situation where parents don't pay all year and don't answer calls, that's the parents we end up having to hand over to debt collectors."

Considering the above context, the research defines a fee-paying classification for households as follows:

i.   Cooperators - households who pay school fees on-time at the set budgeted level, either monthly or annually

ii.   Defectors -   households who do not pay as promised, resulting in late payments, arrears and ultimately bad debt which must be written off or legal action initiated

iii.   Rebators -   households who qualify for a fee exemption, apply for it and are granted a fee exemption by the SGB. These parents pay a reduced school fee.

Over the last decade, the Western Cape Education Department (WCED) trend shows that Rebators and Defectors collectively are showing an increasing trend of non-payment of school fees. This is

threatening some historically performing schools, with potential financial failure, which could pass the financial burden to the State. An example of this trend, is demonstrated using actual data from one of the schools participating in this research, see Figure 1, which shows that non-fee payments had reached levels of 19.8% to 23.3% between 2009 and 2012.

Figure 1: School A - School Fees Non-PaymentTrend
Actual Data
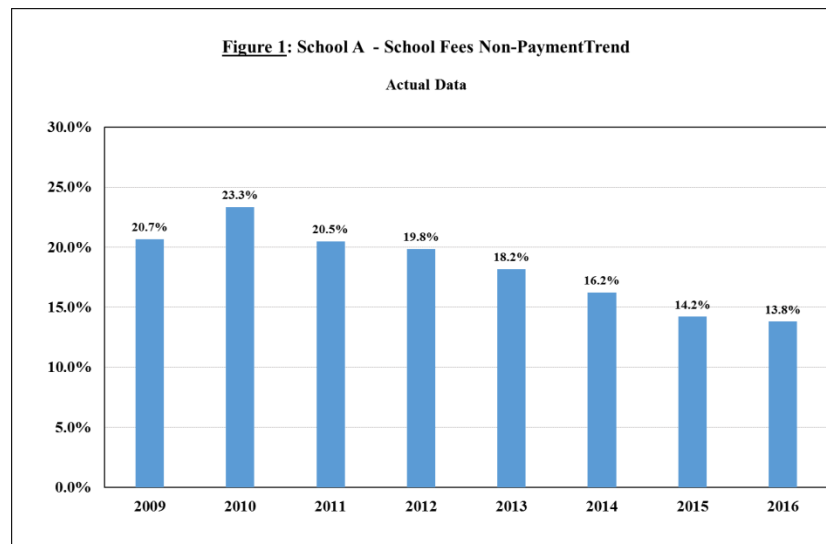
The main cause of a growing trend in number of Defectors and Rebators is the intertemporal trade-offs which households are making between long-term investments like education and short-term cash flow needs. Schools have traditionally engaged parents in many forms of funding activities e.g. donations from school alumni, corporate social investment for scholarships and fund-raising activity, to supplement the finances needed to pay operating costs including teacher salaries which is not deemed necessary and therefore not funded by the Western Cape Education Department (WCED). These funding activities are often not sufficient to supplement shortages in fee-payment received from parents.

The thesis aims to understand and find a solution to this school fee-payment social dilemma. It seeks to explore context and conditions in which text messaging can promote cooperation among parents to improve payment of school fees. It also seeks to encourage parents to make a considered effort to

honour their school fees commitment i.e., positively influence parents' decision-making preference for paying school fees, even if they know they qualify for a school fee exemption as prescribed by The South African Schools Act. Using a Randomised Control Trial (RCT) design, parents assigned to one of two treatment groups received monthly text messages over a period of six months. One set of messages emphasized the affective benefits of education for a brighter future for all children, and other focused on connecting parents with the financial benefits of an investment in education.

The results in this paper suggest that parents who consistently pay their school fees i.e., Cooperators, respond positively to behaviourally framed text messaging. The opposite is true for Defectors i.e. those who do not pay school fees consistently. These parents who received a behaviourally framed test messages pay less of the school fees than those who received just a reminder message or no message. These insights are important in devising how best to reframe the schools' text messaging strategy, as a low-cost mechanism to support financial sustainability within a Section 21 fee-paying school.

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 school fee payments. Section 3 explains the experimental design of the messaging intervention. Section 4 covers the Experimental Approach and description of the sample. Section 5 and 6 then presents the contextual characteristics, intervention results and analysis in the form of a case study for each of the two schools (School A and School B) that participated in the experiment. This section first describes the school-specific context of the experiment, and then covers the analysis and results to understand which the fee payment behaviour outcomes of parents. Section 7 explores the findings of the propensity of parents to pay school fees. Section 8 then presents the limitations of the study. Section 9 discusses the intervention results, how

they relate to the existing literature, and their policy implications, and recommendations on the way forward. Section 10 summarises the conclusions of the research.

2.   The Case for Parental Messaging

The context of the research seeks to analyse both theoretical and an evidence-based approach, in support of what influences and defines the dynamics of a multiplayer (Hilbe et al, 2014) fee-paying equilibrium in Section 21 schools in South Africa. It seeks to understand i) What are the governing dynamics at play that trigger tipping points which can lead to financial failure of fee-paying schools, ii) How does scarcity influence thinking modalities of individuals and household decision-making, as well as the impact of individual decisions on collective results and iii) Relevant experimental evidence which gives insights and learnings which may help answer the research questions posed.

The context for this research is the optimal allocation of household financial resources in favour of contributing to a public good i.e. Education. The benefit of a good education and its importance in individual mobility is a well-established and documented fact (Heckman, 2000; Psacharopoulos & Patrinos, 2004).

The availability of secure jobs can have a transformational effect on households, as proven by Banerjee and Duflo (2012) in their research in India. Parents had hope that their children would grow up, complete high school education and get a salaried job, either in a government office or in an industrial factory. The Korean industrial policy was designed to create good jobs which pay a stable and living wage which will provide households with the financial resources, mental bandwidth and the necessary optimism to invest in their children and build wealth by saving more. In the South African context, the high unemployment rate[8] of between 25 and 40% depending on the racial

---

[8] Statistics South Africa, 2017

demographics, means that there are not enough "good jobs" available for all households to benefit from a steady income.

To combat the effects of families living on the breadline, the South African Government through the Social Security Agency (SASSA) introduced a safety net of a monthly social security grant for children in 1998. This is an addition to the existing pension grant pay-out for adults over 60 years old. In 2018, the pension grant[9] was R1690 per month and the childcare grant was R400 per month. The evidence[10] in School B show that households who receive a SASSA social grant, apply for a full fee exemption. A steady and predictable income either from a good job or from the social grants makes it possible for households to budget and plan for future expenditure.

Who should take responsibility for access and investment in education has been a debate in many countries, and in The Elusive Quest for Growth, Easterly (2001) shows that investment in education in African countries has not really stimulated growth in these countries. The question is if it should be the responsibility of Governments using a top-down policy approach? To what extent is it the responsibility of parents to fund their children's education? Is return on investment in education even a relevant metric for decision-making? Is school fees affordable at the various levels set by School Governing Bodies or is allocating limited household funds to school fees determined by unknown biases or preferences, even an important consideration for parents?

The external socio-political and economic context plays a very important role in how households view their commitment to contribute to school fee payments. In the last decade, the economic climate and the scourge of corruption in South Africa have experienced a significant deterioration, and this has

---

[9] South African Government, Individuals and Households, Social grants
[10] For fee exemption applications at School B, parents provide a SASSA letter as evidence that the household is receiving a social grant.

placed a significant strain on state resources, as the need for bailouts of State Owned Enterprises (SOE's) continues unabated. The significant levels of looting that has started to emerge and continues to make the news headlines will continue to erode parents' sense of good citizenship when it comes to paying school fees. In 2018, 6.2% of GDP[11] was spent on education in South Africa, and yet the quality of education is still well below international norms.

The cooperative norms on which the South African constitution was founded, to ensure "A Better Life for All", seemed to have been flouted by politicians over the last decade, leading to significant corruption. This has led to a vast unnoticed outflow of public funds through what now appears as systemic governance failures, and the perpetrators continue to serve in the public domain as if no wrongdoing has been committed. These are public funds that have been earmarked for economic and social development, that were diverted to satisfy self-interested stakeholders. This is a serious cooperation dilemma, newly introduced investigative mechanisms like the Zondo Commission[12], is a first step towards restoration and possible prosecution of offenders. The foundation of the South African constitution provides the frameworks for people to apply their moral value system, in enabling a stable cooperation, for the greater good of all people. Cooperation linked to strong reciprocity is a theory that was suggested by Ernst Fehr (2000) and that reciprocity created a predisposition to build virtuous cooperative norms. They argued that in many instances' communities may be able to provide local public resources (like education) using their own resources, rather than waiting for government initiatives.

In this context, it is therefore important that communication to parents seeks to reinforce the message that cooperative norms may hold the key to children's education and that the collective parent body

---

[11] The World Bank, Data: Government expenditure on education, total (% of GDP) – South Africa
[12] The Judicial Commission of Inquiry into allegations of State Capture, Corruption and Fraud in the Public Sector, including Organs of State

acting with reciprocity and in good faith, can still ensure that children receive a good education for a brighter future. The current Constitutional Court Judge Mogoeng Mogoeng[13] concluded that the very people that fought for freedom in South Africa have jettisoned the very value system, which motivated them to sacrifice their lives for this greater purpose. He challenged all South Africans to find original mechanisms that will restore the integrity of our society, and create ways to test and surface the leaders who will take responsibility for restoring the unity and hope in our country.

The above reality has created a disparaging environment for households and raised the importance of communication as one of the most effective tools for maintaining cooperative norms. This research seeks to provide some insights into the governing dynamics of school fee payment behaviours in households.

2.1   Why don't parents pay fees, when they can choose to pay?

2.1.1   School Fee Payment - Choice Dynamics and Choice Architecture

The choice environment which creates the context for making complex choices (Thaler & Sunstein, 2009) is important. The key dynamic in the decision process is the trade-offs which is not just related to economic factors, but also involves the influence of cognitive, emotional, cultural and social factors. While most of our traditional economic theory is premised on self-regarding preferences, a growing body of evidence points to other-regarding preferences in economic exchange. There are many drivers which influence the changes in the choice environment (Bertrand et al, 2006) which means that minor situational factors can make or break good decision behaviour and this can make decision-making process more complex given the nature and asymmetry of these drivers. We explore the relevance of behavioural factors in designing the text messaging intervention, and seek to understand better to what

---

[13] Keynote speech to a Directors event June 2019

extent these behavioural effects may or may not play a role in how people make choices. These effects may include some of the following key behavioural elements, 1) Framing effects and Reality, 2) Selective attention and salience, and 3) Bounded rationality, scarcity and bandwidth.

Framing effects and reality testing is said to occur whenever different descriptions of the same decision situation lead to different preferences, despite the fact that the outcomes associated with the decision remain invariant across the descriptions (LeBoeuf and Shafir, 2003). Household budgeting in an environment of scarcity and income uncertainty, coupled with different emotions (Kahneman, 2003) associated with choice trade-offs, means that the school fee payment decision process can be challenging. In addition, this fees payment event happens every month which means that energy is expended every month, to arrive at a household budget equilibrium, which may or may not allocate financial resources to school fee payments. For this reason, deciding to pay school fees and then sustaining any commitment to pay school fees across time, provides real challenges, especially in light of changing preferences across the time horizon and a need to spend on other competing social needs e.g. daily living expenses, unplanned medical costs or extended family needs. A key influencing factor in this research is the households' socio-economic status and the choice to contribute to a public good (i.e. pay school fees) or allocate available financial resources to other consumption priorities. Two very important factors need to be distinguished when considering intertemporal choices i.e. time discounting and time preference. (Frederick S, Loewenstein G, O'Donoghue T, 2002). These factors influence what is called short-term impatience or long-term patience. Yet, it remains the case that individuals systematically undervalue investment goods such as education that generate future benefits, and thereby, make inefficient choices in this regard (Frederick, Loewenstein, & O'Donoghue, 2002). Present-bias[14] resulting from the need to allocate household funds to immediate needs is

---

[14] Present bias is the tendency to settle for a smaller present reward than wait for a larger future reward, in a trade-off situation.

therefore always a factor. Prospect Theory gives some insight into the emotional factors and how they influence behaviours (Kahneman D and Tversky A, 1979). They concluded that it is not unusual for people to make sub-optimal decisions in their lives, based on present-bias or socially acceptable norms which people prefer and which may provide them with aligned prosocial behaviour, a form of social identity or acceptance.

Conflict in making the trade-offs, will likely influence the actual choice of the decision-maker (Tversky and Shafir, 1992), and lead them to seek alternatives and/or defer the decision and/or prefer a default option. In the case of a school fee-paying household, many factors can influence the parents' decision on a monthly basis to pay or not to pay school fees. This includes affordability, emotional factors like dissonance from parents because they may be disillusioned with the child's progress in the school, or claiming to be previously disadvantaged hence makes it justifiable for parents to apply for an exemption from fees, which shifts the fees equilibrium closer to a tipping point.

It is for the above reasons that Thaler and Sunstein's "Nudge", recommend that choice architectures are modified to take account of human agents' bounded rationality. In the school context, a "nudge" can be a text message (via SMS), which can convey specific and salient information through a media channel that is part of parents' everyday mode of communication. This allows parents with limited or selective attention or other-regarding preferences about investment in education, to focus momentarily and exclusively on the most relevant information and it may influence parents' decisions about school fee-payment.

2.1.2   Choice Architecture and Incentives

Incentives can have a significant impact on the decision-making preferences of people (Thaler & Sunstein, 2009). Although what we have emphasised thus far is neglected by standard economic

theory, we know that supply & demand forces, still plays a significant role in household decision making. Designers of Choice interventions must realise that incentives are important in the design. In education, extrinsic effects of incentives can crowd out intrinsic motivation in the short and long run, by shifting the fee-paying situation from a social to a monetary frame. Monetary incentives for prosocial behaviour work better when contributions to a public good like education, is not visible (Gneezy et al, 2011). Differences between social and monetary incentives may also influence the beliefs about the behaviour of others i.e. people may believe that incentives are in place because the practised social norm is that people do not contribute. This dynamic between social commitment and the monetary reward may well play a role in parents' decision to respond to the incentive of an early-bird discount for paying annual fees upfront or not.

One important aspect of incentives is to ensure that "salience" is in effect i.e. that the decision-maker captures the attention of the person, so that they notice or recognise the incentive available to them. They may also want the incentive to make economic sense and be better or equal to the opportunity cost associated with it. In a school setting, knowing the amount that can be saved with an early-bird discount may help because the saving can be used for buying other school supplies like sport equipment, etc. In addition, if the discount rate is not greater than the alternative investment value of the money, the decision-maker may well deem it as a lost opportunity cost to get the best return on their money. In an online article[15] titled, "School Fees: Is The Upfront Discount Worth It?", the author provides a calculation showing that, only if parents have the upfront cash available, and if the upfront discount is greater than 5% of annual fees, that it is economically attractive to take up the offer of the early-bird discount.

---

[15] Moneyweb, Tuesday, 26 November 2019

Exploring "salience" through framing the early-bird discount message is one of the areas in schools that may make a difference to the fee-paying behaviour of parents. Evidence from early-bird fee-payment text messaging experiments in one of the schools in the sample during December of 2015, showed a positive response from parents being reminded of the benefits for paying upfront, by reframing the message as to include what they would "save" instead of just a reminder of when the early-bird discount is available.

2.1.3   Bounded Rationality and Framing Effects of Fee-payment Decisions in Households

Standard economic models assume that all decision-makers have all available information, and it is framed and presented in a way that allows the decision-makers to fully understand its meaning and impact, so that they can make an informed choice. Bounded Rationality research (Kahneman and Tversky, 2002) concludes that when individuals make decisions, their ability to be consistently rational is limited by 1) the nature and relevance of the information they have, and how it is framed, which creates context, 2) the cognitive limitations in how they process the information, and how emotions impact them and 3) the scarcity of important resources e.g. money, energy, time and appreciation available to make the decision. Bounded rationality (Rubinstein, 1998) implies that humans take reasoning shortcuts or use normative reference points, which may lead to sub-optimal decision making.

In the science of availability (Norbert Schwarz, 1990) shows that the availability of information and how it is framed, can evoke significant bias in how human agents process information, which can lead to very different choices. Key behavioural biases in household decision making (Daminger et al, 2015) is important in a school fee paying context and may be addressed by reframing and empowerment of individuals through feedback, e.g. fee statements or priming reminders regarding school fee payment commitments and the future benefits of a good education. Paying school fees means a change in the economic wealth of the household, and is often referenced to a monthly budget surplus or deficit rather

than an investment which would influence the future state of the household economic wealth. This is an important insight as developed in Prospect Theory (Kahneman and Tversky, 2002), which frames changes in wealth as gains and losses, and not as changes in the state of wealth. In addition, the existence of a reference point is an important variable which was defined as part of understanding losses and gains, as it provides the comparative relative to an earlier state which can be evaluated. Kahneman and Tversky derived three cognitive features which forms the fundamentals of Prospect Theory, which are also prevalent in many automatic processes of perception, judgement and emotion, and plays an important role in the financial decision-making outcomes.

In economic decision-making of households relating to school fees, these three cognitive features may show up. These include ***firstly, evaluation of a reference point is an important consideration, and is also referred to as an adaptation level.*** In a household who has a commitment to pay school fees, the question is, "what is the reference point that determines the preferences of parents to pay school fees or not?" The reference point can be the status quo or the norm fees level which is expected by the school. It could also be a feeling of entitlement or a need for fairness and hence expecting to be treated the same as other parents who have a fee exemption. The fees level could also be associated with the perceptions of what fees are payable relative to other schools, or what learning environment either in academic excellence and/or cultural facilities are available at the current school, relative to others. ***Secondly, a principle of diminishing sensitivity*** as applied to the subjective evaluation of changes in wealth is important. For example, the subjective difference to household 1, who needs to pay R300 per month school fees and has a social grant of R1575 as a primary income plus R450 for child care, is significant compared to household 2 who has a steady income of say more than R10 000 per month. It means that household 1 may likely have a more difficult choice to make the trade-off between paying school fees and other consumption needs, since the fees is significant relative to income level. This trade-off raises the question of the propensity of parents to pay school fees in relation to the household

income. ***Thirdly, the principle of loss-aversion, and "that losses loom larger than gains"***, is important in the context of households that have scarce financial resources and are constantly making trade-offs in their household budget allocation. Prospect Theory describes humans as being guided by the immediate emotional impact of losses and gains, not by long-term prospects of wealth and global utility. For households where monthly needs consistently exceed income, not paying school fees in favour of paying for unplanned costs like a medical expense, may mean that the budget deficit or loss is reduced, and hence the long-term impact of continued investment in education, is less important.

When considering the above, it becomes apparent that the behaviours at play are governed more by the psychological response to a change of value i.e. emotion, rather than the physical change in value i.e. money. For this reason, Kahneman & Tversky (1981), put forward the principle of "framing effects", and what they called "the unjustified influences of formulation on beliefs and preferences". It means that how a choice is framed, can have a significant influence on the choice made, depending also if the person is using system 1 or system 2 thinking (Kahneman and Tversky, 2011). It poses the challenge that if a person's preferences are reality-bound, they will make a consistent rational choice, irrespective of the framing which is how Econs[16] make decisions. A person that is applying system 1 thinking may be making choices which are frame-bound, and this is how Humans make decisions. For example, Thaler concluded that costs are not losses i.e. people may readily forego a discount than pay a surcharge. The economic value may be the same, but they do not evoke the same emotional response.

Thomas Schelling (Coleman, 2006) also posed the question on whether child tax exemptions should be standard, or should child tax exemption be larger for the rich than for the poor? In a school setting, we may pose a similar question that says, "should fees be higher for a child from a wealthy household, than from a poor household?" The moral response would create dissonance, yet the question that the problem is really posing is, "How should the governments treat the children of the wealthy and the

---

[16] Richard Thaler (2015) compares how a "Human" goes about making real-world choices, which is based on emotions, context, etc. and compares this with what an "Econ" who makes choices based on theoretical and economic principles.

poor?" Children from poor families qualify for a fee exemption, yet it is not framed in a way that says, "Children from poor families pay less than children from wealthy families". What Thaler (1986) concluded is that our preferences connect with problems that are framed in a certain way, and our moral intuitions are about descriptions, and not necessarily about substance. For fee-paying parents, the messaging regarding the choice trade-off to pay school fees or not, may be governed by either the psychological and emotional value of "loss" in immediate wealth versus the concrete impact that paying school fees will have on increased financial scarcity, in the household budget value i.e. can the money that should go to school fees, reduce the household budget deficit.

2.1.4   The Behavioural Economics of Education

A funding dilemma is one of the barriers in educational attainment especially in developing countries and links directly to behavioural issues that drive similar savings problems in developed nations (Mullainathan,2004). In South Africa, the question however is whether this top-down public intervention to improve the financing of educational outcomes is feasible, given scarce government resources. If parents do not care about education, it may be the reason why in some schools' parents defect and do not pay the school fees. In Madagascar (Nguyen, 2008) parents were asked their view of the returns to education. The findings showed that on average parents responded with the correct returns level however, there was a significant spread in their responses. In these experiments, it showed that a low-cost intervention like sharing statistics of the expected returns on education had a positive impact on both test scores as well as attendance in the treatment schools.

How do parents then view the investment in primary, secondary and tertiary education in South Africa, and what are their views of the risks and expected returns, if they are making economic decisions to pay school fees. Currently, the greatest challenge for the investment return may be that unemployment

rates[17] across all education levels for young adults (Age = 15-24 years) are extremely high at 55.2% (University Graduates = 31%). In addition, tertiary education fees have historically been seen as the right of only the economic-privileged, until the recent fees-must-fall campaigns in universities, which resulted in the SA government making available free tertiary education for qualifying financial-need families.

Deciding how much to invest or not, in their own and their children's education is one of the most important economic decisions parents must consider. Recent research (Koch, Nafziger and Nielsen, 2015) conclude that intergenerational family inputs are strong, and children may end up with similar outcomes to their parents partly because they are influenced by similar attitudes and thus make the same life choices. Family environment plays a big role in shaping the preferences and soft skills of children, which in turn influence educational investments. In the context of schools, the educational beliefs of parents can influence their decisions in favour of investment in education for their children, rather than forego it to spend on other competing household budget priorities. A study by Michael Sherraden (2004) shows that just opening a college savings plan can lead to parents investing more in their children's education. Research by Dan Ariely (2015) showed that kids who have tertiary education savings plans perform better cognitively and emotionally, because their parents are having different conversations with them about their future.

There are also a number of myths which govern how parents may view returns on education. In the USA, there may be a belief that "I cannot get ahead on my own" (Fallow, 2018). This is sometimes premised on the effects of income inequality, a possible result from being previously disadvantaged. Since the end of Apartheid, income inequality in South Africa has deepened. According to figures from the World Inequality Database (Nov 2019), the top 1% of South African earners take home almost

---

[17] StatsSA, Quarterly Labour Force Survey 1Q2019

20% of all income in the country, while the top 10% take home 65%. The remaining 90% of South African earners get only 35% of total income. Given these statistics, it is not unusual to understand why, "the rich get richer, and the poor get poorer." There is also a tremendous amount of socioeconomic mobility today in South Africa, with the fragile middle class, also at risk of being able to sustain their wealth.

The above shows the inequality challenges and the complexity of the socio-economic factors at play for parents and households, to solve the education investment and hence funding dilemma.

2.2 Does the School context provide the right institutional environment to promote co-operative equilibria among fee-paying parents?

2.2.1 Governing Dynamics of Cooperation

Economic theory, based on the assumption of rationality, suggests that every self-interested individual may engage in free-riding behaviour by not contributing to a public good, yet seek to benefit from it. This problem of multi-player cooperation in groups that requires a level of trust and reciprocity , is the foundation of social capital (Karlan, 2005). In contrast, a non-cooperative condition can occur when the pursuit of self-interest by an individual leads to a poor outcome for all. In the case of school-fee payments, free-riders are parents who continue to benefit from their children's enrolment at the school, yet choose to pay only partial fees or no fees at all.

The timeline for co-operation among fee-paying parents of the school is typically 5-7 years which is the life-cycle for learners in either junior or high school. In "The Evolution of Cooperation" Axelrod (1984) contends that cooperation can be started, evolve, and prove stable in situations which otherwise appear unpromising e.g. where parents qualify for fee exemption, but choose not to exercise this right,

and instead continue to pay school fees as is the case in School A. In schools, parents may not realise that they need to cooperate with each other regarding school fee payments, month after month. Axelrod contends that the foundation for cooperation is the durability of the relationship i.e. will cooperation among parents stand the test of time, month after month.

2.2.2   Scarcity and Social Influence – how it impacts Cooperation in Social Dilemmas

The economic model of human behaviour assumes that humans thoroughly consider relevant situations, do the calculations, and then execute the decision. Scarcity of cognitive, emotional, or financial resources can influence the thinking state of the decision-maker, and hence the extent to which cooperation or defections (free-riding) may occur. This limit on "bandwidth" because of a scarcity state is an important variable in the trade-offs that parents make in their household budgets, due to competing priorities. It can also perpetuate the intention-action gap, which results from well-intentioned promises to cooperate and pay school fees; yet allocate funds to short-term unplanned immediate household needs, which may have been earmarked for school fees. This may be the result of tunnelling (Mullainathan and Shafir, 2013) which ensures that the immediate household crisis or a stronger emotional need is averted, yet it creates a problem "outside of the tunnel", which can ultimately contribute to a school-fee tipping point. Not having slack in the household budget for unplanned expenses, not only exacerbates the non-payment of fees behaviour, but it can also perpetuate a fire-fighting dynamic in the household budget.

Fehr and Fischbacher (2004) shows that the longer defections go unchallenged, the more likely defectors will draw a conclusion that it pays to defect. In the absence of a mechanism to "punish" non-payment in schools, the best response to the defectors is to make them aware that the institution or the collective group knows they have defected, immediately. In schools, it is not an acceptable practice to name parents who have not paid, as it is likely to stir up emotions of injustice and inequality which

already is dividing the South African society. Instead, some schools will communicate directly to parents on a monthly basis that their debit order has been rejected or use fee collection agents to call parents telephonically, and inquire about the reason for non-payment and agree a promise-to-pay plan.

Contrary to economic theory, that people are self-interested and will engage in strong free-riding behaviour, Matthew Rabin (1993) concluded that people are conditional co-operators i.e. what they decide to contribute depends crucially on what they believe other members of the group will do. This was supported by John Ledyard (1995), showing that strong free-rider prediction is not accurate. The analysis of this tipping phenomenon when it occurs (Thomas Schelling, 1971) requires that we understand the dynamic relationship between self-interested individual behaviour and collective results. Schelling concludes in his research on the dynamic models of segregation, "to pick a neighbourhood with good schools is to pick a neighbourhood of people who appreciates schools." The implications of an unstable equilibrium in the case of education, is that the quality of the education experience declines, because the schools do not collect enough fees to cover the operational costs of the school.

In a school, collecting fees on a monthly basis is a case of trying to solve for a multi-player social dilemma described by Thomas Schelling (Colman, 2006) similar to a repeated public goods game. The extent of multiple monthly rounds of cooperation (Axelrod and Hamilton, 1981) is not just dependent on the chosen strategy, but also the extent to which the environment is already dominated by cooperating parents (School A) or non-cooperating parents (as is the case in School B). A strategy of cooperation based on reciprocity, underpinned by relatedness has proven to be successful in a predominantly non-cooperative environment. It has also proven to be stable and resist the presence of defectors. What is important to remember is that the WCED governance rules enforces confidentiality regarding individual parent school fee payment information, and schools are encouraged to deal with

non-payment through engagement with parents to agree an arrangement, through the school fee exemption mechanism or last resort, legal action in cases where parents are uncooperative in school fee collection efforts. This means that individual parents can and do defect in their school fee payments, without any other parent knowing or being able to take any action. The status of their school fees account is only known by the parents themselves and the school administration including the SGB. Social influence is fundamental to how cooperation may evolve to a stable equilibrium, because humans are a highly social species and value what other humans think of them (Zak, 2006). Parent social networks are known to be effective in sharing information regarding their school experiences. It is not known if these conversations include discussing school fee payment cooperation but it can be a challenge because schools are large in size and hence difficult to coordinate the provision of partly privately funded public good like education (Isaac, Walker & Thomas, 1994), It is for this reason that this research explores the effects of behaviourally framed text messaging linked to school fee payment. It may be possible that parents are, able to build strategic social "alliances" to pay or not to pay school fees, and text messaging may provide mechanism for leverage in a multi-player repeated dilemma (Hilbe et al, 2014).

2.2.3   What interventions can improve Cooperation in school- fee payments?

Early work by Dawes (1980), identified several factors which may improve cooperation in a public goods situation, and which were deemed potential influences on behaviour. Some of these influences include i) Relevant communication ii) Provision points iii) Repetition iv) Rebates and v) Moral suasion. These may have varying effects on levels of contribution to a public good, with some easy to control for and others more difficult to control.

In the school context, relevant communication via e-mail, letters, and SMS messages between the school and parents are already the norm, and ensures that all stakeholders are informed of scheduled

events, or when changes in the school planning needs to be communicated. Some schools have a system which sends monthly school fee statements to parents, showing what the outstanding balance is. This is not the norm in all schools. In School A, the established communication mechanism since 2016 is to send a monthly SMS reminder that school fee payments are due by a specified date. In School B, a SMS is sent at the start, during and end of term to remind parents that school fees need to be paid.

School fee levels which are set annually and agreed between Governing Body members and parents, creates a natural provision point within schools. This is the level at which all parents are expected to cooperate so that the school has the necessary funding for operating costs which the WCED does not cover. Defecting parents who do not pay school fees, as well as the fee exemption policy which allows parents to apply for a rebate based on financial need without the WCED compensating the school for this non-payment, creates a financial dilemma for the school. In some schools, a minimum payment threshold has been introduced as an administrative cost, whereas in other schools, this threshold does not exist. The challenge with the fee exemption policy without adequate WCED compensation is that over time, fee-paying parents can decide it's unfair, and also start to free-ride. This can disturb the natural equilibrium and can create a tipping point, which then results in a non-fee-paying culture becoming the norm and fee collections deteriorating to an unsustainable level. A newspaper article[18] regarding school fee payments in the Western Cape, titled "Government paying double to support defaulting parents at fee paying schools", reports that the WCED, in an effort to mitigate the effects of the quintile system, has this year "made an increased amount of over R50 million available to assist Quintile 4 and 5 schools who are struggling to collect school fees from parents." In the same article, the WCED indicated that they are, "aware of a number of parents who are in a financial position to pay school fees, but choose not to, knowing that their child cannot be discriminated against". The

---

[18] The Sowetan in November 2017

WCED cautioned these parents that schools can take legal action against those who owe fees and those who do not qualify for exemption or partial exemption. "In cases where parents choose to pay for non-essentials over their child's school fees," the department appealed to them to act responsibly and pay their school fees and reiterated that "Compulsory school fees remain an important source of additional funds in public schools that have not been declared no-fee schools."

In School A, there exists a minimum threshold to be paid for fee exemption applicants, and in School B, this threshold did not exist until introduced after the research in 2018. This is an important mechanism, as it ensures that the free-riding effect is reduced and the level of perceived unfairness for fee-paying parents is minimised.

Repetition is an important variable, as parents have an opportunity every month or every year to cooperate or defect from paying school fees. In School A, the school fees payment analysis over several years, show that new parents of Grade 8 learners, cooperate much better in paying school fees in the first year at school, and then progressively increased levels of free-riding occurs. Anecdotal evidence of what triggers this trend can be ascribed to communication via social networks where parents share information regarding many school matters and may include school fees exemption options. There are parents who have in the past paid full school fees in Grade 8, and then applied for fee exemption from Grade 9 onwards.

There is not much experimental evidence regarding the effects of moral suasion to influence cooperative behaviour. In School A, part of the Grade 8 parent induction programme includes sharing information regarding how collectively the majority of parents pay school fees very well, which allows the school to maintain the quality of facilities, and continue investment in new facilities or technology. Parents are also told that any fee exemptions which are allowed by the Schools Act are ultimately paid

by other fee-paying parents. This is done to create awareness and appreciation for this delicate cooperative equilibrium which exists, so that parents can morally choose what is the right thing to do, if they are making important trade-offs in their household budget, to pay school fees or not.

Priming parents through various communication channels i.e. face-to-face and/or SMS messaging or reminders is therefore an important part of the communication strategy to create an environment conducive to cooperation. In School B, limited priming regarding school fee commitments happens and the annual school fee decision is based on "with" or "without" fundraising scenarios. At the annual fees meeting, parents are reminded that less than 50% parents are paying school fees, and the SGB and Principal make an appeal to encourage parents to pay. This school has already experienced a tipping point, as 100% of parents paid school fees when the school started in 1995, according to the school bursar.

Punishment of free-riding behaviour to sustain cooperative norms has been well documented by Ernst Fehr and Simon Gachter (2000). They discovered that conditional co-operators are also "altruistic punishers" by applying sanctions to those who destabilise the cooperative norm, which can be either monetary or non-monetary via social pressure. This can be done via communication, where the cooperation levels are published so that free-riders are exposed. Unfortunately in a school setting, punishment is not allowed, as the education act makes provision for school fee status to remain confidential, so that households and their children do not get "punished" by their peers if they cannot honour their commitment to pay school fees.

The best way to understand the dynamics of cooperation is what Chauduri (2009) concluded i.e. what seems crucial to effective cooperation is the creation of optimistic beliefs about the actions of others. Many people are willing to cooperate as long as enough others do as well. They need to know that

there are people with similar beliefs, preferences and actions as them. Communication is an important behavioural mechanism that can generate aligned optimistic beliefs, and that can lead to effective collective action. In schools therefore, the primary communication mechanism can be via priming and sharing relevant information which will positively impact the cooperative norms among parents. Creating an optimistic belief is one of the criteria for formulating the text messaging treatments in this research.

2.3   What kinds of Behavioural Interventions might work best in the school environment?

Priming and social proofing in a face-to-face communication with enrolling parents in schools, is an existing practice in many schools to create awareness of parents' responsibility as a collective body for the financial well-being of the school. There is also some evidence from interviews between governing body members and parents at schools[19], that where the school adopts an adversarial and tough stance to non-payment, the cooperation levels are likely to decline, as parents become disgruntled, and seek to exercise their fee exemption rights rather than do what is socially correct and that is to pay school fees.

Text messaging provides an easy low-cost mechanism which schools are already using to communicate with parents regarding school activities, and its use can be extended to create a stronger financial sustainability voice with all education stakeholders, and grow the collective cooperation of parents to a more stable and sustainable fee-payment equilibrium at all Section 21 schools.

Strengthening the financial capability of households (Spencer et al, 2015), in order to make better household financial trade-offs is something that is left to financial advisors to do. The question is also if financial education programmes are able to equip households with the capability to make good

---

[19] Evidence from SGB interviews at School A, one of the schools in the experiment

financial decisions and trade-offs (De Meza, Irlenbusch & Reyniers, 2008). In this regard, the future interventions may need to look at introducing an approach to partnering with financial advisors who can also develop the household decision-making behaviours that will help improve financial well-being through coaching (Dubofsky and Sussman, 2009; Locke and Lathan, 2006; Schoar, A. and Tantia, P., 2014).

The above literature review and existing practices regarding what influences parents school fee payment behaviour, provides the context and basis for the hypothesis and intervention focus to solve for the fee payment social dilemma in Section 21 schools.

3. Intervention – Solving for the school fee payment dilemma

The research sought to establish if school fee text messages to households, can influence and/or improve the fee-payment co-operative equilibrium in schools. It explored the following four questions,

Question 1:   *Are text messages effective at improving the amount and frequency of school fees paid by parents.*

Question 2:   *Does the framing of the text message i.e. the context and content affect the amount of fees paid and the frequency of payment or do all messages have a similar impact?*

Question 3:   *Can behaviourally-framed text messaging help to sustain high collective school fee payment rates i.e. collective cooperation by all parents, and can it disrupt levels of defection which may lead to school financial failure?*

Question 4:   *In addition to text messaging, which contextual factors has the biggest influence on the positive or negative effects of existing fee-payment cooperation equilibrium in schools.*

3.1   Text Message Design: Context unlocks key parental decision trade-offs

The text message design is based on behavioural drivers which seek to connect with identified behavioural biases in the parent fees payment decision-making process. Based on literature in this research, three primary behavioural contexts emerge as possibly the most influential in fee-paying preferences of parents. These are i) Cooperation, ii) Choice Dynamics under conditions of Scarcity and iii) Incentives. **Cooperative Choice** determines if parents may be conditional co-operators or free-riders and their decision to contribute school fees depends crucially on what they believe other parents are and will be contributing. They are governed by social influence or by other regarding preferences e.g. reciprocity, sense of belonging or fairness. They may feel the affective appreciation for being part of a social network with a shared purpose of collectively contributing fees which provides growth and

development opportunities for their children. Conversely, they can choose to free-ride because other parents are getting an exemption, or they know that there are no consequences to defecting on school fee-payments. These parents may believe that paying school fees is the right thing to do yet will also want to know that other parents are doing the same. **Choice Dynamics in a State of Scarcity** determine if parents are governed by a situation of limited resources and possibly bandwidth constraints resulting from continuously needing to make financial and emotional trade-offs. These parents may be tunnelling[20] and need to deal with ever-changing monthly fluctuations in household income and costs. This can make them appear unresponsive to their fee-paying commitments because they need to allocate money to other unplanned and more urgent household needs. These parents may also be anxious if they are not fulfilling their fee-paying promise, knowing that other parents are meeting their commitments. **Choice driven by Incentives** is a powerful behavioural driver and connects with parents' self-interest governed by economic benefits associated with paying fees early. Parents are interested in what they may gain or not lose by making a choice to pay fees annually and on time. This scenario currently only happens in some schools where parents who pay upfront annual fees receive a discount for early settlement of fees by a specified date. Incentives are not generally used to promote monthly on-time school fee payments.

3.2   Behavioural Insights (Be-i): Framing monthly text messaging for impact

Consistent with the behavioural economics literature and section 2.1.1 highlighted the possible behavioural drivers which may be at play in the household decision-making for school-fee payments. It is not known what behavioural drivers currently influence the Cooperators, Defectors or the Rebators in their fee-payment decisions most. What the research is seeking to establish is,

1) Does text messaging increase the likelihood that parents pay fees (on time)?

---

[20] Eldar Shafir – Tunnelling is when you devote more and more of your energy and attention dealing with a scarcity of resources, which means you have less and less energy and attention for other things in life

2) Does text messaging increase the proportion of fees that parents pay?

3) Does the type of messaging have a differential effect on fee-payment behaviour?

4) For Cooperators, can the text messaging reinforce existing behaviour to continue paying school fees?

5) For Defectors, can the text messaging shift the fee-payment preferences of the household in favour of paying fees more often, and therefore increase total fees paid by parents

The context in which the household fee payment decisions are made is complex and dynamic i.e. it can change significantly from day to day, and month to month, and year to year depending on both financial and social well-being factors. The number of fee-exemption applications in Section 21 schools is an important contextual factor, as parents exercise their right to a fee exemption although they know that other parents then have to pay additional school fees to compensate the school for this loss. To address the fee-payment social dilemma of cooperation, free-riding and ensuring trust (Zak, 2006) and fairness, the text messaging uses words like "together", "we" and "our" to prime parents that collective cooperation is a good thing, and can create a brighter future for their children. It also seeks to shift any free-riders towards conditional cooperation, even if previously they believed and know that free-riding pays, as currently limited punishment happens via say legal action, or any other means.

This section gives clarity to the specific behavioural insights which were applied in crafting the messages, and which could focus the attention of parents thereby shifting or reinforcing existing preferences towards paying school fees. Given the socio-economic levels of the households, the text message design uses a composite of the behavioural insights to influence the context in which household fee-payment decisions are made, during the experiment. These include,

a) **Framing** – this is the behavioural mechanism for constructing the text message, containing the selected behavioural insights and crafted to test which experimental treatments are more or less

effective in influencing fee-payment behaviour. We know that framing has a significant impact on people especially in situations of loss-aversion and decision-making under conditions of scarcity and uncertainty.

b) **Salience** – the message seeks to draw attention to the importance of choosing education as a priority in the household budget by starting the message with "Education 1st" or "Fees First" which is a sub-treatment for the experimental approach. This is supported by research on parent engagement (Harris & Goodall, 2007) which shows the importance of making this a priority in schools and integral to the learning outcomes for children. It is for this reason that parents will apply and pay for additional transport if their children are accepted into good schools that have a track-record of university exemption passes and learners who go on to be successful at tertiary education and in their careers.

c) **Prosocial Behaviour** – anecdotal evidence based on SGB fee-payment conversations in School A with defector and rebator households in the period 2014 to 2016, indicate that they feel they have a right to free education, and therefore parents may feel that free-riding is justified. Education is a public good and there is a belief that it is the South African government's responsibility to fund education in schools. This is an important reference point that may also create an anchor for parents to not pay school fees.

d) **Scarcity** – the presence of limited financial and psychological resources in households may be a reality, and this can lead to bandwidth challenges in making optimal trade-offs in the household budget. It also means that these households could be challenged by *selective attention* and misses the importance of contributing to the education for their kids and their communities.

e) **Intention-action gap** – parents say they are committed to paying school fees, especially when they are applying for their children to attend a specific school. However, once the children are accepted, their behaviour is more influenced by what other parents are doing. It is for this reason that priming parents regarding their commitments as a collective group is important, and it is

necessary to remind them that their intent needs to lead to the action of paying school fees of a fixed amount, by a specific date every month.

f) **Channel Factors** – the mechanisms for making school-fee payments have improved, with many schools able to accept electronic payments via EFT or debit-order. The era of smartphones has also made it easier to make electronic payments directly into the school's banking account. However, although many households have electronic banking, lower income households with limited resources, still prefer to pay cash, as and when they have money available. It is for this reason that the message includes a "channel factor" with a call to action to "pay at the office", as and when parents drop or fetch their children from school.

g) **Loss-aversion**– for households with limited financial resources, not paying school fees can reduce the overall "loss" which can be a constant state for some households. For this reason, not applying for a fee exemption will be experienced as a loss. Also, if households believe that government should be funding education, it would be a loss for them, if they pay school fees, and they could be using the money to satisfy other household needs.

Table 1 shows an example of the final text messages and the component parts to illustrate how key behavioural insights (BE-i) were applied in the message design for the schools in this experiment.

Table 1: Example of design of text message in schools

Example of Framing Text Message using Behavioural Insights	"School Name" message: Education 1st-Together, restore our children's Hope and Optimism for a brighter future. Monthly school fees of Rxxxx due by 31Aug2018. Thank you.	"School Name" Message: #FeesFirst-Closing the gap to a brighter Financial Future for our children. Pay monthly school fees of Rxxx at the office by 22Jun2018. Thank you.
Attention:	School "Name"	School "Name"
Salience:	Education 1st	#FeesFirst
Pro-social Behaviour:	Together, restore our children's Hope and Optimism for a brighter future	Closing the gap to a brighter Financial Future for our children
Intention-Action:	Monthly school fees of Rxxxx due by 31Aug2018	Pay monthly school fees of Rxxx …..by 22Jun2018"
Channel factors:	n/a	"at the office"
Appreciative Emotion:	Thank you	Thank you

3.3   Intervention Treatments - Targeting the affective and financial sentiments of parents associated with future outcomes for school fee payment

The human behavioural factors which can influence the school-fee payment decision in households are vast, complex and the interrelationships are dynamic. The research review shared in Section 2 and early experiments at School A, show that it may be possible to improve cooperation from parents, through text messaging, and hence regular priming may influence parents' choice in how they pay school fees. The intervention focus seeks to achieve the following,

i)   Remind parents of the amount of fees due and by when, on a monthly basis

ii)   Thank parents for their commitment to pay school fees

iii)   Connect parents to the moral sentiment that paying school fees provides a positive future for their children, through learning opportunities and growth

iv)   Reinforce the schools' pursuit of excellence and hence therefore strengthen parents' associative appreciation for being part of the school community. This creates a sense of belonging and togetherness.

v)   Remind parents that education is still the best investment for financial well-being, and that it is an opportunity to close the economic gap and unlock children's future wealth potential.

vi)   Build and reinforce the association between paying fees and education as a prudent investment in a public good i.e. education.

Three experimental groups were defined for the intervention i.e.

1) **Control group: Attention-framed Theme**

   For School A, a monthly *reminder* message to all parents is already an established practice. For the research therefore, the control group received a "reminder" message for parents to pay school fees. For School B, the control group received *no message*.

2) **Treatment group 1: Affective-framed Theme**

For both Schools, parents received an *"affective-framed" text message* which seeks to connect with their preferences or beliefs that education provides a brighter future for children, increased learning opportunities, and being part of a school of excellence for the future is beneficial for their children. It also fosters a sense that parents are achieving these social goals together and there is hope through education for a bright future for their children.

3) **Treatment group 2: Financial-framed Theme**

For both Schools, parents received a *"financial-framed" text message* which seeks to connect with the preferences or beliefs of parents' that investment in education pays and can lead to financial well-being. It seeks to appeal to parents that historic economic gaps can be closed, that the future wealth for their children and investment returns on education is a good reason to pay school fees, and appeal to parents to not lose the opportunity to unlock their children's wealth potential through education.

The summary of the intervention process is shown in Figure 2 below and provides an overview of how the intervention was contextualised and finally executed.

Figure 2: School Fees Text Messaging Intervention Process
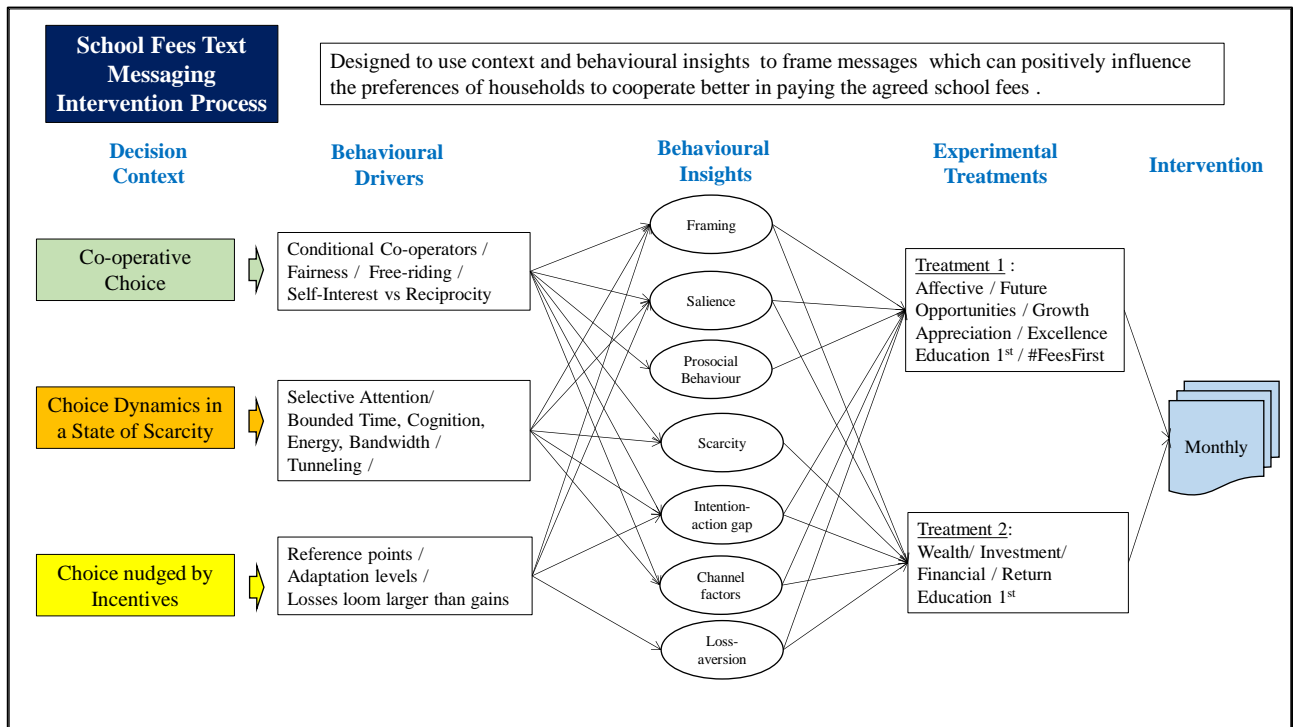
The above framework shows how solving this fee payment dilemma starts with the decision context for parents, and then to understand their behavioural drivers. The message design then uses behavioural insights to construct a text message which can connect with the parents' behavioural drivers. The experimental treatment then tests the parents' responsiveness to text messages which are either framed with "Affective (Human) appeal" or the "Financial (Econ) appeal".

4.   Experimental Approach and Sample

The sample was drawn from the participating school's database and parents were classified into the various fee payment typology groups as follows: a) The parents that were classified as "Defectors" are those parents who had not paid their monthly school fees consistently prior to messaging starting, and were in arrears by more than 1 month, b) The parents that were classified as "Cooperators" are those parents who had paid their monthly school fees consistently and on time up until before messaging started, and were not in arrears, c) The parents that were classified as "Rebators" are those parents who had applied for and were granted a full or partial exemption for the 2018 school year.

The sample excluded learners who receive scholarships and learners who may start off in one typology e.g. Defector and is transitioned to the Rebator group during the period of the messaging and data collection. The sample also includes demographic information i.e. race, home language, grade, age, gender and residential suburb. There were no early termination criteria for the messaging phases, and text messaging reverted to its original format and frequency, in the respective schools after completion of data collection step.

This research followed the approach of a Randomised Control Trial (RCT). A key consideration for this randomised control trial was to minimise any spillover effects, between treatment and control groups. Randomisation was done at a household level to ensure that siblings who attend the same school were assigned to the same treatment group. Before randomisation, each household was designated into a household typology i.e. Defectors, Cooperators and Rebators, based on prior fee payment history. Randomisation was then carried out, stratifying by these 3 categories in order to ensure balance across the groups.

The research findings are now presented in the form of a case study for each of the two participating schools, because the two schools have quite different educational and socio-economic environments and make it easier to understand the results comparisons once the full analysis has been presented. The summary and discussion section will be used to evaluate differences and commonalities of the outcomes and then then draw conclusions that are consistent or divergent, based on the results.

5. Case Study – School A

5.1 Contextual Background

School A is a single-sex former model C high school in Cape Town (see Table 2 for summary description). The school is large, with 913 students registered as learners in 2018. Annual school fees were R42 800, and the school offered a discount to parents who paid their fees in full before the end of December in the preceding year. Historically, fee payment rates are and have been above 80%, over the last 6-10 years. School A has also been experimenting with text messaging interventions since 2014, which has resulted in some improvements (refer Figure 1). Since 2014, the outstanding fee ratio has fallen from 16.2% to 13.8% in 2016. These experiments included sending a monthly SMS text message to remind parents that school fees were due. This practice of a "monthly reminder message" has continued since then and is part of the routine fee collection process at School A[21].

Table 2: Description of School Demographics

	Demographics	School A
1	No of Learners (+/-)	800 - 950
2	Annual School Fees	R40 000 - R45 000
3	Text Messaging Capability (SmsWeb)	Yes
4	Fee-Payment Cooperation - % of parents paying school fees	> 80 - 90%
5	Education Level	Secondary School: Grade 8 - 12
6	Incentive for Early Payment	Yes, Annual
7	Exemption Applications	10 - 15%
8	Pupil -Teacher Ratio	± 16
9	Learners per class (average)	25-30
10	Fund-raising supplement School Fees	No
11	Financial Reserves for Maintenance, etc	Yes
12	Outstanding Fee-Payment Communication	1) e-mail Monthly Statements, 2) Monthly SMS reminder, 3) Meet with SGB Member wrt arrears
13	Fee-exemption Application	Assessment & Meeting with SGB

---

[21] This is important to keep in mind. As such, the control group for School A also receives a message, but it is the standard reminder message that all parents have been receiving since 2014. The experiment in School A thus compares whether messaging content (Treatment 1 and 2) is more effective at prompting parents to pay fees as opposed to a standard reminder message.

Also important in all schools is the fee-collection strategy, and at School A, the following is done,

1) When the parents apply for a place at the school, the school's financial goals and policies are shared during the interview process

2) When the new parents (Grade 8) are welcomed before the start of the new year, the school fees policy as well as the expectations from parents, as a collective, are re-iterated by the headmaster in a face-to-face group conversation

3) Monthly cell phone text messages regarding school-fee reminders, which includes a "thank you message for paying school fees" is sent from the school. The school offers a value-based early-bird discount for parents who pay fees in advance by 31 December, of the previous year

4) The school has a minimum threshold payment for parents who apply for a fee's exemption of about 10-15% of school fees. This was introduced as a fairness mechanism because fee-paying parents continuously challenged the school management and SGB regarding acceptance of non-fee-paying learners, which places an increased burden on those parents who are paying the required school fees.

At the annual budget meeting for School A, the school management reiterates the importance of cooperation from all parents to pay school fees and maps out what learners will lose out on if the school is not able to provide for learners, if school fee payments are not complied with.

5.2   School Governance and the Annual Budget Planning Process

The annual budget process which is set out by the WCED and governed by the SGB ensures that parents are aware of the basis for setting the school fees. Annually in October, the budget is formally voted on by parents before it is accepted and becomes a binding agreement between parents and the school. In the case of School A the annual budget increases for the last five years have been between 7 and 9%. Fundraising efforts are not integral to the budgeting process and the school fee levels. At

the budget meeting, parents are shown a clear breakdown of changes in funding levels required to maintain or improve school facilities as well as the plans to invest in new learning capability e.g. technology. The budget process context that is framed, positions parents as the main agents who are maintaining the legacy of excellence for future generations. Attendance by parents is normally just more than the quorum of 15%.

Making it easy to pay school fees is also an important consideration to ensure timely school fee payments. At School A, parents can pay via Electronic Funds Transfer (EFT) or pay in person at the schools' fees office in cash. At School A, parents can also pay using a bank debit or credit card transacted via a Speedpoint card swiping machine. They also encourage parents to sign up for a monthly debit order, which is an easy mechanism to ensure timely monthly school fee payment. However, about 5-7% of debit orders fail in any given month, due to insufficient funds available in parents' bank account.

5.3 Data Sample

Table 3 below describes the experimental design that was implemented in School A. Following the process described in Section 3.4 above, parents were assigned to either a control group (who received the standard reminder message) or one of two treatment groups. Treatment 1 received an affective-framed appeal for school fee payment whilst those in Treatment 2 received an appeal framed in financial terms (see Appendix 1 for all School A intervention messages).

The final sample size for School A is 425 and excludes learners where the school already had existing payment arrangements in place e.g., upfront full fee payment, scholarships or existing arrear payment plans. However, the sample includes individuals on debit orders, and this is controlled for in the analysis.

Table 3: Baseline School A Sample split fee-payment typology and treatment groups

School A :Sample Split										
Experimental Groups		**Control**			**Treatment 1**			**Treatment 2**		
Text Framing Theme		**Reminder**			**Affective-Framed (Human Appeal)**			**Financial-Framed (Econ appeal)**		
Experimental Treatment		**Attention**			**Collectivism / Appreciation / Hope**			**Benefits of Wealth / Investment / Loss**		
Fee-Payer Typology		**Defectors**	**Cooperators**	**Rebators**	**Defectors**	**Cooperators**	**Rebators**	**Defectors**	**Cooperators**	**Rebators**
Treatment sub-groups		**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
No of Learners	425	24	100	19	31	91	21	30	91	18
% of Learners	100%	6%	24%	4%	7%	21%	5%	7%	21%	4%

The final sample comprises all those designated as Defectors (85) and Cooperators (282) across the control and treatment groups, giving a total sample size of 367. There are 58 learners in the sample who received a fee rebate/exemption from the school. These individuals are explicitly excluded from the analysis.

Messaging commenced on 28th May 2018, and fees data was then collected from month-end reports from May to end November 2018. For subsequent months, messages were sent 3-5 days before month-end which aligns with when monthly household salary payments are received, and when households are making their budget decisions and trade-offs. A common mid-month message was sent to all parents in the control and treatment groups, as a priming reminder, to reinforce the treatment message of the previous month-end and say "thank you" to parents for their commitment to pay school fees. This message also served as a reminder to parents who had not yet paid school fees. This frequency of when messages were sent was based on experimental learning in School A during the period from 2014 to 2016.

5.4   Data Gathering

The primary data for monthly fee payment of School A was sourced from systems within the school, contained in a monthly "Outstanding Fees" report. The learner demographic data for end of term 1 of 2018 was sourced from the WCED research unit, ensuring confidentiality and these independent variables for both schools included race, home language, grade and suburb. In addition, monthly household income per capita[22] by suburb (see Appendix 3) was sourced to include this important socio-economic variable as it plays an important role in household financial decision-making and trade-offs relating to school fee payments. The messaging was done using the SMSWeb platform.

5.5   Analysis and Results

The aim of this section is to analyse the effects i.e. treatment versus control, of text messaging to parents regarding their school fee payment behaviour. It aims to evaluate if treatments 1 and 2 who received a behaviourally framed text message produced a different fee payment response compared to the control group, where parents received a reminder message. In addition, the analysis reviewed differences in the fee payment behaviour for Defectors and Cooperators treatment groups versus control group.

The accuracy and magnitude of these differences in experimental results was evaluated using two important reference points, i) the statistical significance[23] and ii) substantive significance[24], to derive the research outcomes and insights. The test for statistical significance applied thresholds at $p < 0.15$ (small sample size), $p < 0.1$, $p < 0.05$ and $p < 0.01$. The analysis also considered the substantive significance (Ziliak and McCloskey, 2009; Esarey, 2010), to evaluate the economic impact of these treatment effects in relation to outstanding or expected school fee payments. Any improvements in

---

[22] Census 2011 – Income Dynamics and Poverty Status of Households in South Africa, Statistics South Africa 2015
[23] Statistical significance describes the measurement precision or certainty of an outcome. It ascertains if the difference between a variable and a baseline, is not due to random chance
[24] Substantive significance refers to whether an observed effect is large enough to be meaningful.

school fee payment (Rands) will have a direct positive impact on available teaching and infrastructure resources at fee-paying schools.

The analysis of results is now shared. Firstly the descriptive statistical analysis, which is then followed by the multivariate regression analysis, which will apply statistical significance thresholds at $p < 0.05$ and $p < 0.01$.

5.5.1 Descriptive Statistical Analysis

5.5.1.1 Did Randomisation work and are the experimental groups balanced?

Result 1: For School A, the experimental groups are largely balanced across the demographic characteristics for control versus treatments.

The analysis of the baseline data for School A shows that the sample consisted of 367 of the 425 (86%) learners i.e. includes Defectors and Cooperators only. The grade 8 group (28%) makes up the larger portion of the sample, with the other grades evenly spread between 16-19% of the sample. Just over half the sample are classified as "White", followed by "Coloured" (37%), with the remainder made up of "Indian" (5%), "Black" (5%) and Other (2%). English is spoken by a large majority of learners (96%) who range in age from 13 to 19 years old. Based on Census data for each learner's residential suburb, the monthly household income per capita is evenly balanced across the sample groups.

There are three instances of statistically significant difference which relate to the following independent variables: a) Grade 9[25], b) Race - "Indian"[26] and c) Home Language - "English"[27] categories. This can be seen from the T-test results summarised in Table 4 below and is controlled for during later phases of the analysis.

---

[25] T-test results: TPooled vs Control – t = 1.62, p=0.11,
                 Treatment 1 vs Control- t= 2.44, p= 0.02; Treatment 1 vs Treatment 2 - t= -1.87, p= 0.06
[26] T-test results: Treatment 1 vs Treatment 2 - t= 2.36, p= 0.01
[27] T-test results: Treatment 1 vs Treathent 2 - t= -1.93, p= 0.06

Table 4: School A – Test of balance (post randomisation) across experimental groups

School A	Means			T-Stat	Means		T-Stat		
Biographic Variable	n	All	Control	Pooled Treatment	TPooled vs Control	Treatment 1	Treatment 2	Treat1 vs Control	Treat2 vs Control	Treat1 vs Treat2
Grade	367									
Grade 8	104	0.28	0.27	0.29	-0.53	0.31	0.27	-0.78	-0.12	0.66
Grade 9	60	0.16	0.21	0.14	1.62*	0.10	0.18	2.44***	0.55	-1.87**
Grade 10	67	0.18	0.16	0.19	-0.77	0.19	0.20	-0.56	-0.75	-0.19
Grade 11	67	0.18	0.15	0.20	-1.07	0.20	0.20	-0.90	-0.92	-0.10
Grade 12	69	0.19	0.21	0.18	0.74	0.20	0.15	0.09	1.24	1.15
Race	362									
Black	11	0.03	0.02	0.04	-1.25	0.04	0.03	-1.15	-0.85	0.31
Coloured	133	0.37	0.34	0.38	-0.65	0.36	0.39	-0.31	-0.81	-0.49
Indian	17	0.05	0.04	0.05	-0.39	0.08	0.02	-1.34	1.12	2.36***
Other	8	0.02	0.02	0.02	0.22	0.02	0.03	0.44	-0.03	-0.46
White	193	0.53	0.57	0.51	1.11	0.50	0.53	1.21	0.69	-0.51
Home Language	362									
Afrikaans	6	0.02	0.02	0.01	0.76	0.02	0.01	0.44	0.99	0.57
English	347	0.96	0.96	0.96	0.03	0.93	0.98	0.87	-1.12	-1.93**
Other	3	0.01	0.01	0.01	-0.01	0.02	0.00	-0.59	1.00	1.42
isiXhosa	6	0.02	0.01	0.02	-1.02	0.03	0.01	-1.36	-0.02	1.34
Age	362	15.78	15.75	15.79	-0.24	15.86	15.72	-0.56	0.16	0.71
Monthly Household Income per Capita (Rands)	349	12782	12910	12782	0.35	12616	12807	0.43	0.15	-0.25

Note: Primary statistic is sub-sample Mean for Control, Pooled Treatment, Treatment 1 and Treatment 2.
The primary statistic is T-Stat for the T-test:
i) Pooled Treatment Mean minus Control Mean, ii) Treatment 1 vs Treatment 2, iii) Treatment 1 vs Control, iv) Treatment 2 vs Control
Test for Significance is designated as follows: **** p<0.01, *** p<0.05, ** p<0.1, * p<0.15

5.5.1.2 Was the SMS messaging implementation successful?

The messaging implementation had good success in School A i.e. greater than 80%, as measured by the proportion of SMS messages that were sent and delivered. Messages[28] were set up to be sent automatically from the SMSWeb system, between 10h00 and 16h00 on the designated day.

The Control group received a *reminder* message and Figure 5 shows the results for SMS delivered rate for the Defector and Cooperator groups, for the months when text messaging occurred.

---

[28] The detailed messages are summarised in Appendix 1 for School A.

Figure 3: School A - Monthly SMS Message Delivery
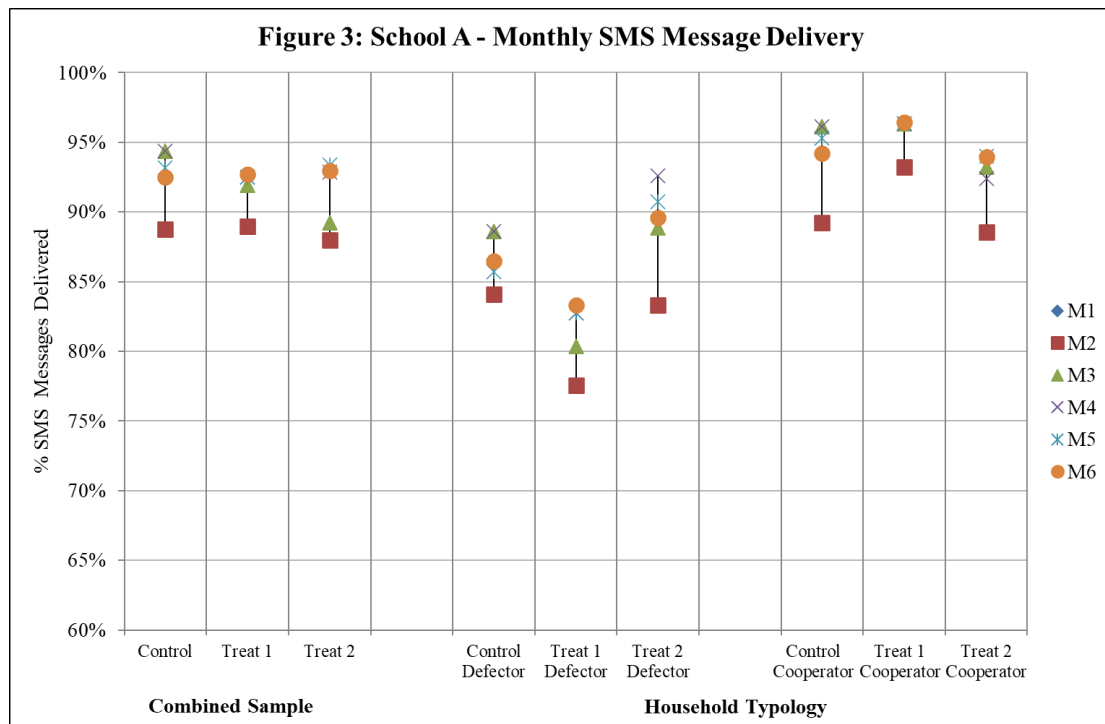
The overall SMS delivered rate was 92%, with small differences in Control (93%), Treatment 1 (92%) and Treatment 2 (91%) groups. The average SMS delivered rate for Defectors was 86%, and for Cooperators it was 94%. The mid-month "thank you" message delivery rate was 90%.

According to SMSWeb, the primary reason for non-delivery of an SMS message is when the cell phone number is no longer in use. It is not unusual for cell phone users to change numbers frequently based on new deals that are available, or if users want to remain uncontactable to third parties. This is despite the option of "porting"[29] being available in South Africa since 2006.

The trends above show that in both schools, the average SMS delivery rate is highest for Cooperators, compared to Defectors. SMSWeb was not able to provide SMS statistics for each parent, and the overall SMS delivered rate was the only available data to assess to what extent the SMS's sent reached

---

[29] Porting allows customers to continue using the same phone number when changing cell phone services providers e.g. switching from Vodacom to MTN

parents during the messaging period. It may be possible that this difference in SMS delivered rate can contribute to unresponsive fee payment behaviour in the case of Defectors compared to Cooperators. It may also indicate the need to ensure that mobile phone information for parents who fall into the Defector group, be updated regularly to ensure that they are being reached via the SMS messaging channel.

5.5.1.3 Analysis of School Fees Payment Behaviour

This section analyses the outcome variables for the research to understand if; a) does messaging impact the fees payment behaviour of parents and b) does the *type* of message parents receive make a difference to their fee payment cooperation.

Four outcome variables have been defined for the analysis, 1) Mean Annual Fees Paid[30] in Rands and expressed as a proportion of total annual fees. 2) Mean Cumulative Fees Paid[31] in Rands during the messaging period (absolute value) and expressed as a proportion of outstanding fees before messaging started, 3) Mean cumulative no. of monthly fee payments[32] during the messaging period and expressed as a proportion of maximum no. of total monthly payments expected, 4) Mean 1st month fee payment[33] in Rands and expressed as a proportion of expected monthly school fee payment. The proportions provide a measure of how well parents paid fees relative to expected fee-payment commitments.

Analysis of Outcome Variable 1: Mean Annual Fees Paid

Sample Description

The histogram in Figure 4.1 and Table 5.1 below, illustrate the sample payment distribution for control vs pooled treatment, which shows a strong central tendency around the mean annual fees paid of

---

[30] Mean Annual Fees paid is the sum of cumulative fees paid by parents from Jan to November 2018 in Rands
[31] Mean Cumulative Fees paid is the sum of monthly fees paid by parents during the messaging period in Rands
[32] This is the sum of the no. of months a payment was made by parents. In school A, 6 monthly payments are expected i.e. May to Oct 2018, and in School B, 5 monthly payments are expected i.e. Jun to Oct 2018.
[33] This is the fee payment in Rands made by parents in the 1st month after messaging started.

R39 815. This equates to a fee payment rate of 93% demonstrating a high level of cooperation by fee paying parents in School A. It is also worth noting that the data is characterised by significant censoring, and this will be controlled for in the regression analysis.

Figure 4.1: School A - Mean Annual Fees Paid

Figure 4.2: School A - Mean Annual Fees Paid
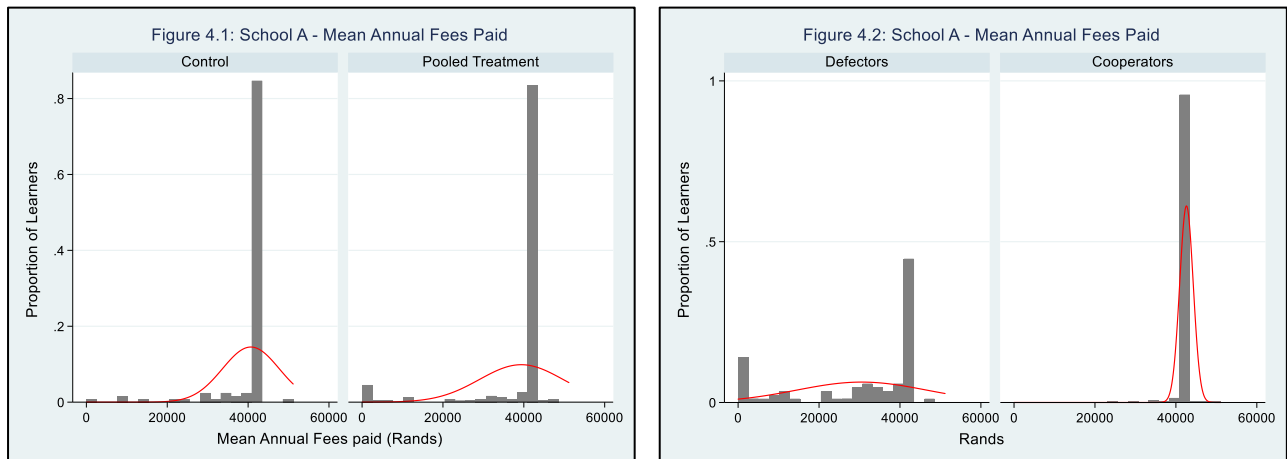
The histogram in Figure 4.2 together with Table 5.1 illustrates that the sample payment distribution for Defectors, shows a wide spread of fee payments around the mean of R30 529, and equates to a outstanding fees payment rate of 71.3%. Cooperators show a strong central tendency around the mean of R 42 614, and a fee payment rate compared to the outstanding fees payment before messaging started of 99.5%, which is a very high level of fee payment cooperation. These characteristics of the sample set for School A, provides the basis for the analysis and outcomes which now follow.

Treatment vs Control

The comparison for the mean annual fees paid (for both absolute value and proportion of annual fees) for the sample across the treatment groups are summarised in Table 5.1 and Appendix 5 for the statistical results.

The mean annual fees paid for the pooled treatment (R39 374), is lower (-3.2%) than for the control group (R40 679), but this difference is not statistically significant. The mean annual fees paid for treatment 1 (R39 026) is lower (-4.1%) than the control group (R40 679), and this result is significant for both the absolute annual fees paid and proportion of annual fees. The mean annual fees paid by

treatment group 2 (R39 725) is lower (-2.3%) than for control group, but this not a statistically significant difference.

Comparing the differences in outcomes for treatment 1 versus treatment 2, the mean annual fees paid for treatment 2 is higher 1.8% higher than for treatment 1 and the result is not statistically significant.

Table 5.1: School A – Analysis for Outcome Variable 1: Mean Annual Fees Paid

No.	Typology	Outcome Variable	n	All	Control	Pooled Treatment	T-Stat TP vs C	Treatment 1	T-Stat T1 vs C	Treatment 2	T-Stat T2 vs C	T-Stat T2 vs T1
1	Combined (Defectors + Cooperators)	Mean Annual Fees Paid (Rands)	367	39 815	40 679	39 374		39 026	*	39 725		
				(9357)	(7021)	(10333)		(10498)		(10196)		
		Mean Annual Fees paid as a *proportion* of total annual fees (%)		93,0%	95,0%	92,0%		91,1%	Δ	92,8%		
1.1	Defectors	Mean Annual Fees Paid (Rands)	85	30 529	33 771	29 254		27 992		30 558		
				(16082)	(13122)	(17036)		(16545)		(17716)		
		Mean Annual Fees paid as a *proportion* of total annual fees (%)		71,3%	78,9%	68,3%		65,4%		71,4%		
1.2	Cooperators	Mean Annual Fees Paid (Rands)	282	42 614	42 336	42 766	*	42 785	*	42 747	*	
				(1668)	(2629)	(689)		(2629)		(491)		
		Mean Annual Fees paid as a *proportion* of total annual fees (%)		99,5%	98,9%	99,9%	Δ	100,0%	Δ	99,9%	Δ	
1.3	^^Cooperators (excluding debit orders)	Mean Annual Fees Paid (Rands)	137	42 448	41 799	42 735	*	42 775	*	42 685		
				(2358)	(3967)	(955)		(1110)		(723)		
		Mean Annual Fees paid as a *proportion* of total annual fees (%)		99,2%	97,7%	99,9%	Δ	99,9%	Δ	99,7%		

Note: Primary statistic is sample Mean, standard deviation is in parentheses for All, Control, Pooled Treatment, Treatment 1 and Treatment 2.
Results of T-tests of Mean Fees Paid- Treatment versus Control: * * * * p<0.01, * * * p<0.05, * * p<0.1, * p<0.15
Results of T-tests of Mean Fees Paid as proprotion of Outstanding Fees - Treatment versus Control: Δ Δ Δ Δ p<0.01, Δ Δ Δ p<0.05, Δ Δ p<0.1, Δ p<0.15

As a proportion of annual fees paid, the control group has the highest mean annual fees paid of 95.0%, and Treatment 1 (91.1%) and Treatment 2 (92.8%) are lower than the control group. These differences in proportions for the mean cumulative fees paid are illustrated in Figure 4.3 below.

Figure 4.3: School A Combined - Differences between Treatment groups for Annual Fees Paid
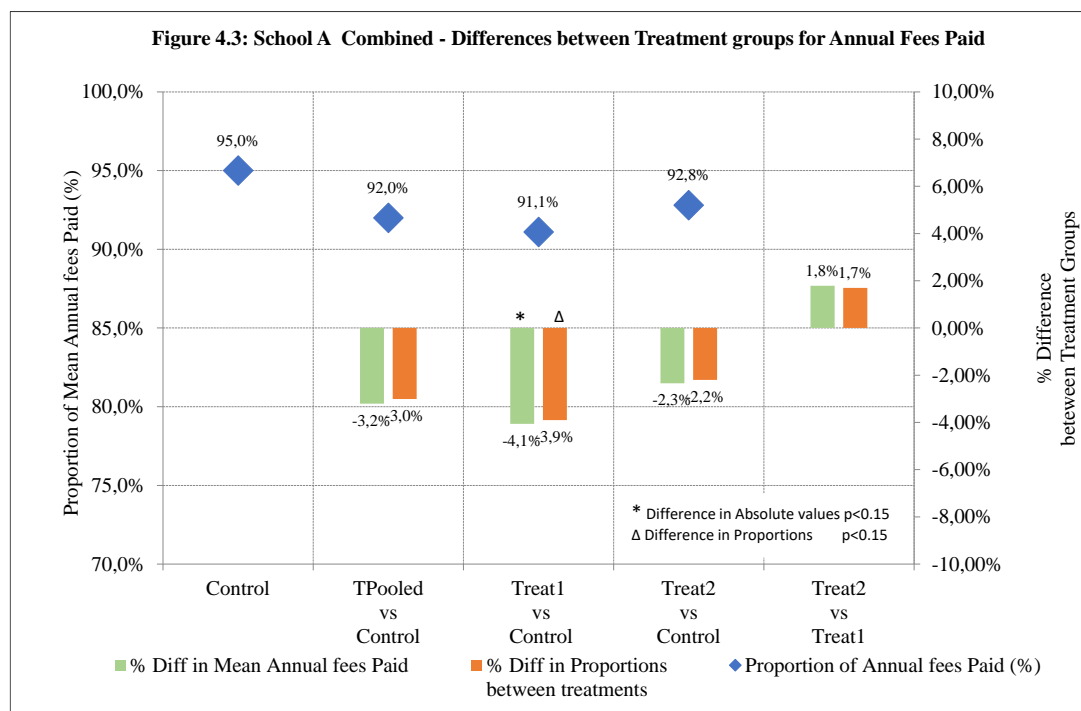
The only important result above is for parents in treatment 1, who pay significantly less (4.1%) of the absolute annual fees than the control group. The result also shows these parents in treatment 1 pay 3.9% less of the proportion of annual fees than the control group, and the result is also significant. These parents received an affective-framed message, which reinforces with parents that education provides a brighter future. The response from the parents in this treatment group is negative as seen by the lower annual fees paid.

Defectors and Cooperators across Treatment Groups

The comparison for the mean annual fees paid for Defectors and Cooperators across the treatment groups are summarised in Table 5.1 above and illustrated in Figure 4.4, which also highlights the statistically significant outcomes. The detailed analysis of the outcomes is summarised in Appendix 5.
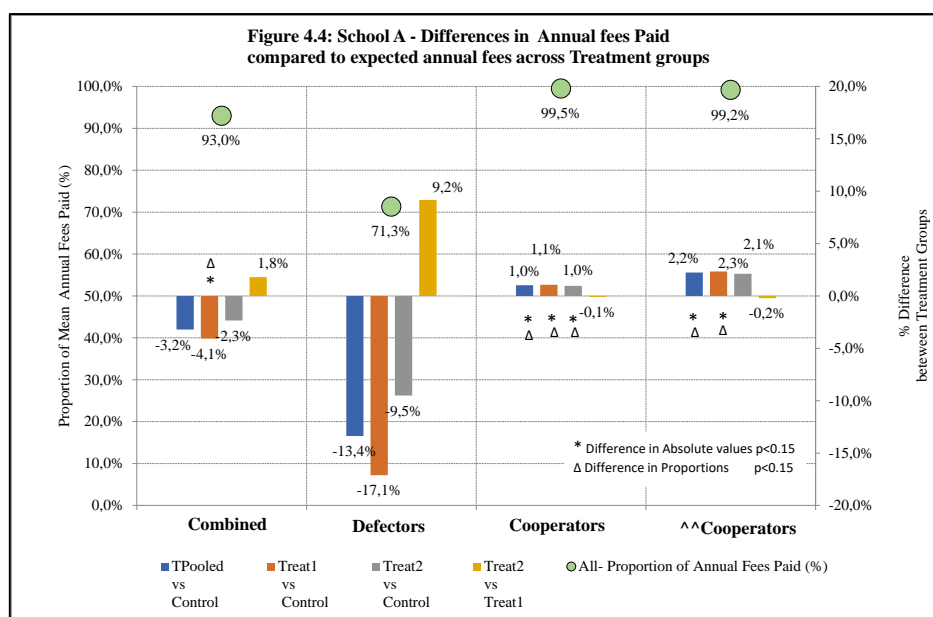
Figure 4.4: School A - Differences in Annual fees Paid compared to expected annual fees across Treatment groups

The above shows that the only significant differences that arise are for cooperator parents and extends to both treatment 1 and treatment 2. Co-operator parents in treatment 1 (received an affective-framed message) and treatment 2 (received a finance-framed message) have significantly higher annual fee payment rates than co-operator parents who simply receive the reminder message. The converse appears to be true amongst defector parents in the treatment groups who have lower fee payment rates than defector parents in the control group. These differences appear to be driven by the (non) response to payment of defector parents in both treatment 1 and 2. In short, for Defectors , both the behaviourally framed message appears to have counter effects for parents depending on their prior fee payment behaviour, relative to parents in the control who continue to receive the reminder message.

Analysis of Outcome Variable 2: Mean Fees Paid during messaging period (Absolute Value)

This variable seeks to understand how much fees parents paid during the period of messaging only i.e. from May to November 2018. The absolute cumulative fees paid for the messaging period is then expressed as a proportion of the total outstanding fees before messaging started, and gives a measure of the messaging effects on fees paid, but just for the messaging period. The differences between treatment and control were then analysed.

Sample Description

The histogram in Figure 5.1 together with Table 5.2 below, illustrate the sample payment distribution for control vs pooled treatment, which shows a strong central tendency around the mean cumulative fees paid during the messaging period of R26 412. This equates to a fee payment rate of 92% demonstrating a high level of cooperation by fee paying parents in School A. As expected, the data is characterised by significant censoring, and this will be controlled for in the regression analysis.
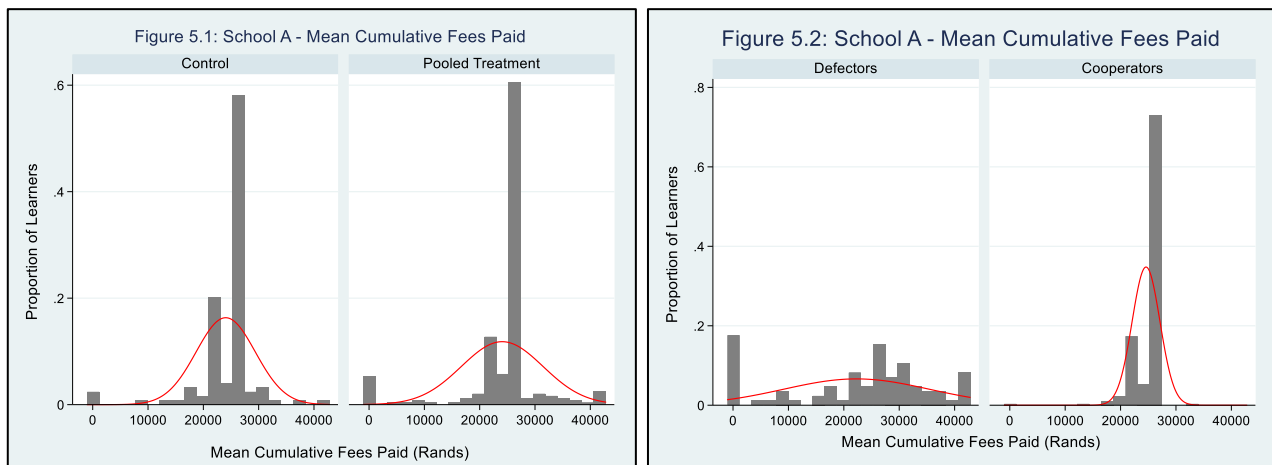
The histogram in Figure 5.2 together with Table 5.2 illustrate that the sample payment distribution for Defectors, shows a wide spread of fee payments around the mean of R23 168, which equates to a fee payment rate of 68.9%. Cooperators show a strong central tendency around the mean cumulative fees paid during the messaging period of R27 389, and a fee payment rate of 99.2%, which is a very high level of fee payment cooperation. These characteristics of the sample set for School A, provides the basis for the analysis and outcomes which now follow.

Treatment vs Control

The comparison for the mean cumulative fees paid (for both absolute value and proportion of outstanding fees) for the sample across the treatment groups are summarised in Table 5.1 and Appendix 5 for the statistical results.

There are no significant differences in absolute fees paid and proportion of outstanding fees paid before messaging started, between treatment and control groups. The absolute mean cumulative fees paid for the pooled treatment (R26 416), is marginally higher than for the control group (R26 404). However, what is perhaps more useful to consider is the proportion of outstanding fees paid at the start of messaging, that was paid. The proportion of outstanding fees paid before messaging started for the control of 93.9% is higher that both treatment 1 (90.4%) and treatment 2 (92.2%), although the differences are not statistically significant on average.

Table 5.2: School A – Outcome Variable 2: Cumulative Fees Paid during messaging period

No.	Typology	Outcome Variable	n	All	Control	Pooled Treatment	T-Stat TP vs C	Treatment 1	T-Stat T1 vs C	Treatment 2	T-Stat T2 vs C	T-Stat T2 vs T1
2	Combined (Defectors + Cooperators)	Mean Cumulative Fees Paid during messaging period (Rands)	367	26 412	26 404	26 416		25 986		26 850		
				(7351)	(5926)	(7993)		(7784)		(8207)		
		Mean Cumulative Fees paid as a *proportion* of outstanding fees before messaging started (%)		92,2%	93,9%	91,3%		90,4%		92,2%		
2.1	Defectors	Mean Cumulative Fees Paid during messaging period (Rands)	85	23 168	24 377	22 693		21 484		23 943		
				(13575)	(10286)	(14718)		(13999)		(15566)		
		Mean Cumulative Fees paid as a *proportion* of outstanding fees before messaging started (%)		68,9%	76,7%	65,8%		62,3%	Δ	69,5%		
2.2	Cooperators	Mean Cumulative Fees Paid during messaging period (Rands)	282	27 389	26 890	27 664	*	27 519		27 808	**	
				(3341)	4 220	(2715)		(2604)		(2828)		
		Mean Cumulative Fees paid as a *proportion* of outstanding fees before messaging started (%)		99,2%	98,0%	99,9%	Δ	100,0%	Δ	99,8%	Δ	
2.3	^^Cooperators (excluding debit orders)	Mean Cumulative Fees Paid during messaging period (Rands)	137	26 162	25 276	26 554	*	26 688	*	26 385		
				(3842)	(5405)	(2849)		(2517)		(3243)		
		Mean Cumulative Fees paid as a *proportion* of outstanding fees before messaging started (%)		98,5%	95,6%	99,8%	Δ	100,0%	Δ	99,5%		

Note: Primary statistic is sample Mean, standard deviation is in parentheses for All, Control, Pooled Treatment, Treatment 1 and Treatment 2.
Results of T-tests - Outcome Variable Treatment versus Control: * * * * p<0.01, * * * p<0.05, * * p<0.1, * p<0.15
Results of T-tests - Proportions Treatment versus Control: Δ Δ Δ Δ p<0.01, Δ Δ Δ p<0.05, Δ Δ p<0.1, Δ p<0.1

The differences in the absolute value and the proportions of the mean cumulative fees paid are illustrated in Figure 5.3 below for the combined sample.

None of the results for the combined sample for treatment versus control are statistically significant. Parents in treatment 1 pay slightly less (1.6%) of the absolute fees than the control group, whilst parents in treatment 2, pay slightly more (1.7%), but these results are not statistically significant. The result also shows that parents in treatment 1 pay 3.5% less of the outstanding fees compared to the control group, and in treatment 2, parents 1.7% less of the outstanding fees prior to messaging starting. The difference in absolute fees paid between treatment 1 and treatment 2 is 3.3% and the result is not statistically significant.

Figure 5.3: School A Combined - Differences between Treatment groups for the proportion of Mean Fees Paid relative to outstanding fees before messaging started
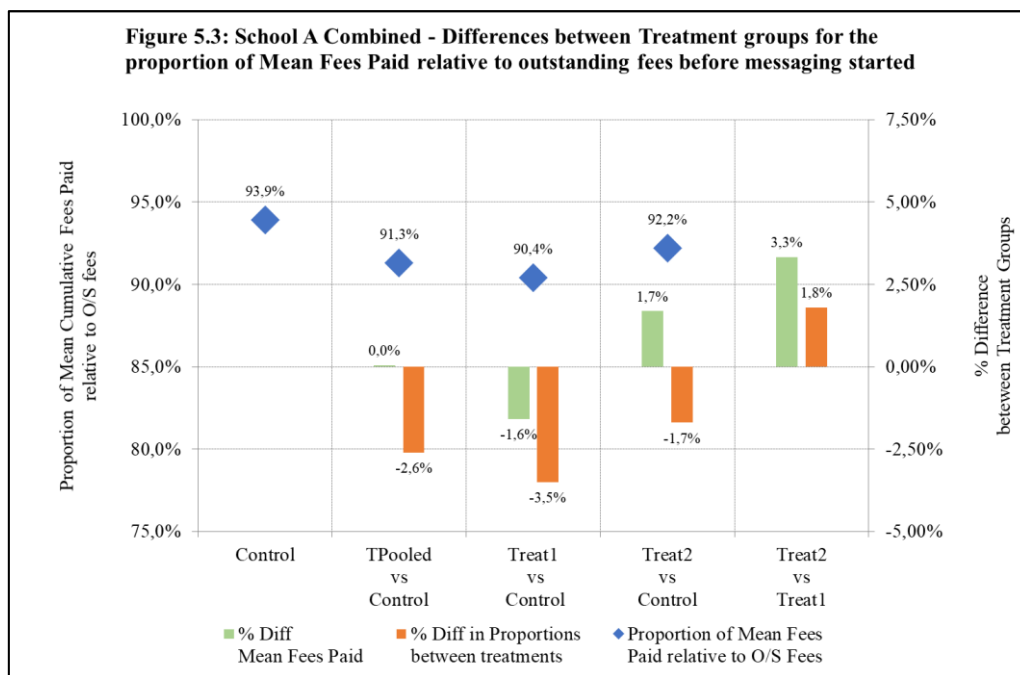
Analysis for Defectors and Cooperators across the Treatment groups

The comparison for the absolute fees paid and proportion of outstanding fees paid before messaging started for Defectors and Cooperators are summarised in Table 5.2 above and illustrated in Figure 5.4, which also highlights the statistically significant outcomes. The detailed analysis of the outcomes is summarised in Appendix 6.

Figure 5.4: School A - Differences in Mean Cumulative Fees Paid across Treatment groups
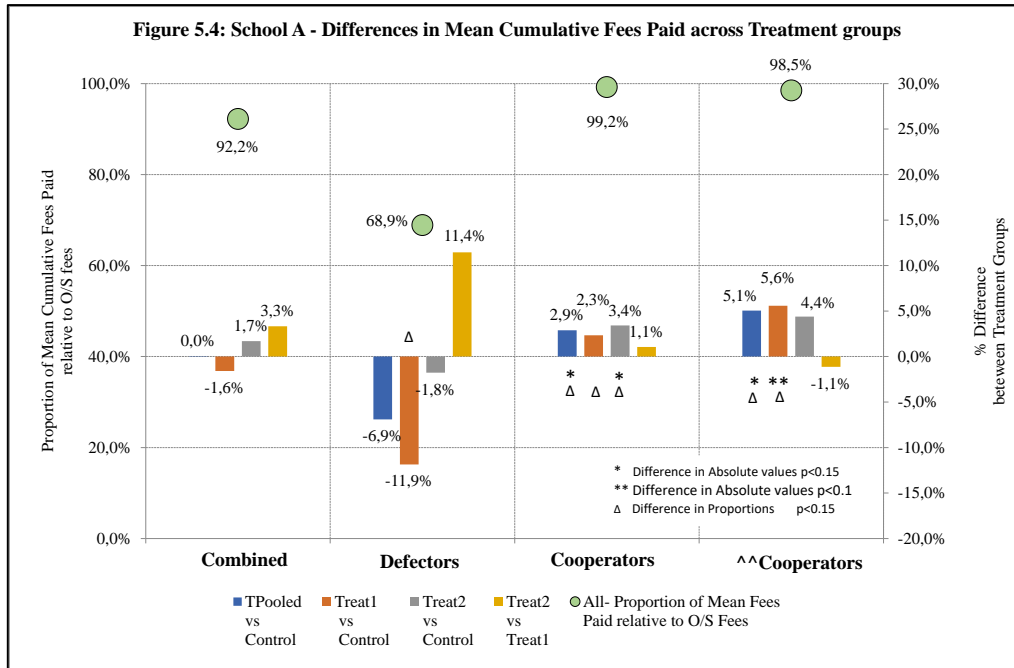
The above shows that there are significant differences that arise between treatment and control is amongst co-operator and defector parents. Cooperator parents in the treatment groups have significantly higher fee payment rates than cooperator parents who simply receive the reminder message. In particular, it appears that this difference may be driven by co-operator parents in both treatment 1 (affective-framed message of education creating a brighter future) and treatment 2, where parents received a financially framed message encouraging parents to invest in their children's success and future. The converse appears to be true amongst defector parents. Parents in treatment 1 pay significantly less of the absolute fees during the messaging period. Parents with prior history of inconsistent fee payment have significantly lower fee payment rates than defector parents in the control group, and again, this difference is driven by the (non) response of defector parents in treatment 1 mainly. In short, for Defectors, the affective framed message appears to have counter effects for parents depending on their prior fee payment behaviour, relative to parents in the control who continue to receive the reminder message.

Analysis of Outcome Variable 3: No. of Monthly Fee Payments during the messaging period

This variable of no. of monthly fee payments is useful because the payment terms for school fees which allows payment of annual school fees spread over ten months. This is geared to make it easy for parents to pay in a way which is aligned with monthly household income earners. It's a measure which schools can track easily to see if parent have paid or not on a monthly basis. This variable is also useful to establish payment frequency trends which is used for fees follow-up responses.

Sample Description

Figure 6.1: School A - Mean Cumulative No. of Monthly Fee Payments

Figure 6.2: School A - Mean Cumulative No. of Monthly Fee Payments

The histogram in Figure 6.1 and Table 5.3 below, illustrate the sample payment distribution for control vs pooled treatment, which shows a strong central tendency around the mean cumulative no. of monthly fee payments during the messaging period of 5.4 which equates to a fee payment frequency rate of 90.3% compared to the maximum no. of total monthly payments expected. This represents a high level of cooperation by fee paying parents in School A. The histogram in Figure 6.2 combined with Table 5.3 below illustrate a lower no. of payments made by Defectors, with a mean of 3.7 which equates to a monthly frequency of payments rate of 62.9%. Cooperators show a strong central tendency in the no. of monthly fee payments of 5.9, and a monthly frequency of payments rate of 98.6%, which show a high level of fee payment cooperation.

Treatment vs Control

The comparison for the mean cumulative no. of monthly fee payments during the messaging period for the combined sample across the treatment groups are summarised in Table 5.3 below and Appendix 7 for the statistical outcomes.

Table 5.3: School A – Analysis for Outcome Variable 3: No. of Monthly Fee Payments

	School A			Mean (Standard Deviation)								
No.	Typology	Outcome Variable	n	All	Control	Pooled Treatment	T-Stat TP vs C	Treatment 1	T-Stat T1 vs C	Treatment 2	T-Stat T2 vs C	T-Stat T2 vs T1
3	Combined (Defectors + Cooperators)	Mean cumulative no. of monthly fee payments during the messaging period	367	5,41	5,41	5,42		5,30		5,54		
				(1.84)	(1.75)	(1.89)		(1.91)		(1.87)		
		Mean cumulative no. of monthly fee payments as a proportion of expected total payments during the messaging period (%)		90,3%	90,2%	90,4%		88,4%		92,4%		
3.1	Defectors	Mean cumulative no. of monthly fee payments during the messaging period	85	3,77	3,95	3,70		3,45		3,96		
				(2.37)	(2,19)	(2.45)		(2.43)		(2.49)		
		Mean cumulative no. of monthly fee payments as a proportion of expected total payments during the messaging period (%)		62,9%	66,0%	61,7%		57,5%		66,1%		
3.2	Cooperators	Mean cumulative no. of monthly fee payments during the messaging period	282	5,91	5,76	6,00		5,93		6,06	*	
				(1.30)	(1.44)	(1.2)		(1.16)		(1.26)		
		Mean cumulative no. of monthly fee payments as a proportion of expected total payments during the messaging period (%)		98,6%	96,0%	100,0%		98,9%		98,4%	Δ	
3.3	^^Cooperators (excluding debit orders)	Mean cumulative no. of monthly fee payments during the messaging period	137	5,41	5,12	5,53	*	5,60	*	5,45		
				(1.39)	(1.61)	(1.27)		(1.13)		(1.43)		
		Mean cumulative no. of monthly fee payments as a proportion of expected total payments during the messaging period (%)		90,1%	85,3%	92,2%	Δ	93,4%	Δ	90,9%		

Note: Primary statistic is sample Mean, standard deviation is in parentheses for All, Control, Pooled Treatment, Treatment 1 and Treatment 2.
Results of T-tests of Mean Fees Paid- Treatment versus Control: * * * * p<0.01, * * * p<0.05, * * p<0.1, * p<0.15
Results of T-tests of Mean Fees Paid as proprotion of Outstanding Fees - Treatment versus Control: Δ Δ Δ Δ p<0.01, Δ Δ Δ p<0.05, Δ Δ p<0.1, Δ p<0.15

There are no significant differences in the no. of monthly payments made and the monthly payments frequency rate, between treatment and control groups. The no. of monthly fee payments during the

messaging period for the pooled treatment (5.42) is the same as for the control group (5.41). The monthly no. of payments frequency rate is highest for treatment 2 (92.4%) compared to control (90.2%) and treatment 1 (88.4%).

These differences in means and proportions for the cumulative of no. of monthly fee payments are illustrated in Figure 6.3 below for the combined sample.

Figure 6.3: School A Combined - Differences between Treatment groups for Mean Cumulative No. of Monthly Fee Payments during the messaging period
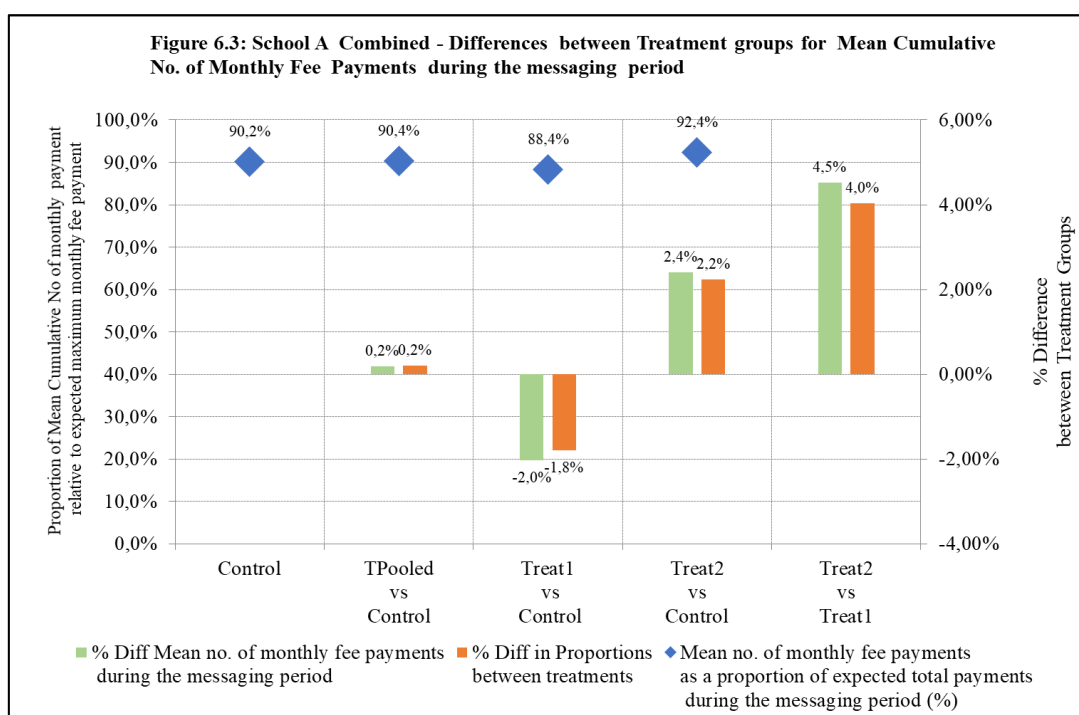
Once again there are no significant treatment effects for the combined sample. Parents in treatment 1 make slightly lower (2.0%) monthly fee payments than the control group, whilst parents in treatment 2, make slightly more (2.4%) monthly fee payments, but these results are not statistically significant. The result also shows that parents in treatment 1 make 1.8% less monthly payments compared to the control group, and in treatment 2, parents make 2.4% more monthly payments. The difference in no. of payments between treatment 1 and treatment 2 is 4.5% and as already mentioned, none of the above results are statistically significant.

Defectors and Cooperators across Treatment Groups

The comparison for the monthly fee payments for Defectors and Cooperators across the treatment groups are summarised in Table 5.3 above and illustrated in Figure 6.4, which also highlights the statistically significant outcomes. The detailed analysis of the outcomes is summarised in Appendix 7.
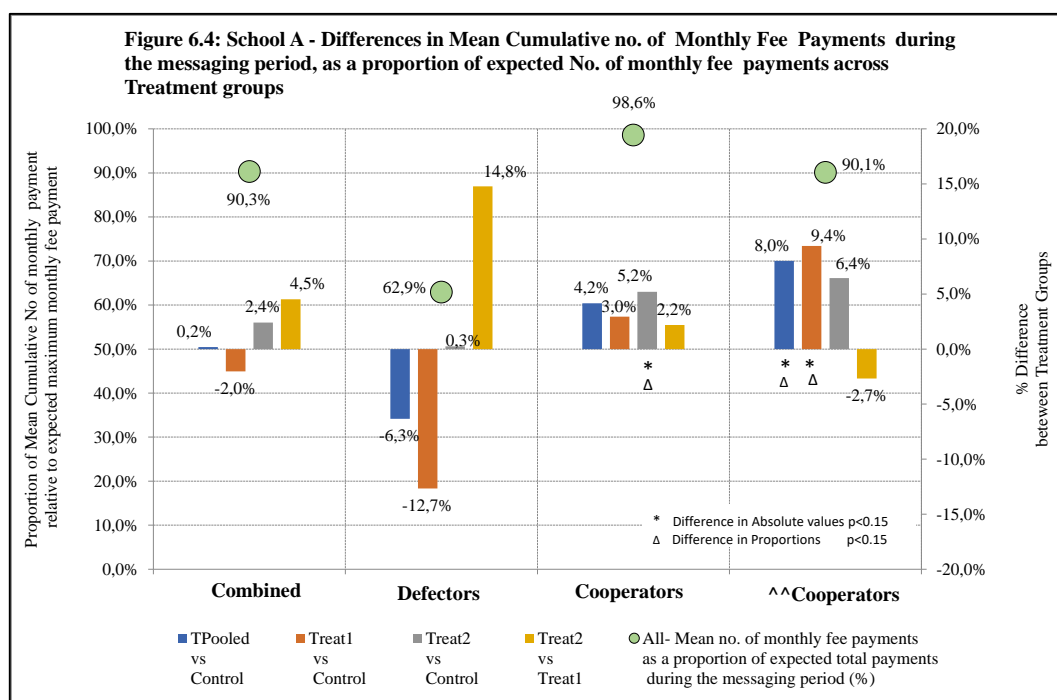
Figure 6.4: School A - Differences in Mean Cumulative no. of Monthly Fee Payments during the messaging period, as a proportion of expected No. of monthly fee payments across Treatment groups

The above shows that the only significant differences that arise between treatment and control is amongst co-operator parents in treatment 2, where parents received a financially framed message encouraging parents to invest in their children's success and future. Co-operator without debit orders also has a positive significant difference but for parents who received an affective-framed message. Parents with prior history of inconsistent fee payment have significantly lower no. of payments than defector parents in the control group, and again, this difference is driven by the (non) response of defector parents in both treatment groups. For the defector group it appears that both the affective and financial framed message appears to have counter effects for parents, relative to parents in the control who continue to receive the reminder message.

Analysis of Outcome Variable 4: Mean Fee Payment in 1st month after messaging started

It is also possible that messaging might work initially but lose its efficacy quite quickly. As a result, a fourth outcome measure is analysed, namely, the fee payment in the *first month* after messaging occurs. Thus, if the new treatment messages act to nudge parents to pay fees initially, this may be a good measure to see such a short-term response which might otherwise be masked in the longer-term outcome variables already discussed.

Description

Figure 7.1:School A - Mean 1st Month Fee Payment

Figure 7.2:School A - Mean 1st Month Fee Payment
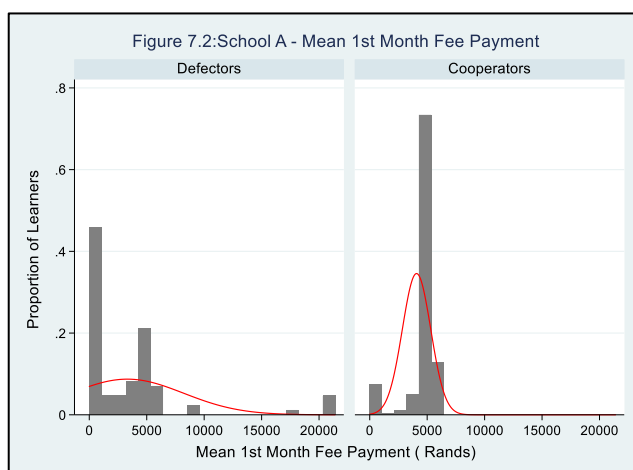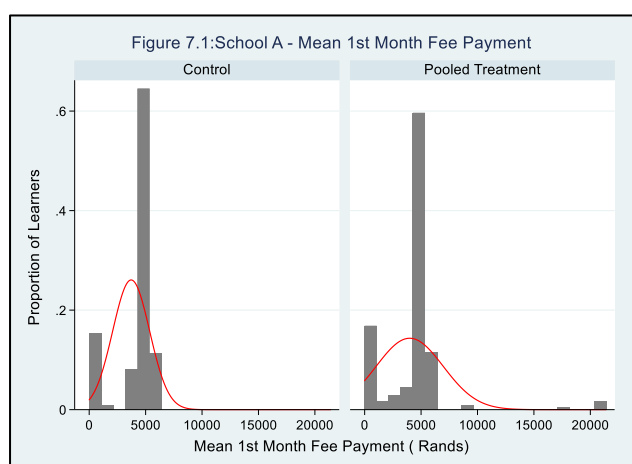
The histogram in Figure 7.1 and Table 5.4 below, illustrate the 1st month fee payment distribution for control vs pooled treatment, and the sample shows a strong central tendency around the mean of R3 900, which equates to a 1st month fee payment rate of 90.5% compared to the expected monthly school fee payment. The histogram in Figure 7.2 together with Table 5.4 below illustrate that the payment distribution for Defectors, shows a wider spread of 1st month fee payments around the mean of R3 313, which equates to a 1st month fee payment rate of 75.9% compared to the expected monthly school fee payment. Cooperators show a stronger central tendency around the mean of R4 077, which equates to a fee payment rate of 94.9% compared to the expected monthly school fee payment.

Treatment vs Control

The comparison for the mean 1st month fee payment for the combined sample across the treatment groups are summarised in Table 5.4 above and Appendix 8 for the statistical outcomes.

The mean 1st month fee payment for the pooled treatment (R3 992), is higher (18.2%) than for the control group (R3 719). The mean 1st month fee payment for treatment 1 (R3 840) is higher (3.3%) more than the control group (R3 719), and for treatment group 2 (R4 146), the mean 1st month fee payment is higher (11.5%) than for control group (R3 719). These results are not statistically significant.

Table 5.4: School A – Analysis for Outcome Variable 4: Mean Fee Payment in 1st month

No.	Typology	Outcome Variable	n	All	Control	Pooled Treatment	T-Stat TP vs C	Treatment 1	T-Stat T1 vs C	Treatment 2	T-Stat T2 vs C	T-Stat T2 vs T1
4	Combined (Defectors + Cooperators)	Fee payment in 1st month after messaging started (Rands)	367	3 900	3 719	3 992		3 840		4 146		
				(2601)	(1637)	(2974)		(1828)		(3798)		
		Proportion of fee payment in 1st month after messaging started, compared to expected monthly fee (%)		90,5%	86,9%	92,3%		89,7%		94,9%		
4.1	Defectors	Fee payment in 1st month after messaging started (Rands)	85	3 313	2 956	3 453		2 568		4 368		
				(4892)	(2194)	(5620)		(2839)		(7438)		
		Proportion of fee payment in 1st month after messaging started, compared to expected monthly fee (%)		75,9%	69,0%	78,6%		59,9%		97,8%		
4.2	Cooperators	Fee payment in 1st month after messaging started (Rands)	282	4 077	3 902	4 173	*	4 274	***	4 073		
				(1234)	(1427)	(1106)		(2144)		(1177)		
		Proportion of fee payment in 1st month after messaging started, compared to expected monthly fee (%)		94.9%	91,1%	96,9%	*	99,8%	Δ Δ Δ	94,0%		
4.3	^^Cooperators (excluding debit orders)	Fee payment in 1st month after messaging started (Rands)	137	3 810	3 490	3 952	*	4 088	**	3 780		
				(1509)	(1750)	(1376)		(1262)		(1506)		
		Proportion of fee payment in 1st month after messaging started, compared to expected monthly fee (%)		89,0%	81,5%	92,3%	Δ	95,5%	Δ Δ	83,3%		

Note: Primary statistic is sample Mean, standard deviation is in parentheses for All, Control, Pooled Treatment, Treatment 1 and Treatment 2.
Results of T-tests - Outcome Variable Treatment versus Control: $****$ p<0.01, $***$ p<0.05, $**$ p<0.1, $*$ p<0.15
Results of T-tests - Proportions Treatment versus Control: Δ Δ Δ Δ p<0.01, Δ Δ Δ p<0.05, Δ Δ p<0.1, Δ p<0.15

The above result indicates that parents in the treatment group pay a higher level of 1st month fee payment, than those in the control group, which indicates a positive response to a behaviourally framed text message, compared to a reminder message. These differences in proportions for the mean cumulative fees paid are illustrated in Figure 7.3 below.

Figure 7.3: School A Combined - Differences between Treatment groups for Mean Fee Payment in 1st month after messaging started, as a proportion of expected monthly fee payment
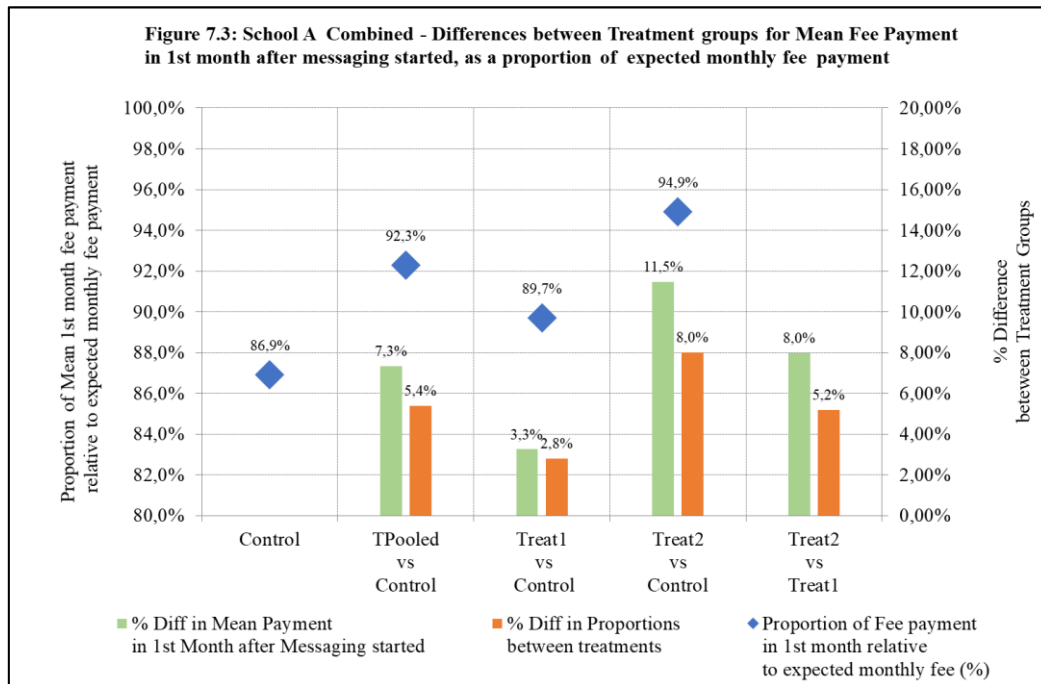
None of the results for the combined sample for treatments versus control are significant, although the co-efficients are large.

Defectors and Cooperators across Treatment Groups

The comparison for the Mean 1st Month Fee Payment after messaging started for Defectors and Cooperators across the treatment groups are summarised in Table 5.4 above and illustrated in Figure 7.4, which also highlights the statistically significant outcomes. The detailed analysis of the outcomes is summarised in Appendix 8.
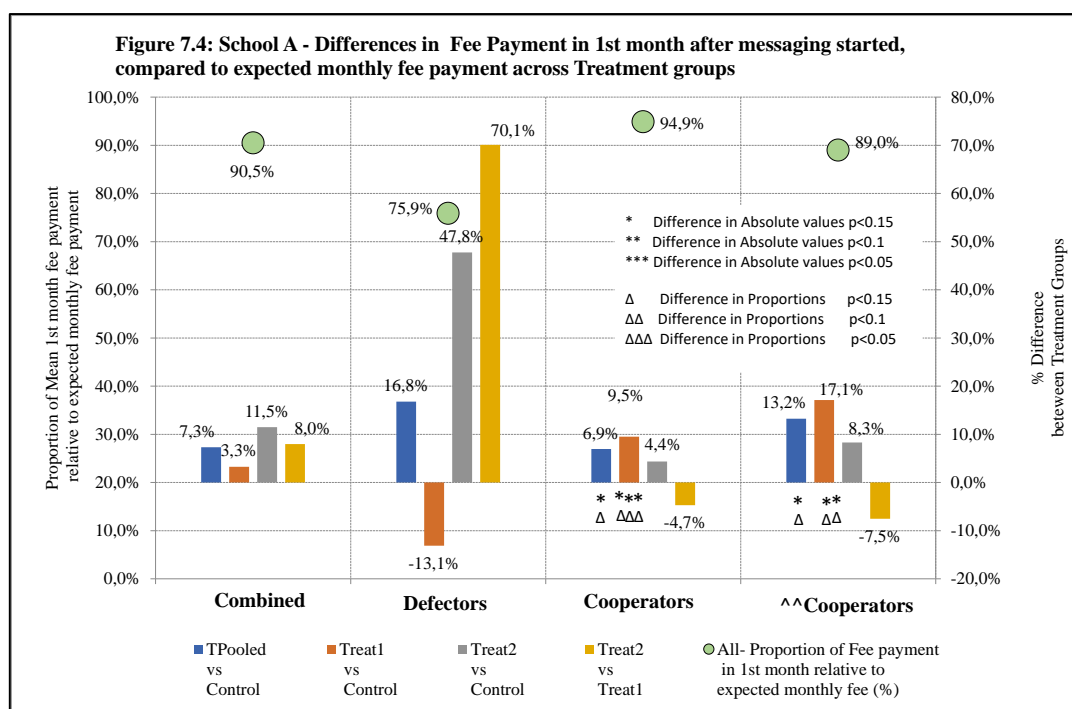
Figure 7.4: School A - Differences in Fee Payment in 1st month after messaging started, compared to expected monthly fee payment across Treatment groups

The above shows that the only significant differences that arise are for cooperator parents who received an affective message i.e. appealing to the sentiment that education provides a brighter future for children. Again, there is a negative response from defector parents, although not statistically significant. For Defectors , affective-framed message appears to have counter effects for parents depending on their prior fee payment behaviour, relative to parents in the control who continue to receive the reminder message, whereas the finance-framed message received a large positive response (+47.8%) in 1st month fee payment, but the result is not statistically significant.

5.5.2   School A - Multivariate Regression

This section employs multivariate regression analysis to corroborate the results described thus far by the summary descriptive statistics presented in Section 5.5.1.3. Assessment of treatment effects for the control versus treatment groups and for Defectors versus Cooperators are important in verifying the results thus far, and to consider if any interaction between terms is relevant and significant. For this reason, the following models were applied to the different fees payment outcome variables already described in Section 5.5.1.3. As a reminder, there are four outcome variables that have been defined for the statistical analysis, i) Mean Cumulative Annual Fees Paid in Rands for the year and expressed as a proportion of annual fees paid when messaging was completed at end November. ii) Mean Cumulative Fees Paid in Rands during the messaging period and expressed as a proportion of outstanding fees before messaging started, iii) Mean cumulative no. of monthly fee payments during the messaging period, and expressed as a proportion of maximum no. of total monthly payments expected and iv) Mean 1st month fee payment in Rands after messaging started and expressed as a proportion of expected monthly school fee payment. The proportions provide a measure of how well parents paid fees relative to expected fee-payment commitments, which means there are eight variables that have been analysed using descriptive statistics in section 5.5.3.

For the purposes of the multivariate regression analysis, we have selected the four proportion variables above and the variable for the 1st month fee payment after messaging started. The variables are , i) the proportion of *annual fees* paid, ii) proportion of *outstanding fees* paid before messaging started, iii) proportion of *monthly school fee payments*, iv) the value of the *1st month fee payment* after messaging start and v) proportion of *1st month fee payment* after messaging started. The multivariate regression analysis using these five variables provide the basis for assessing to what extent text messaging impacted the fee payment behaviour of parents at School A.

Based on the nature of the data, two models i.e. OLS and Tobit were used to conduct the regression analysis, to provide a level of robustness to the outcomes.

Model 1: OLS

$$y_i = \alpha + \beta_1 Treatment1_i + \beta2 Treatment2_i + \beta3 Cooperator_i + \beta4 Debit\ Order_i + X_i\gamma + e_i \quad (1)$$

Where y_i is the fees paid variable for the relevant period, α is a constant, X is a vector of control variables describing the demographics 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 race, home language, grade and household income per capita before the intervention started. $Treatment1_i$, $Treatment2_i$, $Cooperator_i$ and $Debit\ Order_i$ each represent a dummy variable and equals 1 if learner i is assigned to that designated group and equal to zero otherwise. The control $Cooperator_i$ is included to control for the fee-paying behaviour of the parent prior to messaging, and can be thought of as indicative of parental "type". The control $Debit\ Order_i$ is included since arguably, parents on debit order may be less responsive to messaging as they have, in some sense, already pre-committed to paying (although debit orders can be rejected, so messaging can serve as a reminder for them to ensure sufficient funds are available in their bank account). $\beta1$, and $\beta2$ thus represent the treatment effects on the proportion of fees paid and are the variables to be discussed. This model is estimated using OLS.

Model 2: TOBIT

In addition to the above OLS model, this research uses a Tobit model[34] to investigate the treatment effect on the proportion of school fees paid. This is because many of the outcome variables display significant clustering either at 0 or 100%, depending on the school. For School A, variable 1, i.e.

---

[34] Wikipedia - The Tobit model is a special case of a censored regression model, because the latent variable y_i^* cannot always be observed while the independent variable x_i^* is observable.

proportion of annual school fees paid, displays significant censoring at 100% as illustrated in Figure 8 below.

Figure 8 : School A - Proportion of Annual Fees Paid
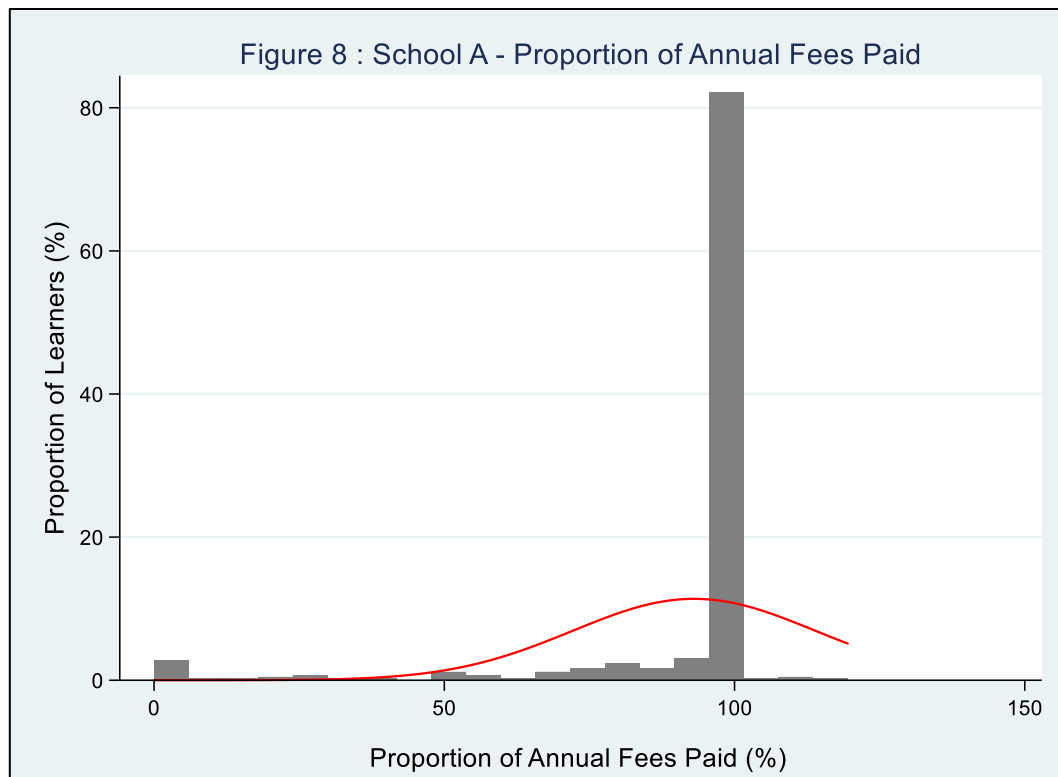
This shows that the sample can be censored, implying that OLS could produce biased estimates. The Tobit model applies a latent variable approach to account for this and is described as follows:

$$y_i^* = \alpha + \beta_1 \text{Treatment1}_i + \beta_2 \text{Treatment2}_i + \beta_3 \text{Cooperator}_i + \beta_4 \text{Debit Order}_i + X_i\gamma + e_i \qquad (2)$$

y_i^* is the latent variable for proportion of fees paid, which is equal to the fees paid y_i for all values

$0 \leq y_i^* \geq 0$. The Tobit model estimates the above equation and calculates the marginal treatment effect for the dependent variable of proportion of fees paid, y_i .

Structure of the Regression Analysis Results

The results of the regression analysis are evaluated in three ways, 1) to determine the treatment effects and to what extent differences show up in the parental prior fee payment behaviour type (Cooperators versus Defectors). In addition, debit orders are analysed to ascertain its relevance only in School A,

where this is an existing payment method and represents a commitment device for parents, 2) examine whether any significant differences arise between treatment and control parents in terms of the decision to pay fees or not compared to how much of the fee to pay once the decision-to-pay threshold has been crossed, and 3) is a sub-group analysis, focusing on fee payment consistency prior to messaging i.e. for Cooperators and Defectors, as well as results for debit order for whether parents are using debit order or not.

The analysis is done for the pooled treatment group, who received a *behaviourally framed SMS text message* compared to the control group, who received a *reminder SMS text message.* The analysis then reviews the outcomes for treatment 1 (affective-framed messaging) and treatment 2 (finance-framed messaging), to ascertain any observed differences for the two treatments. Also note that each of the three sections describe the results of the proportion of annual fees paid in detail, and then share any specific nuances which emerge from the other four variables to support the overall result.

5.5.3   Summary of Regression Results

Result 6 : Individuals in the treatment group pay a smaller proportion of their annual fees on average, although this effect is driven by the behaviour of Defectors.

Table 6.1 presents the output from the OLS and Tobit models. The OLS results (Columns 1-3) suggest that treatment group individuals pay a significantly smaller proportion of annual fees than those in the control group on average (of the order of -4.1% , see Column 1). However, once controls are included for behavioural type (i.e. Co-operator or Defector), it becomes clear that this overall negative treatment effect is driven by opposite responses by Co-operator parents compared to Defector parents. In Column 3, the results suggest that parents who had not paid fees consistently prior to messaging, paid 18.1% less of their annual school fee compared to parents in the control group, whilst Co-operator parents

70

who had paid fees consistently prior to messaging, respond positively to messaging, paying just over 1.5% more of their annual school fees than control group parents.

Columns 4-5 repeat the analysis using a Tobit model to account for censoring in the data. Whilst the qualitative effects remain, the pooled treatment co-efficient loses significance (but is still large and negative). However, the results remain that co-operator parents pay significantly higher proportions of their annual school fee on average, and this is enhanced for cooperator parents in the treatment groups.

Table 6.1: School A - Regression Results for Proportion of Annual fees Paid

Dep Var: Fraction of Annual School Fees Paid	OLS			Tobit	
	1	2	3	4	5
Pooled Treatment	-4.06*	-2.51	-18.05*	-5.95	-34.69
	(1.99)	(1.72)	(7.45)	(13.99)	(19.01)
Cooperator (Paid fees prior)		25.09**	11.40*	117.95**	76.32**
		(3.99)	(5.24)	(18.06)	(23.02)
Fees Paid via Debit Order		0.35	0.36	32.57	29.33
		(1.92)	(1.92)	(17.25)	(16.70)
Treatment x Cooperator			19.50*		61.02*
			(7.57)		(28.07)
n	349	349	349	349	349
(Pseudo) R-squared	0.062	0.306	0.337	0.175	0.182

Notes:
Standard errors in parentheses
Additional controls included but not reported: Race, Home Language, Grade, Household Income/Capita
* p<0.05, ** p<0.01

Table 6.2 disaggregates the treatment effect further. Qualitatively, the results are much the same and confirm the summary descriptives discussed earlier. On average, parents in the treatment group pay a small fraction of their annual fees than those in the control group. This difference only becomes significant when parental type is controlled for. In our preferred set of estimates (Column 5), the results show opposite responses by parental type. Parents who had not paid fees prior to messaging pay a significantly smaller proportion of their annual fee than parents in the control group. Conversely, parents who had paid fees prior to messaging pay significantly more than parents in the control group, on the order of 1.5% respectively. There is no statistically significant difference(Prob > F = 0.352)

between treatment 1 and treatment 2 which means there is not a differentially different response between treatment 1 and treatment 2.

Table 6.2: School A - Regression Results for Proportion of Annual fees Paid					
Dep Var: Fraction of Annual School Fees Paid	OLS			Tobit	
	1	2	3	4	5
Treatment 1	-3.99	-3.07	-20.53*	-11.74	-21.43**
	(2.38)	(2.11)	(9.20)	(16.15)	(5.14)
Treatment 2	-4.13	-1.99	-15.93	-0.31	-16.65***
	(2.63)	(2.19)	(9.19)	(16.26)	(4.95)
Cooperator (Paid fees prior)		25.17**	11.48*	118.51**	11.38**
		(3.98)	(5.24)	(18.12)	(4.23)
Fees Paid via Debit Order		0.27	0.36	32.16	0.38
		(1.95)	(1.92)	(17.24)	(2.11)
Treatment 1 x Cooperator			21.86*		22.77**
			(9.35)		(5.74)
Treatment 2 x Cooperator			17.44		18.18**
			(9.25)		(5.60)
n	349	349	349	349	349
(Pseudo) R-squared	0.062	0.306	0.338	0.176	0.047
Notes: Standard errors in parentheses Additional controls included but not reported: Race, Home Language, Grade, Household Income/Capita * $p<0.05$, ** $p<0.01$					

The above analysis is repeated for the other 4 outcome variables, using the same specifications as in Column 5 above. Table 6.3 below now summarises a disaggregated view of the co-efficients for the Tobit Model for the five outcome variables which have been analysed, to make a comparison of the outcome of the various models. The detailed tables are summarised in Appendix 9.

The summary below shows that the Tobit model using the variable "proportion of annual fees" is the only model where treatment effects are statistically significant. In both Model 1 and 2, the results show that parents with a prior history of fee payment are significantly more likely to pay fees during messaging, and this is enhanced for co-operator parents assigned to treatment. In short, in terms of proportion of annual or outstanding fees paid, it would appear that treatment messaging further encourages the behavioural tendency of fee-paying parents to continue to do the right thing.

Table 6.3: School A - Regression Results for Treatment Effects (Tobit)

Dependent Variable	Proportion of Annual Fees	Proportion of Outstanding Fees	Proportion of Monthly Payments	1st Month Payment	Proportion of 1st Month Fee Payment
	1	2	3	4	5
Treatment 1	-21.43**	-42.63	-19.58	-507.92	-11.87
	(5.14)	(24.68)	(11.54)	(879.36)	(20.55)
Treatment 2	-16.65**	-33.59	-18.84	344.43	8.05
	(4.95)	(23.93)	(11.32)	(846.19)	(19.77)
Cooperator (Paid fees prior)	11.38**	80.96**	16.61	439.20	10.26
	(4.23)	(25.61)	(9.99)	(714.58)	(16.70)
Fees Paid via Debit Order	0.38	35.39	31.85**	472.77	11.05
	(2.11)	(18.71)	(6.03)	(351.15)	(8.20)
Treatment x Cooperator	22.77**	68.18	31.16*	1189.92	27.80
	(5.74)	(35.77)	(13.60)	(977.17)	(22.83)
Treatment x Cooperator	18.18**	75.23*	26.77*	-108.36	-2.53
	(5.60)	(38.03)	(13.53)	(951.56)	(22.23)
n	349	349	349	349	349
(Pseudo) R-squared	0.047	0.181	0.115	0.007	0.012

Notes:
Standard errors in parentheses
Additional controls included but not reported: Race, Home Language, Grade, Household Income/Capita
* $p < 0.05$, ** $p < 0.01$

To pay or not to pay fees? A question parents face every day.

However, the results above mask the fact that messaging could operate in different ways. On the one hand, messaging might prompt parents to pay something as opposed to nothing, even if they do not pay in full. Alternatively, messaging might prompt parents to pay their fees in full. In order to consider whether such differential responses might be at play, the analysis switches to analysing whether the decision to pay any fee at all as opposed to paying zero is the key behavioural bottleneck, or whether all parents pay fees but differ in the amount they choose to pay. Identifying where the hurdle lies is important in terms of policy implications. As with the previous section, we discuss the results fully in relation to the dependent variable "Proportion of annual fees paid", and then provide an overview summary of the same specifications when we alter the dependent variable used.

Result 7: Heterogeneity in response to messaging appears most significant in terms of the decision to pay or not to pay, rather than how much to pay.

Using the proportion of annual fees paid, Table 6.4 examines whether any significant differences arise between treatment and control parents in terms of the decision to pay fees or not (1=Pay fees, 0=Pay zero) compared to how much of the fee to pay once the decision-to-pay threshold has been crossed. Columns 1 and 3 of Table 6.4 present linear probability estimates for the decision to pay versus not to pay. Columns 2 and 4 examine how much is paid amongst parents who do make a payment.

Column 1 suggests that parents in the treatment groups are 4% less likely to pay any fee at all compared to those in the control group. However, in Column 3, it is again evident that this negative treatment group effect is influenced by counter-opposing decisions of co-operator and defector parents. Interestingly, once the decision to pay threshold has been crossed (Columns 2 and 4), there is no significant treatment effect, and the coefficients are small. However, parents who were already paying fees prior to messaging i.e. cooperators, pay significantly more fees than those who were not paying fees consistently prior to messaging.

Table 6.4: School A - Regression Results for Proportion of Annual fees Paid				
Dep Var: Fraction of Annual School Fees Paid	OLS			
	1	2	3	4
	Pr (Pay fee=1)	Fee Paid>0	Pr (Pay fee=1)	Fee Paid>0
Pooled Treatment	-0.04**	0.65	-0.20**	-1.72
	(0.01)	(1.30)	(0.06)	(6.38)
Cooperator (Paid fees prior)	0.12**	15.26**	-0.02	13.30**
	(0.04)	(3.05)	(0.02)	(5.08)
Fees Paid via Debit Order	0.00	-0.06	0.00	-0.05
	(0.02)	(1.08)	(0.02)	(1.11)
Treatment x Cooperator			0.20**	2.93
			(0.06)	(6.50)
n	349	339	349	339
(Pseudo) R-squared	0.140	0.245	0.189	0.247
Notes: Standard errors in parentheses Additional controls included but not reported: Race, Home Language, Grade, Household Income/Capita * p<0.05, ** p<0.01				

Table 6.5 disaggregates treatment effects into their 2 separate groups. Columns 3 and 4 control for parental type, and these results suggest divergent responses from co-operator parents compared to defector parents. Those who had not paid fees prior to messaging remain significantly less likely to make any fee payment at all. Those parents who had paid fees prior to messaging were significantly more likely to pay fees compared to control group parents, albeit the magnitude of the coefficient is close to zero. Columns 2 and 4 demonstrate that once the decision-to-pay threshold has been crossed, there are no significant treatment effects on the amount of fees paid.

Thus, in short, it would appear that messaging reinforces prior fee-paying behaviour. Parents who paid fees prior to messaging continue to pay, but those who had not paid, do not pay. However, this result must be interpreted in light of the differential sms delivery rates described in Section 5.5.1.2 earlier. It is evident that defector parents had slightly lower sms delivery rates, so some of this differential response to sms messaging may reflect lack of access to messaging. However, since the delivery rate to defector parents was 86%, it certainly does not fully explain the divergent behaviours.

Table 6.5: School A - Regression Results for Proportion of Annual fees Paid

Dep Var: Fraction of Annual School Fees Paid	OLS			
	1	2	3	4
	Pr (Pay fee=1)	Fee Paid>0	Pr (Pay fee=1)	Fee Paid>0
Treatment 1	-0.04*	0.32	-0.21*	-3.45
	(0.02)	(1.46)	(0.08)	(7.19)
Treatment 2	-0.03	0.95	-0.18*	-0.33
	(0.02)	(1.61)	(0.07)	(7.73)
Cooperator (Paid fees prior)	0.12**	15.31**	-0.02	13.32**
	(0.04)	(3.03)	(0.01)	(5.09)
Fees Paid via Debit Order	0.00	-0.11	0.00	-0.06
	(0.02)	(1.11)	(0.02)	(1.11)
Treatment 1 x Cooperator			0.21*	4.62
			(0.08)	(7.27)
Treatment 2 x Cooperator			0.19**	1.56
			(0.07)	(7.81)
n	349	339	349	339
(Pseudo) R-squared	0.140	0.245	0.189	0.248

Notes:
Standard errors in parentheses
Additional controls included but not reported: Race, Home Language, Grade, Household Income/Capita
* $p<0.05$, ** $p<0.01$

Table 6.6 below now summarises a disaggregated view of the co-efficients for the Tobit Model for the five outcome variables which have been analysed, to make a comparison of the outcome of the various models. The detailed tables are summarised in Appendix 9.

Column 1, 3 and 5 suggests that parents in the treatment groups are 21% less likely to pay any fee at all compared to those in the control group and the outcome is influenced by the negative treatment group effect of the counter-opposing decisions being made by cooperator and defector parents. Columns 2 and 4 show that once the decision to pay threshold has been crossed, there is no significant treatment effect, and the coefficients are small. The analysis for 1st month fee payments (Column 8 and 10) shows large co-efficients for especially treatment 2, but it is not significant.

Table 6.6: School A - Regression Results for payment threshold - OLS

Dependent Variables	Prop. of Annual Fees		Prop. of Outstanding Fees		Prop. of Monthly Payments		1st Month Fee Payment		Prop. of 1st Month Fee Payment	
	1	2	3	4	5	6	7	8	9	10
	Pr (Pay fee=1)	Fee Paid>0	Pr (Pay fee=1)	Fee Paid>0	Pr (Pay fee=1)	Fee Paid>0	Pr (Pay fee=1)	Fee Paid>0	Pr (Pay fee=1)	Fee Paid>0
Treatment 1	-0.21*	-3.45	-0.21*	-3.62	-0.21*	1.45	-0.12	317.99	-0.12	7.43
	(0.08)	(7.19)	(0.08)	(7.76)	(0.08)	(9.99)	(0.13)	(600.78)	(0.13)	(14.04)
Treatment 2	-0.18*	-0.33	-0.22**	2.69	-0.22**	5.72	-0.25	4148.26	-0.25	96.92
	(0.07)	(7.73)	(0.08)	(7.57)	(0.08)	(7.72)	(0.13)	(2150.51)	(0.13)	(50.25)
Cooperator (Paid fees prior)	-0.02	13.32**	-0.03	14.14**	-0.03	12.28	0.10	-92.52	0.10	-2.16
	(0.01)	(5.09)	(0.02)	(5.40)	(0.02)	(6.68)	(0.10)	(193.10)	(0.10)	(4.51)
Fees Paid via Debit Order	0.00	-0.06	0.01	0.54	0.01	15.97**	0.08*	-112.35	0.08*	-2.62
	(0.02)	(1.11)	(0.02)	(1.49)	(0.02)	(2.21)	(0.03)	(184.02)	(0.03)	(4.30)
Treatment 1 x Cooperator	0.21*	4.62	0.22*	5.71	0.22*	5.11	0.20	-178.15	0.20	-4.16
	(0.08)	(7.27)	(0.08)	(7.79)	(0.08)	(10.20)	(0.14)	(614.88)	(0.14)	(14.37)
Treatment 2 x Cooperator	0.19**	1.56	0.23**	-0.74	0.23**	-1.76	0.29*	-4100.69	0.29*	-95.81
	(0.07)	(7.81)	(0.08)	(7.69)	(0.08)	(8.04)	(0.13)	(2151.01)	(0.13)	(50.26)
n	349	339	349	338	349	338	349	299	349	299
(Pseudo) R-squared	0.189	0.248	0.211	0.240	0.211	0.504	0.269	0.232	0.269	0.232

Notes:

Standard errors in parentheses

Additional controls included but not reported: Race, Home Language, Grade, Household Income/Capita

* p<0.05, ** p<0.01

In this final section, sub-group analysis is conducted as a robustness check. Separate regressions are done for parents with a history of fee payment prior to messaging and those without a history of consistent fee payment. We also analyse if debit orders have any significance.

Result 8 : Parental history of fee payment prior to messaging is significantly correlated with treatment status.

Table 6.7 presents sub-group analysis, focusing on fee payment consistency prior to messaging, as well as parents fee payment behaviour if they are on debit order or not. Column 1 confirm that the proportion of annual fees paid amongst parents with a positive track record of fee payment prior to messaging is 20.5% higher for those in the pooled treatment group compared to the control group, and the result is statistically significant. Amongst parents who had not been paying fees consistently prior to messaging, those who received messaging paid 45.9% less of the annual fee compared to similar parents in the control group, and this result is statistically significant. In contrast, when we analyse the data for parents who opt to be on debit order as opposed to not, the coefficients are large (Column 3 and 4), but the result is not statistically significant.

Table 6.7: School A - Regression Results for Proportion of Annual fees Paid				
Dep Var: Fraction of Annual School	Tobit			
	1	2	3	4
	Cooperator	Defector	With D/Order	No D/Order
Pooled Treatment	20.45*	-45.88*	13.48	-17.62
	(9.55)	(22.07)	(20.67)	(17.98)
Fees Paid via Debit Order	36.77*	-34.74		
	(15.58)	(28.84)		
Cooperator (Paid fees prior)			140.66**	107.33**
			(32.19)	(21.23)
Observations	272	77	154	195
Pseudo R-squared	0.183	0.047	0.362	0.123
Notes: Standard errors in parentheses Additional controls included but not reported: Race, Home Language, Grade, Household Income/Capita * p<0.05, ** p<0.01				

Table 6.8 disaggregates the treatment effect. The results suggest that amongst parents with a history of prior fee payment, there are no differential treatment responses. However, amongst parents who did not pay fees prior to messaging, the negative treatment effect is driven by parents in Treatment 1 (the affective-framed message). In other words, amongst parents who had not paid fees consistently prior to messaging, sending an affective message as opposed to the standard reminder is correlated with a significantly lower fee payment rate. Again, there are no significant treatment effects for parents on debit orders or not compared to control group parents.

Table 6.8: School A - Regression Results for Proportion of Annual fees Paid				
Dep Var: Fraction of Annual School	Tobit			
	_1_	_2_	_3_	_4_
	Cooperator	Defector	With D/Order	No D/Order
Treatment 1	20.21	-57.38*	-7.16	-20.54
	(10.90)	(26.04)	(26.98)	(20.15)
Treatment 2	20.74	-36.65	25.35	-14.32
	(11.55)	(24.33)	(25.17)	(20.77)
Fees Paid via Debit Order	36.76*	-36.05		
	(15.59)	(28.91)		
Cooperator (Paid fees prior)			140.51**	107.79**
			(31.48)	(21.34)
Observations	272	77	154	195
Pseudo R-squared	0.183	0.049	0.367	0.123
Notes: Standard errors in parentheses Additional controls included but not reported: Race, Home Language, Grade, Household Income/Capita * $p<0.05$, ** $p<0.01$				

Table 6.9 below now summarises a disaggregated view of the co-efficients for the Tobit Model for the five outcome variables which have been analysed, to make a comparison of the outcome of the various models. The detailed tables are summarised in Appendix 9.

Treatment messaging does not appear to significantly affect payment rates (or annual fees or outstanding fees) for co-operator parents relative to control group parents who also had a prior history of paying fees (Columns 1 and 3). However, the results do suggest that in the first month after

messaging starts, co-operator parents receiving the affective message pay a significantly higher fee amount, on the order of R553 (12.92%), compared to control group co-operator parents who receive the standard reminder message (Colum 7 & 9). Conversely, affective treatment messaging, appears to significantly reduce the fee payment rate for parents with no prior history of fee payment relative to their control group counterparts who also had not paid fees prior to messaging (Columns 2 & 4).

Table 6.9: School A - Regression Results for Cooperators and Defectors fee payment behaviour - Tobit										
Dependent Variables	Prop. of Annual Fees		Prop. of Outstanding Fees		Prop. of Monthly Payments		1st Month Fee Payment		Prop. of 1st Month Fee Payment	
	1	2	3	4	5	6	7	8	9	10
	Cooperator	Defector	Cooperator	Defector	Cooperator	Defector	Cooperator	Defector	Cooperator	Defector
Treatment 1	20.21	-57.38*	36.76	-60.13*	12.52**	-27.22	553.00**	-1398.07	12.92**	-32.67
	(10.90)	(26.04)	(19.39)	(27.52)	(4.74)	(16.82)	(184.24)	(2303.26)	(4.30)	(53.81)
Treatment 2	20.74	-36.65	36.72	-40.78	6.54	-23.22	221.73	-1646.85	5.18	-38.48
	(11.55)	(24.33)	(20.43)	(25.82)	(4.77)	(16.60)	(182.06)	(2238.94)	(4.25)	(52.31)
Fees Paid via Debit Order	36.76*	-36.05	65.34*	-37.13	29.95**	25.39	408.65*	1052.25	9.55*	24.59
	(15.59)	(28.91)	(27.65)	(30.60)	(4.73)	(21.52)	(160.90)	(2815.44)	(3.76)	(65.78)
Observations	272	77	272	77	272	77	272	77	272	77
Pseudo R-squared	0.183	0.049	0.173	0.049	0.165	0.040	0.010	0.015	0.018	0.023

Notes:

Standard errors in parentheses

Additional controls included but not reported: Race, Home Language, Grade, Household Income/Capita

* $p<0.05$, ** $p<0.01$

Overall Summary of Regression Analysis for School A

Based on the above, the results from the three key areas evaluated show that the treatment groups pay a smaller proportion of their school fees, and this is consistent with the findings in the descriptive analysis. In addition, the treatment effects are mainly driven by the behaviour of Defectors and their inconsistent fee payment behaviour. Cooperator parents pay higher proportions of their fees. Heterogeneity in response to messaging appears most significant in terms of the decision to pay or not to pay, rather than how much to pay. Debit order status, although not important for Cooperators, could improve the number of fee payments made, once the threshold of making a payment has been crossed. There is evidence at treatment 1 and 2 level, that affective-framed messaging has a positive effect on Cooperators and a negative effect on Defectors.

6. Case Study – School B

6.1 Contextual Background

School B is a unisex former model C junior school in Cape Town (see Table 7.1 for summary description). The school had 815 students registered as learners in 2018. Annual school fees were R2930, and fee payment rates are below 40-50%. and have been reducing over the last 5 years. School B sends termly reminder text messages for parents to pay school fees. There are no regular scheduled SMS text messages which only relate to school fee payment[35].

Table 7.1: School B - Description of School Demographics

	Demographics	School B
1	No of Learners (+/-)	800-875
2	Annual School Fees	R2 500 - R3 000
3	Text Messaging Capability (SmsWeb)	Yes
4	Fee-Payment Cooperation - % of parents paying school fees	< 40 - 50%
5	Education Level	Primary School: Grade 1 -7
6	Incentive for Early Payment	No
7	Exemption Applications	20 - 30%
8	Pupil -Teacher Ratio	± 32
9	Learners per class (average)	30 - 40
10	Fund-raising supplement School Fees	Yes
11	Financial Reserves for Maintenance, etc	Limited
12	Outstanding Fee-Payment Communication	SMS reminder - termly and when seeking improvement in fee payments
13	Fee-exemption Application	Assessment & Meeting with SGB

Also important in all schools is the fee-collection strategy, and at School B, following is done,

---

[35] This is important to keep in mind. As such, in this experiment, the control group for School B receives *no* message. The experiment in School B thus compares whether messaging content (Treatment 1 and 2) is more effective at prompting parents to pay fees as opposed to receiving no message.

1) When the parents apply for a place at the school, the school fee expectation is shared via a written notification with the acceptance letter, and with those who are part of an interview process.

2) New parents of Grade 1 learners are reminded via text message of the fees due for the following year, after the annual budget meeting.

3) Text messages regarding school-fee reminders are sent to parents towards the end of school term from the SGB or the Principal, asking parents to "pay outstanding school fees".

4) The school does not have a minimum threshold payment for parents who apply for a fee exemption, even for those who qualify for full exemption. This places an increased burden on those parents who are paying.

At the annual budget meeting for School B, the school management reiterates the importance of cooperation from all parents to pay school fees and maps out what services and support learners will lose out on if the school is not be able to provide for learners because school fee payments are not complied with.

6.2   School Governance and the Annual Budget Planning Process

The annual budget process which is set out by the WCED and governed by the SGB ensures that parents are aware of the basis for setting the school fees. Annually in October, the budget is formally voted on by parents before it is accepted and becomes a binding agreement between parents and the school. At School B, the fee increase has been between 0 and 5% for the last 3-5 years.

This below inflation level of annual fee increase can be ascribed to the perception that parents in School B cannot afford the fees, because fee payment cooperation is already below the 40-50% level, and any increases will likely exacerbate the problem. Instead, School B seeks to support parents by developing budget scenarios with and without fundraising, which is then put to the vote for parents. The school

makes limited provision for a reserves fund, and hence any unplanned maintenance or improvements in school facilities are made via a request to the WCED, who themselves are constrained in funding for all schools. The budget meeting is well attended by parents ($> 70\%$) as this meeting also serves for parents to collect term 3 reports for learners.

Making it easy to pay school fees is also an important consideration to ensure timely school fee payments. At School B, parents can pay via Electronic Funds Transfer (EFT) or pay in person at the schools' fees office in cash.

6.3 Data Sample

The sample for School B is described in Table 7.2 below and is the result of the randomisation process at an individual learner level, already described earlier. The sample size for School B is 780 and excludes learners who paid their annual fees at the start of the school year.

Table 7.2: Baseline School B Sample split fee-payment typology and treatment groups

School B :Sample Split										
Experimental Groups		**Control**			**Treatment 1**			**Treatment 2**		
Text Framing Theme		**Reminder**			**Affective-Framed (Human Appeal)**			**Financial-Framed (Econ appeal)**		
Experimental Treatment		**Attention**			**Collectivism / Appreciation / Hope**			**Benefits of Wealth / Investment / Loss**		
Fee-Payer Typology		Defectors	Cooperators	Rebators	Defectors	Cooperators	Rebators	Defectors	Cooperators	Rebators
Treatment sub-groups		1	2	3	4 / 4a	5	6	7 / 7a	8	9
No of Learners	780	96	29	89	95 / 74	31	82	93 / 75	34	82
% of Learners	100%	12%	4%	11%	12% / 9%	4%	11%	12% / 10%	4%	11%

The final sample comprises all those designated as Defectors (433) and Cooperators (94) across the control and treatment groups, giving a total sample size of 527. There are 253 learners in the sample who received a fee rebate/exemption from the school. These individuals are explicitly excluded from the analysis.

Messaging commenced on 19th June 2018[36] and fees data was then collected from month-end reports from June to end November 2018. For subsequent months, messages were sent 3-5 days before month-end which aligns with when monthly household salary payments are received, and when households are making their budget decisions and trade-offs. A common mid-month message was sent to all only parents that were in the treatment groups, as a priming reminder, to reinforce the treatment message of the previous month-end and say "thank you" to parents for their commitment to pay school fees. This message also serves as a reminder to parents who have not paid school fees, of their commitment to pay school fees. This frequency of when messages were sent was based on experimental learning in School A.

6.4   Data Gathering

The primary data for monthly fee payment of Schools B was sourced from systems within the school, contained in a monthly "Outstanding Fees" report. The learner demographic data for end of term 1 of 2018 was sourced from the WCED research unit, ensuring confidentiality and these independent variables for both schools included race, home language, grade and suburb. In addition, monthly household income per capita[37] by suburb (see Appendix 4) was sourced to analyse this important socio-economic variable as it plays an important role in household financial decision-making and trade-offs relating to school fee payments. The messaging was done using the SMSWeb platform.

6.5   Analysis and Results

The analysis of results is now shared, firstly the descriptive statistical analysis, which is then followed by the multivariate regression analysis. The approach follows that adopted for School A, both in terms of descriptives, as well as the regression analysis.

---

[36] This started a month later than School A due logistics challenges in setting up the messaging lists
[37] Census 2011 – Income Dynamics and Poverty Status of Households in South Africa, Statistics South Africa 2015

6.5.1 Descriptive Statistical Analysis

6.5.1.1 School B - Did Randomisation work and are the experimental groups balanced?

Result 1: For School B, the experimental groups are largely balanced across the demographic characteristics for control versus treatments.

The analysis of the baseline data for School B sample shows that the sample consisted of 527 of the 780 (67%) learners i.e. includes Defectors and Cooperators only. Grade 1 (20%) makes up the largest proportion of learners, and then the proportions reduce progressively across the grades with Grade 7 (8%) having the smallest number of learners. More than three-quarters of the learners are in the classification of "Coloured" , with the rest made up of "Indian" (17%) and "Black" (7%). Home Language of English (90%) is by far the majority language spoken by all and the range in age is between 6 and 15 years old. Based on Census data for each learner's residential suburb, the monthly household income per capita is evenly balanced across the sample groups.

There are a few instances of significant difference which relate to the following independent variables: a) Grade 1[38] and Grade 6[39] , b) "Other Home" [40] language and Age[41] category. This can be seen from the T-test results in Table 8 and is controlled for during the regression phase of the analysis.

---

[38] T-test results: Pooled Treatment vs Control- t= -1.86, p= 0.06, Treatment 1 vs Control- t= -1.87, p= 0.06
[39] T-test results: Treatment 1 vs Control- t= 1.77, p= 0.08
[40] T-test results: Pooled Treatment vs Control- t= -2.46, p= 0.01, Treatment 1 vs Control- t= -2.48, p= 0.01
                            Treatment 1 vs Treatment 2 - t= -2.48, p= 0.01
[41] T-test results: Treatment 1 vs Control- t= 1.51, p= 0.13

Table 8: School B - Test of balance (post randomisation) across experimental groups

School B		Means			T-Stat	Means		T-Stat		
Variable	n	All	Control	Pooled Treatment	TPooled vs Control	Treatment 1	Treatment 2	Treat1 vs Control	Treat2 vs Control	Treat1 vs Treat2
Grade	527									
Grade 1	104	0.20	0.14	0.21	-1.86**	0.23	0.20	-1.87**	-1.39	0.54
Grade 2	87	0.17	0.18	0.16	0.63	0.17	0.15	0.44	0.71	0.32
Grade 3	77	0.15	0.14	0.15	-0.37	0.18	0.12	-0.95	0.32	1.44
Grade 4	85	0.16	0.18	0.16	0.50	0.16	0.15	0.37	0.53	0.18
Grade 5	70	0.13	0.14	0.13	0.12	0.11	0.16	0.82	-0.56	-1.58*
Grade 6	63	0.12	0.15	0.11	1.19	0.09	0.13	1.77**	0.46	-1.56*
Grade 7	41	0.08	0.07	0.08	-0.28	0.09	0.07	-0.43	-0.08	0.40
Race	499									
Black	39	0.08	0.07	0.08	-0.63	0.08	0.08	-0.50	-0.60	-0.11
Coloured	375	0.75	0.73	0.76	-0.63	0.78	0.74	-0.99	-0.17	0.94
Indian	84	0.17	0.20	0.16	1.18	0.13	0.18	1.58*	0.58	-1.17
White	1	0.00	0.00	0.00	-1.00	0.01	0.00	-1.00	0.00	-
Home Language	499									
Afrikaans	26	0.05	0.07	0.05	0.71	0.06	0.03	0.04	1.32	1.50
English	451	0.90	0.91	0.90	0.26	0.90	0.91	0.35	0.12	-0.26
Other	6	0.01	0.00	0.02	-2.46**	0.00	0.03	-	-2.48**	-2.48**
isiXhosa	16	0.03	0.02	0.03	-0.58	0.04	0.03	-0.66	-0.36	0.33
Age (Years)	499	9.6	9.8	9.5	1.30	9.4	9.6	1.51*	0.81	-0.78
Monthly Household Income per Capita (Rands)	469	3957	3834	3996	-1.13	4044	3951	-1.27	-0.76	0.65

Note: Primary statistic is sub-sample Mean for Control, Pooled Treatment, Treatment 1 and Treatment 2.
The primary statistic is T-Stat for the T-test:
i) Pooled Treatment Mean minus Control Mean, ii) Treatment 1 vs Treatment 2, iii) Treatment 1 vs Control, iv) Treatment 2 vs Control
Test for Significance is designated as follows: **** p<0.01, *** p<0.05, ** p<0.1, * p<0.15

6.5.1.2 Was the SMS messaging implementation successful?

The implementation had good success in Schools B i.e. greater than 75%, as measured by the proportion of SMS messages that were sent and delivered. Messages[42] were set up to be sent automatically from the SMSWeb system, between 10h00 and 16h00 on the designated day.

---

[42] The detailed messages are summarised in Appendix 2 for School B.

For School B, the Control group received *no* message and Figure 9 shows the results for SMS delivered rate for the Defector and Cooperator groups, for the months when text messaging occurred. Again it is clear that defector parents receive fewer messages on average (as in School A) and this must be borne in mind when considering the results of the experiment.

Figure 9 : School B - SMS Message Delivery
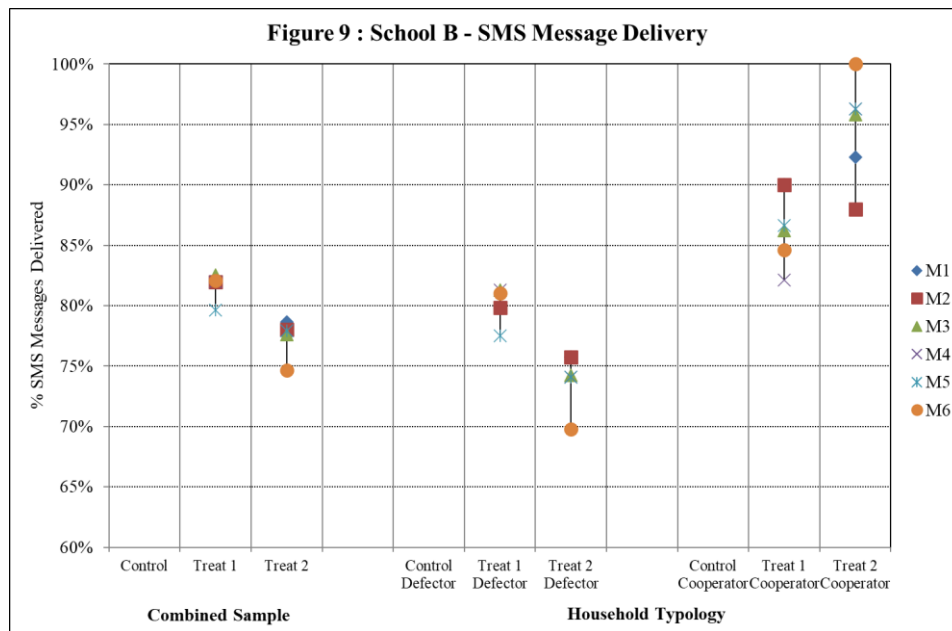
The overall SMS delivered rate was 80% for the combined sample, with some differences between Treatment 1 (82%) and Treatment 2 (78%) groups. The average SMS delivered rate for Defectors was 77%, and for Cooperators it was 91%. The mid-month "thank you" message delivery rate was 80%.

The trends above show that in both schools, the average SMS delivery rate is highest for Cooperators, compared to Defectors. SMSWeb does not have the capability to provide SMS statistics for each parent, and the overall SMS delivered rate was the only available data to assess to what extent the SMS's sent reached parents during the messaging period. It may be possible that this difference in SMS delivered rate can contribute to unresponsive fee payment behaviour in the case of Defectors compared to Cooperators. It may also indicate the need to ensure that mobile phone information for

parents who fall into the Defector group, be updated regularly to ensure that they are being reached via the SMS messaging channel.

For School B, there was 1 additional SMS message sent in October 2018, advising parents regarding the budget meeting fees outcome for 2019 of R3000 per annum, and indicating the introduction of a minimum fees' threshold of R65 per month for SASSA fee exempted parents. No other fees messages were communicated during the messaging period.

6.5.1.3 Analysis of School Fees Payment Behaviour

This section analyses the outcome variables introduced in the School A case study to understand if; a) does messaging impact the fees payment behaviour of parents and b) does the *type* of message parents receive make a difference to their fee payment cooperation.

As before, four outcome variables have been defined for the analysis, 1) Mean Annual Fees Paid[43] in Rands and expressed as a proportion of total annual fees. 2) Mean Cumulative Fees Paid[44] in Rands during the messaging period (absolute value) and expressed as a proportion of outstanding fees before messaging started, 3) Mean cumulative no. of monthly fee payments[45] during the messaging period and expressed as a proportion of maximum no. of total monthly payments expected, 4) Mean 1st month fee payment[46] in Rands and expressed as a proportion of expected monthly school fee payment.

---

[43] Mean Annual Fees paid is the sum of cumulative fees paid by parents from Jan to November 2018 in Rands
[44] Mean Cumulative Fees paid is the sum of monthly fees paid by parents during the messaging period in Rands
[45] This is the sum of the no. of months a payment was made by parents. In school A, 6 monthly payments are expected i.e. May to Oct 2018, and in School B, 5 monthly payments are expected i.e. Jun to Oct 2018.
[46] This is the fee payment in Rands made by parents in the 1st month after messaging started.

Analysis of Outcome Variable 1: Mean Annual Fees Paid

Sample Description

The histogram in Figure 10.1 and Table 9.1 below, illustrate the sample payment distribution for control vs pooled treatment, which shows a strong concentration of data at zero, and the mean annual fees paid is R701. This equates to a fee payment rate of 23.9% compared to the expected annual fees. This shows a low level of cooperation by fee paying parents in School B. The data is characterised by significant censoring, and this will be controlled for in the regression analysis.
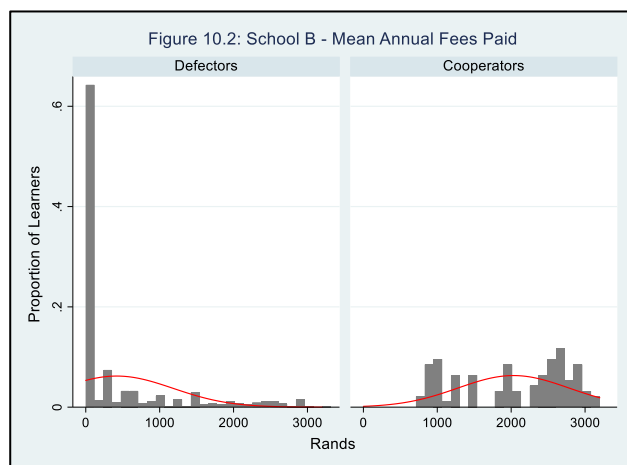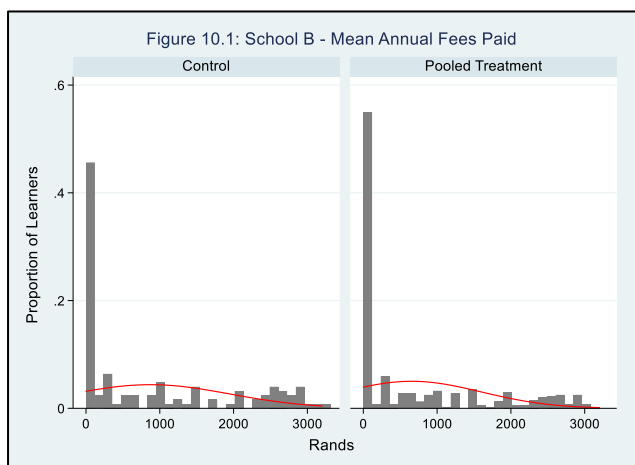
The histogram in Figure 9.2 and Table 9.1 illustrate that the sample payment distribution for Defectors, which shows a concentration around zero, and a mean of R412 , which equates to a fee payment rate of 14.1%, which is very low, because of the no. of free-riders. Cooperators also show a wide spread around the mean of R2013, and a fee payment rate compared to the mean annual fees of 69.3%, which is an average level of fee payment cooperation. These characteristics of the sample set for School B, provides the basis for the analysis and outcomes which now follow.

Treatment vs Control

The comparison for the mean annual fees paid (for both absolute value and proportion of annual fees) for the sample across the treatment groups are summarised in Table 9.1 and Appendix 10 for the statistical results.

The mean annual fees paid for the pooled treatment (R647), is lower (-25.8%) than for the control group (R872). The mean annual fees paid for treatment 1 (R687) is lower (-21.2%) than the control group (R872), and for treatment group 2 (R608), the mean annual fees paid is lower (-30.3%) than for control group. These results are statistically significant[47].

Comparing the differences in outcomes for treatment 1 versus treatment 2, the mean annual fees paid for treatment 2 is higher 11.5% lower than for treatment 1 and the result is not statistically significant. In other words, the key difference appears to be that messaging reduces the propensity to pay fees compared to parents who do not receive any message, and the type of messaging does not make any significant difference in this regard.

---

[47] T-test results: Treatment 1 vs Control – t = 1.56, p= 0.12, Treatment 2 vs Control – t = -2.26, p= 0.02

Table 9.1: School B – Analysis for Outcome Variable 1: Mean Annual Fees Paid

School B				Mean (Standard Deviation)								
No.	Typology	Outcome Variable	n	All	Control	Pooled Treatment	T-Stat TP vs C	Treatment 1	T-Stat T1 vs C	Treatment 2	T-Stat T2 vs C	T-Stat T2 vs T1
1	Combined (Defectors + Cooperators)	Mean Annual Fees Paid (Rands)	527	701 (242)	872 (1077)	647 (946)	***	687 (968)	*	608 (925)	***	
		Mean Annual Fees paid as a *proportion* of total annual fees (%)		23,9%	29,7%	22,1%	ΔΔΔ	23,5%	Δ	20,8%	ΔΔΔ	
1.1	Defectors	Mean Annual Fees Paid (Rands)	433	412 (765)	506 (866)	385 (734)		439 (772)		331 (691)	**	
		Mean Annual Fees paid as a *proportion* of total annual fees (%)		14,1%	17,3%	13,2%		15,0%		11,3%	ΔΔ	
1.2	Cooperators	Mean Annual Fees Paid (Rands)	94	2 031 (783)	2 085 (145)	2 007 (739)		2 038 (803)		1 978 (687)		
		Mean Annual Fees paid as a *proportion* of total annual fees (%)		69,3%	71,1%	68,5%		69,5%		67,5%		

Note: Primary statistic is sample Mean, standard deviation is in parentheses for All, Control, Pooled Treatment, Treatment 1 and Treatment 2.
Results of T-tests - Outcome Variable Treatment versus Control: $****$ p<0.01, $***$ p<0.05, $**$ p<0.1, $*$ p<0.15
Results of T-tests - Proportions Treatment versus Control: ΔΔΔΔ p<0.01, ΔΔΔ p<0.05, ΔΔ p<0.1, Δ p<0.15

As a proportion of annual fees paid, the control group has the highest mean annual fees paid of 29.7%, and all the treatment groups (Treatment 1 = 23.5%, Treatment 2 = 20.8%) are lower than the control group. These differences in proportions for the mean cumulative fees paid are illustrated in Figure 10.3.

Figure 10.3: School B Combined - Differences between Treatment groups for the proportion of annual fees paid, compared to expected annual fees
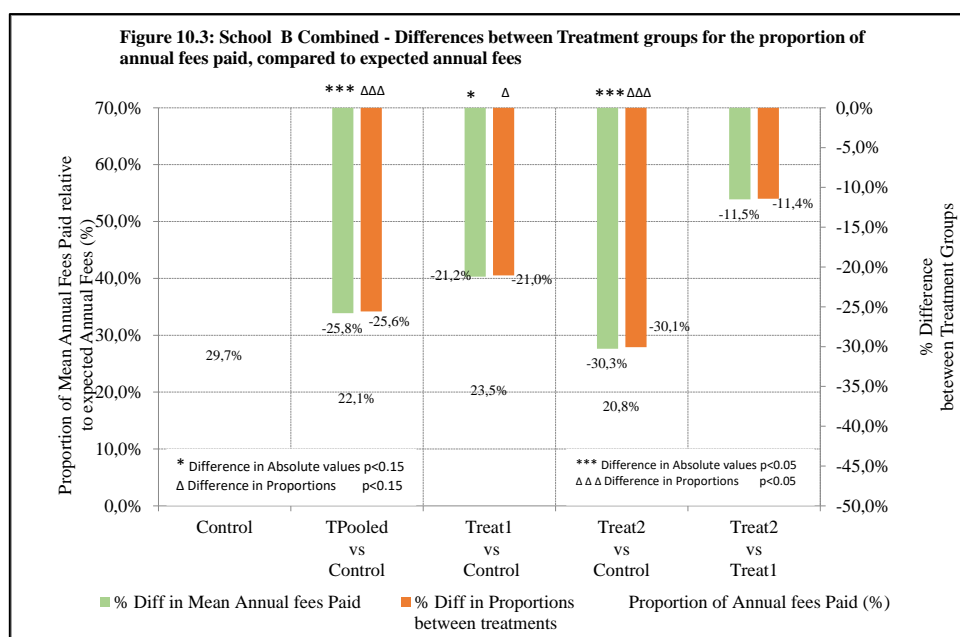
The only important result above is for parents in treatment 1 (-21.2%)and treatment 2 (-30.1%), pay significantly less of the absolute annual fees than the control group. The result also shows these parents in treatment 1 and 2 pay significantly less of the proportion of annual fees than the control group, and the result is also significant. These parents received an affective-framed message (treatment 1), which reinforces with parents that education provides a brighter future and a finance-framed message, which advocates education as the best investment return[48]. The response from the parents in in both treatment group is extremely negative as seen by the lower annual fees paid.

Defectors and Cooperators across Treatment Groups

The comparison for the mean annual fees paid for Defectors and Cooperators across the treatment groups are summarised in Table 9.1 above and illustrated in Figure 10.4, which also highlights the statistically significant outcomes. The detailed analysis of the outcomes is summarised in Appendix 11.

---

[48] The difference in annual fees between treatment 1 and treatment 2 is not statistically significant.

Figure 10.4: School B - Differences in Annual fees Paid, compared to expected annual fees across Treatment groups
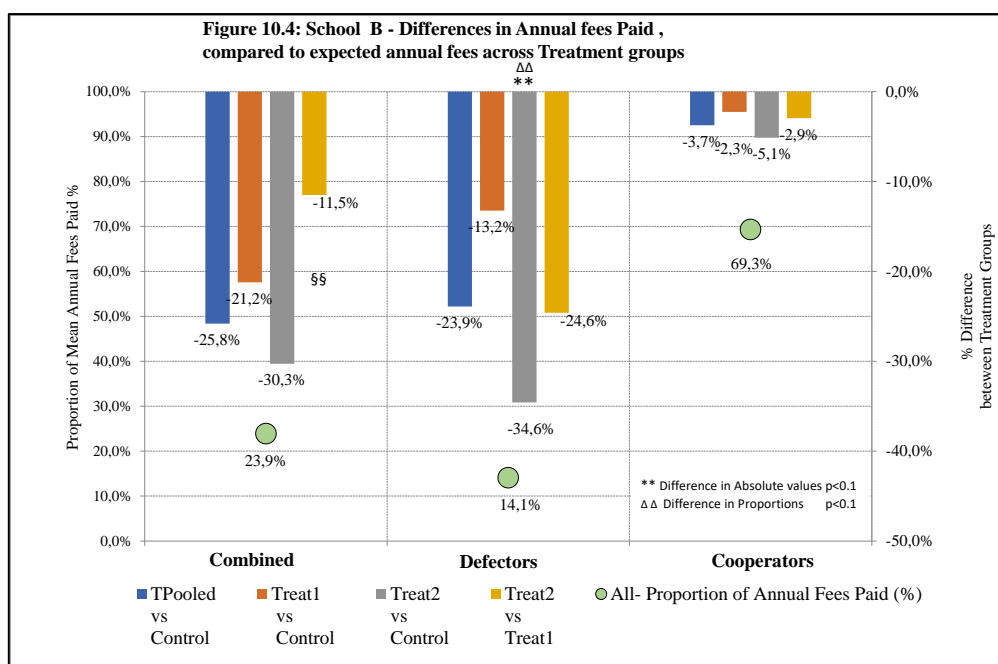
The above shows that the only significant differences that arise are for defector parents in treatment 2. These defector parents who received a finance-framed message paid significantly lower annual fee payment rates compared to parents in the control group, who received no message. A similar effect appears for cooperators, but to a smaller degree, and the result is not statistically significant.

Analysis of Outcome Variable 2: Mean Fees Paid during messaging period (Absolute Value)

This variable seeks to understand how much fees parents paid during the period of messaging only i.e. from June to November 2018. The absolute cumulative fees paid for the messaging period is then expressed as a proportion of the total outstanding fees before messaging started, and gives a measure of the messaging effects on fees paid, but just for the messaging period. The differences between treatment and control were then analysed.

Sample Description

The histogram in Figure 11.1 and Table 9.2 below, illustrate the sample payment distribution for control vs pooled treatment, which shows a wide spread of data but with a concentration around zero.

The mean cumulative fees paid during the messaging period of R335, equates to a fee payment rate of 16.2% compared to the outstanding mean fees payment before messaging started. This shows a very low level of cooperation by fee paying parents in School B. As expected, the data is characterised by significant censoring, and this will be controlled for in the regression analysis.

Figure 11.1: School B - Mean Cumulative Fees Paid

Figure 11.2: School B - Mean Cumulative Fees Paid
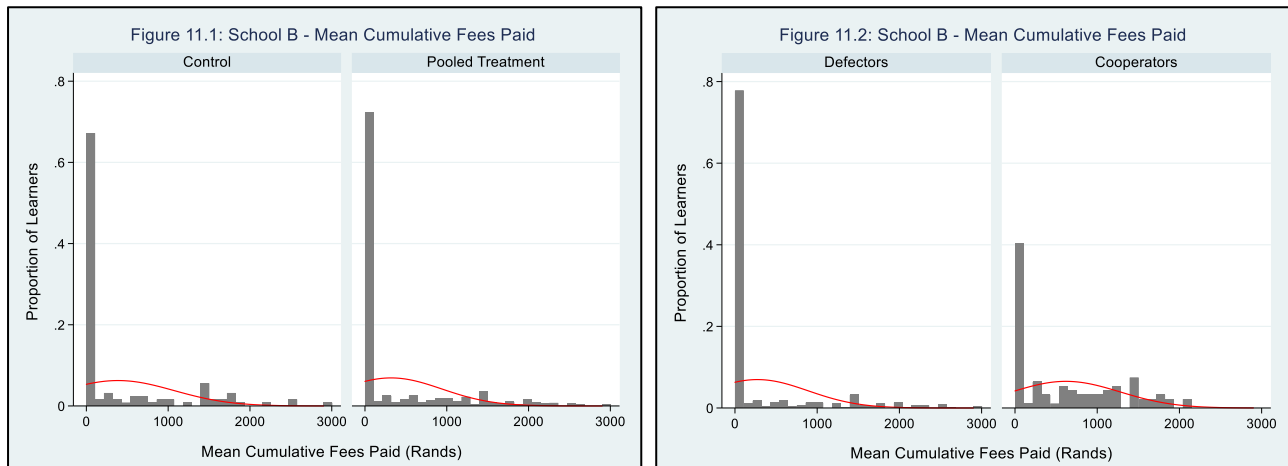
The histogram in Figure 11.2 and Table 9.2 illustrates that the sample payment distribution for Defectors, which shows a high concentration of fee payments around zero, and a mean cumulative fees paid of R273, which equates to a fee payment rate compared to the outstanding mean fees payment before messaging started of 10.8%. Cooperators show a slightly higher payment frequency with the mean cumulative fees paid during the messaging period of R619, and a fee payment rate compared to the outstanding mean fees payment before messaging started of 40.8%, which is relative to defectors, an improved level of fee payment cooperation. The characteristics of the sample set for School B, provides the basis for the analysis and outcomes which now follow.

Treatment vs Control

The comparison for the mean cumulative fees paid (for both absolute value and proportion of outstanding fees) for the sample across the treatment groups are summarised in Table 9.2 below and Appendix 11 for the statistical outcomes.

The mean cumulative fees paid for the pooled treatment (R 319), is lower (-17.4%) than for the control group (R 386). The mean cumulative fees paid for treatment 1 (R 347) is lower (-10.1%) than the control group (R 386). These results are not statistically significant. For treatment 2 (R 290), the mean cumulative fees paid is lower (-24.9%) than for control group (R 386).

Table 9.2: School B – Analysis for Outcome Variable 2: Mean Cumulative Fees Paid

No.	Typology	Outcome Variable	n	All	Control	Pooled Treatment	T-Stat TP vs C	Treatment 1	T-Stat T1 vs C	Treatment 2	T-Stat T2 vs C	T-Stat T2 vs T1
2	Combined (Defectors + Cooperators)	Mean Cumulative Fees Paid during messaging period (Rands)	527	335	386	319		347		290		
				(636)	(684)	(620)		(652)		(587)		
		Mean Cumulative Fees paid as a proportion of outstanding fees before messaging started (%)		16,2%	19,7%	15,1%		16,6%		13,6%	ΔΔ	
2.1	Defectors	Mean Cumulative Fees Paid during messaging period (Rands)	433	273	322	259		295		223		
				(615)	(675)	(597)		(645)		(544)		
		Mean Cumulative Fees paid as a proportion of outstanding fees before messaging started (%)		10,8%	13,1%	10,2%		11,6%		8,8%		
2.2	Cooperators	Mean Cumulative Fees Paid during messaging period (Rands)	94	619	601	627		633		621		
				(656)	(681)	(627)		(633)		(621)		
		Mean Cumulative Fees paid as a proportion of outstanding fees before messaging started (%)		40,8%	41,9%	40,3%		43,6%		37,4%		

Note: Primary statistic is sample Mean, standard deviation is in parentheses for All, Control, Pooled Treatment, Treatment 1 and Treatment 2.
Results of T-tests - Outcome Variable Treatment versus Control: * * * * p<0.01, * * * p<0.05, * * p<0.1, * p<0.15
Results of T-tests - Proportions Treatment versus Control: Δ Δ Δ Δ p<0.01, Δ Δ Δ p<0.05, Δ Δ p<0.1, Δ p<0.15

The differences in the absolute value and the proportions of the mean cumulative fees paid are illustrated in Figure 11.3 below for the combined sample.

The only significant result which is statistically significant is for treatment 2 versus control, where parents who received a financial-framed message pays 31% less fees than parents in the control group who received no message.
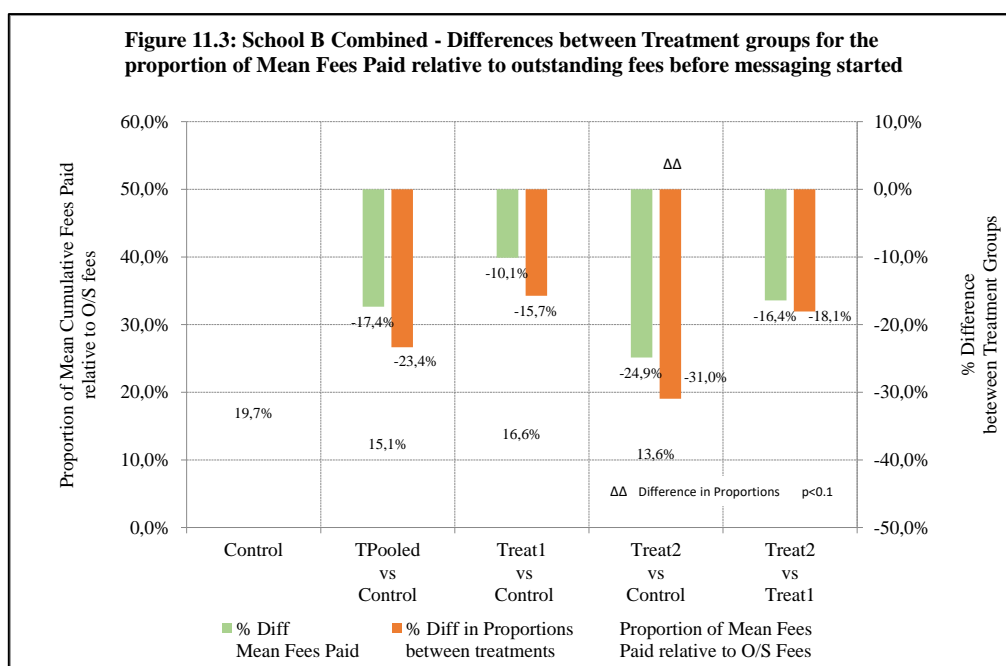
Figure 11.3: School B Combined - Differences between Treatment groups for the proportion of Mean Fees Paid relative to outstanding fees before messaging started

Defectors and Cooperators across Treatment Groups

The comparison for the absolute fees paid and proportion of outstanding fees paid before messaging started for Defectors and Cooperators are summarised in Table 9.2 above and illustrated in Figure 11.4, which also highlights the statistically significant outcomes. The detailed analysis of the outcomes is summarised in Appendix 11.

Figure 11.4: School B - Differences in Mean Cumulative Fees Paid across Treatment groups
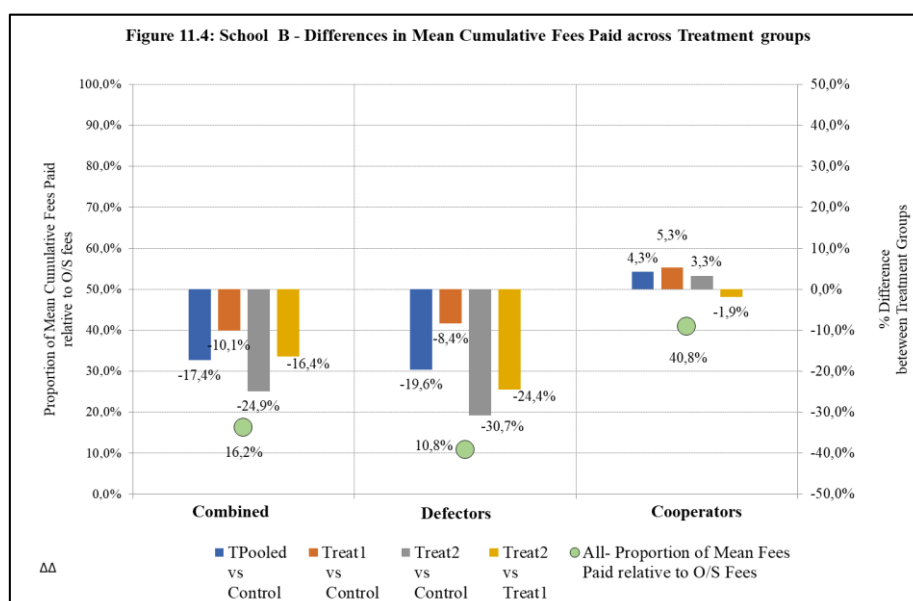
The above shows that there are no significant differences that arise between treatment and control for both defectors and cooperators. Defectors, in treatment 1, who received an affective-framed message and treatment 2 parents who received a financial-framed message show large negative co-efficients. This means that these parents paid less than parents in the control group who received no message. Co-operators show a positive treatment effect for both treatment groups, but none of the results are statistically significant and the effect sizes are small.

Analysis of Outcome Variable 3: Mean No. of Monthly Fee Payments during messaging period

This variable of no. of monthly fee payments is useful because the payment terms for school fees which allows payment of annual school fees spread over ten months. This is geared to make it easy for parents to pay in a way which is aligned with monthly household income earners. It's a measure which schools can track easily to see if parent have paid or not on a monthly basis. This variable is also useful to establish payment frequency trends which is used for fees follow-up responses.

Sample Description
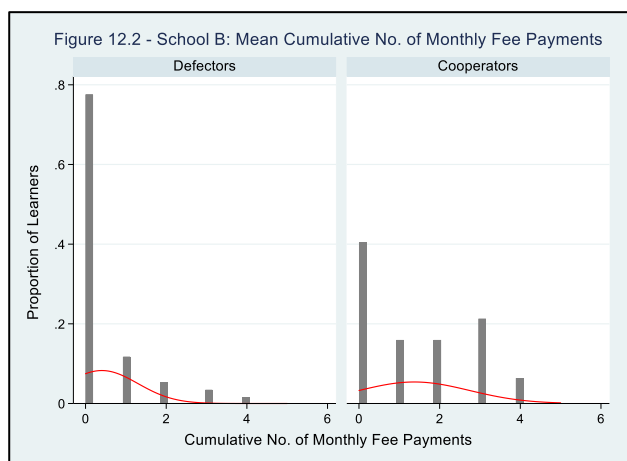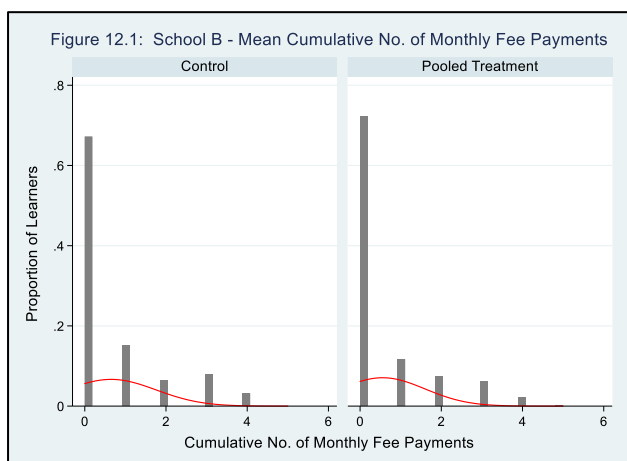
The histogram in Figure 12.1 and Table 9.3 below, illustrate the sample payment distribution for control vs pooled treatment, which shows a wide spread in the range 0 to 5, with a large concentration

around zero. The mean cumulative no. of monthly fee payments during the messaging period is 0.57, which equates to a fee payment frequency rate of 11.5% compared to the maximum no. of total monthly payments expected. This shows a low level of cooperation by fee paying parents in School B. The histogram in Figure 12.2 above and Table 9.3 below illustrate that the sample no. of monthly fee payments for Defectors, shows a spread in cumulative no. of monthly of fee payments around the mean of 0.40, which equates to a fee payment rate compared to the expected maximum no. of total monthly payments of 8.1%. Cooperators also show a wide spread around the mean cumulative no. of monthly fee payments during the messaging period of 1.37, and a fee payment rate compared to the outstanding mean fees payment before messaging started of 27.4%, which is better level of fee payment cooperation than for Defectors.

Treatment vs Control

The comparison for the mean cumulative no. of monthly fee payments during the messaging period for the combined sample across the treatment groups are summarised in Table 5.8 below and Appendix 12 for the statistical outcomes.

The mean cumulative no. of monthly fee payments during the messaging period for the pooled treatment (0.55) is lower (-14.1%) than for the control group (0.64). The mean cumulative no. of monthly fee payments for treatment 1 (0.61) is lower (-4.71%) than the control group (0.64), and for treatment group 2 (0.49), the mean cumulative no. of monthly fee payments is lower (-23.4%) than for control group (0.55). These results are not statistically significant.

Table 9.3: School B – Analysis for Outcome Variable 3: Mean No. of Monthly Fee Payments

	School B		n	Mean (Standard Deviation)								
No.	Typology	Outcome Variable	n	All	Control	Pooled Treatment	T-Stat TP vs C	Treatment 1	T-Stat T1 vs C	Treatment 2	T-Stat T2 vs C	T-Stat T2 vs T1
3	Combined (Defectors + Cooperators)	Mean cumulative no. of monthly fee payments during the messaging period	527	0,57	0,64	0,55		0,61		0,49		
				(1.05)	(1.10)	(1.04)		(1.11)		(0.96)		
		Mean cumulative no. of monthly fee payments as a proportion of expected total payments during the messaging period (%)		11,5%	12,9%	11,0%		12,3%		9,9%		
3.1	Defectors	Mean cumulative no. of monthly fee payments during the messaging period	433	0,40	0,40	0,40		0,48		0,33		*
				(0.89)	(0.86)	(0.90)		(1.01)		(0.77)		
		Mean cumulative no. of monthly fee payments as a proportion of expected total payments during the messaging period (%)		8,1%	8,1%	8,7%		9,6%		6,5%		Δ
3.2	Cooperators	Mean cumulative no. of monthly fee payments during the messaging period	94	1,37	1,45	1,34		1,35		1,32		
				(1.36)	(1.42)	(1.34)		(1.35)		(1.38)		
		Mean cumulative no. of monthly fee payments as a proportion of expected total payments during the messaging period (%)		27,4%	29,0%	26,8%		27,1%		26,5%	19,3%	

Note: Primary statistic is sample Mean, standard deviation is in parentheses for All, Control, Pooled Treatment, Treatment 1 and Treatment 2.
Results of T-tests - Outcome Variable Treatment versus Control: * * * * $p<0.01$, * * * $p<0.05$, * * $p<0.1$, * $p<0.15$
Results of T-tests - Proportions Treatment versus Control: Δ Δ Δ Δ $p<0.01$, Δ Δ Δ $p<0.05$, Δ Δ $p<0.1$, Δ $p<0.15$

There are no significant differences in the no. of monthly payments made and the monthly payments frequency rate, between treatment and control groups. The no. of monthly fee payments during the messaging period for the pooled treatment (0.55) is lower than for the control group (0.64). The monthly no. of payments frequency rate is highest for the control group (12.9%) compared to treatment 1 (12.3%) and treatment 2 (9.9%).

These differences in proportions for the mean cumulative no. of monthly fee payments are illustrated in Figure 12.3 below.

Figure 12.3: School B Combined - Differences between Treatment groups for the proportion of Mean Cumulative No. of Monthly Fee Payments, compared to expected monthly fee
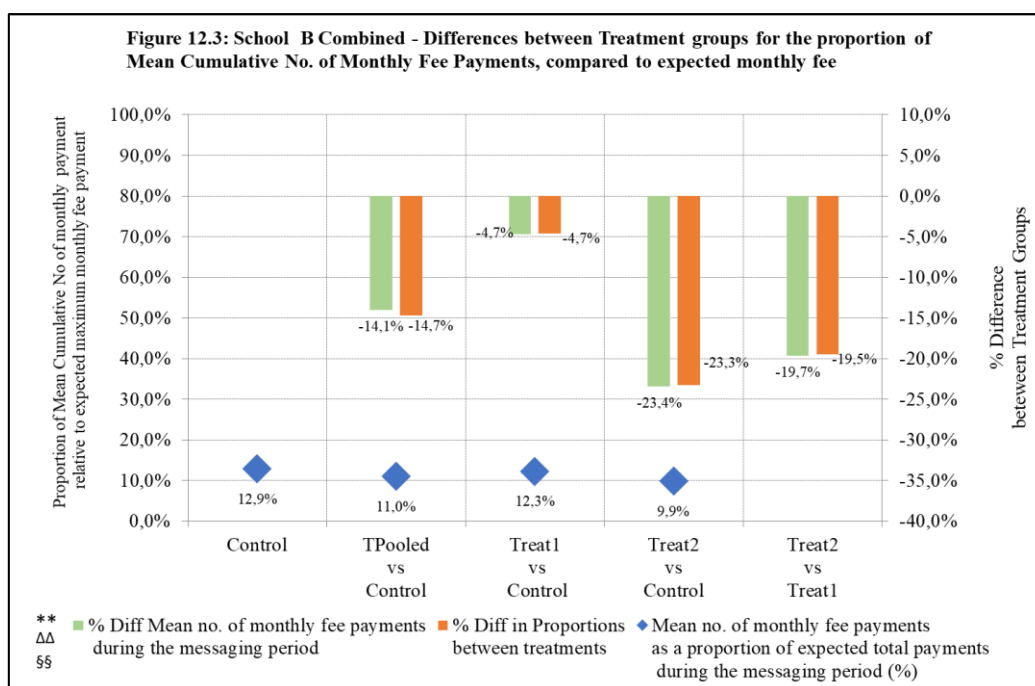
The differences in proportions between control and treatment groups range between -14.7% and -23.3% and are not statistically significant. The difference in proportions between treatment 1 and treatment 2 is -19.5% and it is not statistically significant.

Defectors and Cooperators across Treatment Groups

The comparison for the mean cumulative fees paid for Defectors and Cooperators across the treatment groups are summarised in Table 5.8 above and illustrated in Figure 12.4, which also highlights the statistically significant outcomes. The detailed analysis of the outcomes is summarised in Appendix 12.

Figure 12.4: School B - Differences in Fee Payment for Mean Cumulative No. of Monthly Fee Payments, compared to expected monthly fee across Treatment groups
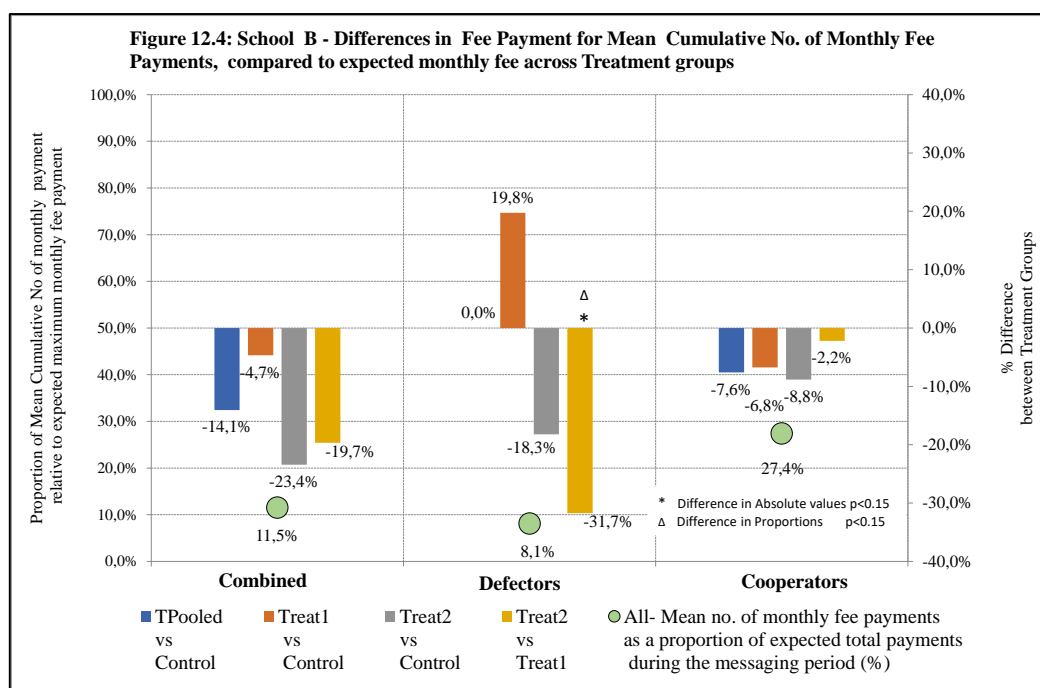
The above shows that the only significant differences that arise is for the Defector group between treatment 1 and treatment 2. Treatment 1 shows a large positive response compared to the control group (19.8%) versus treatment 2 which shows a negative (-18.3%) response. This means that parents with poor prior payment history responded better to the affective-framed message, and were negatively impacted by the financially-framed message.

Analysis of Outcome Variable 3: Mean Fee Payment in 1st month after messaging started

This section analyses the Mean 1st Month Fee Payment after messaging started and expressed as a proportion of expected monthly school fee payment, to ascertain the level of cooperation from parents between the control and the treatment groups and for the Defectors and Cooperators groups.

Sample Description

Figure 13.1 - School B: Mean 1st Month Fee Payment
Control | Pooled Treatment

Figure 13.2 - School B: Mean 1st Month Fee Payment
Defectors | Cooperators
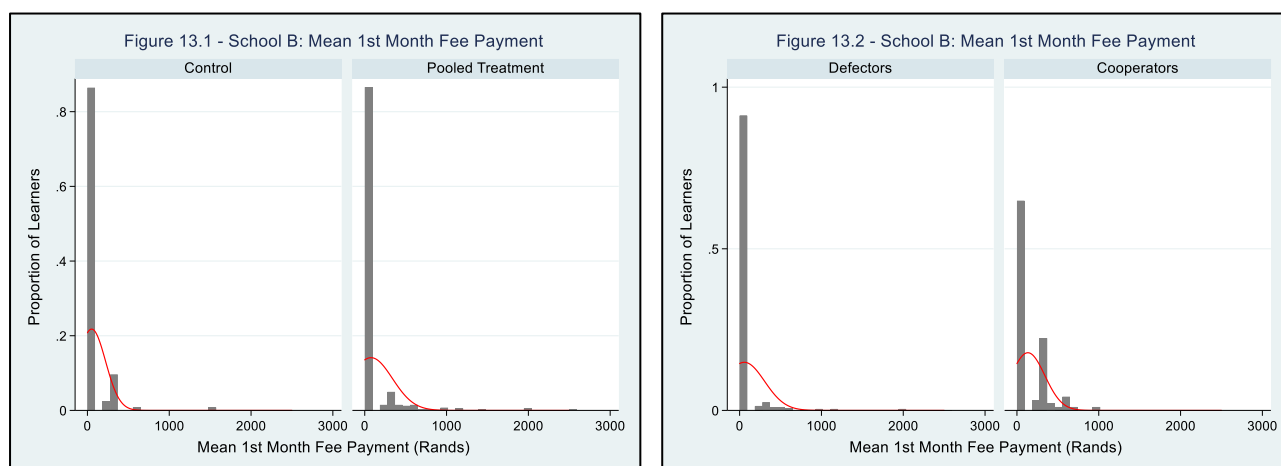
The histogram in Figure 13.1 and Table 9.4 below, illustrate the 1st month fee payment distribution for control vs pooled treatment, and the sample shows a strong central tendency around the mean of R 70, which equates to a 1st month fee payment rate of 24% compared to the expected monthly school fee payment. The histogram in Figure 13.2 and Table 9.4 below illustrates that the payment distribution for Defectors, shows a wider spread of 1st month fee payments around the mean of R 56, which equates to a 1st month fee payment rate of 19.3% compared to the expected monthly school fee payment. Cooperators show a stronger central tendency around the mean of R 133, which equates to a fee payment rate of 45.7% compared to the expected monthly school fee payment. This rate is better than the mean cumulative fees paid over the messaging period, showing possibly the "nudge" effect of a different, out of sequence, text message compared to a termly reminder.

Treatment vs Control

The comparison for the mean 1st month fee payment for the combined sample across the treatment groups are summarised in Table 9.4 above and Appendix 13 for the statistical outcomes.

The mean 1st month fee payment for the pooled treatment (R 76), is higher (49%) than for the control group (R 51). This result is economically significant, but not statistically significant. The mean 1st month fee payment for treatment 1 (R 99) is higher (94.1%) than the control group (R 51). This result is statistically significant[49]. For treatment group 2 (R 53), the mean 1st month fee payments is slightly higher (3.9%) than for control group (R 51). This result is not statistically significant. In other words, parents assigned to the affective treatment group were especially responsive in the short-run to a different out-of-sequence message. This is particularly the case for defector parents as discussed below.

---

[49] T-test results: Treatment 1 vs Control- t = -1.79, p=0.07

Table 9.4: Analysis for Outcome Variable 4: Mean Fee Payment in 1st month after messaging started

No.	Typology	Outcome Variable	n	All	Control	Pooled Treatment	T-Stat TP vs C	Treatment 1	T-Stat T1 vs C	Treatment 2	T-Stat T2 vs C	T-Stat T2 vs T1
4	**Combined (Defectors + Cooperators)**	**Fee payment in 1st month after messaging started (Rands)**	527	70	51	76		99	**	53		**
				(242)	(169)	(261)		(308)		(202)		
		Proportion of fee payment in 1st month after messaging started, compared to expected monthly fee (%)		24,0%	17,6%	26,0%		33,9%	Δ Δ	18,3%		Δ Δ
4.1	**Defectors**	**Fee payment in 1st month after messaging started (Rands)**	433	56	33	63		87	**	38		**
				(248)	(167)	(266)		(317)		(201)		
		Proportion of fee payment in 1st month after messaging started, compared to expected monthly fee (%)		19,3%	11,5%	21,6%		29,9%	Δ Δ	13,2%		Δ Δ
4.2	**Cooperators**	**Fee payment in 1st month after messaging started (Rands)**	94	133	110	144		162		127		26,4%
				(165)	(165)	(233)		(250)		(198)		
		Proportion of fee payment in 1st month after messaging started, compared to expected monthly fee (%)		45,7%	37,7%	49,2%		55,5%		43,5%		

Note: Primary statistic is sample Mean, standard deviation is in parentheses for All, Control, Pooled Treatment, Treatment 1 and Treatment 2.
Results of T-tests of Mean Fees Paid- Treatment versus Control: * * * * p<0.01, * * * p<0.05, * * p<0.1, * p<0.15
Results of T-tests of Mean Fees Paid as proprotion of Outstanding Fees - Treatment versus Control: Δ Δ Δ Δ p<0.01, Δ Δ Δ p<0.05, Δ Δ p<0.1, Δ p<0.15

The difference in proportions between treatment 1 and treatment 2 is -46% and this result is

statistically significant[50].

---

[50] T-test results: Treatment 1 vs Control- t = -1.75, p=0.08
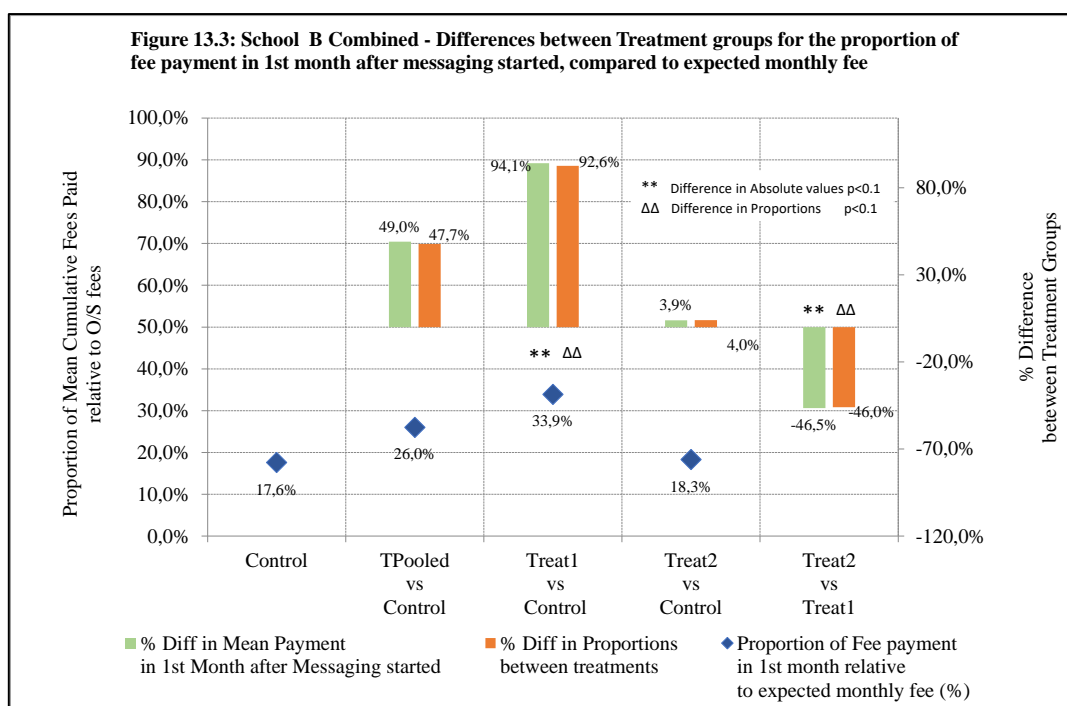
Figure 13.3: School B Combined - Differences between Treatment groups for the proportion of fee payment in 1st month after messaging started, compared to expected monthly fee

Defectors and Cooperators across Treatment Groups

The comparison for the Mean 1st Month Fee Payment after messaging started for Defectors and Cooperators across the treatment groups are summarised in Table 9.4 above and illustrated in Figure 13.4, which also highlights the statistically significant outcomes. The detailed analysis of the outcomes is summarised in Appendix 13.

Figure 13.4: School B - Differences in Fee Payment in 1st month after messaging started, compared to expected monthly fee across Treatment groups
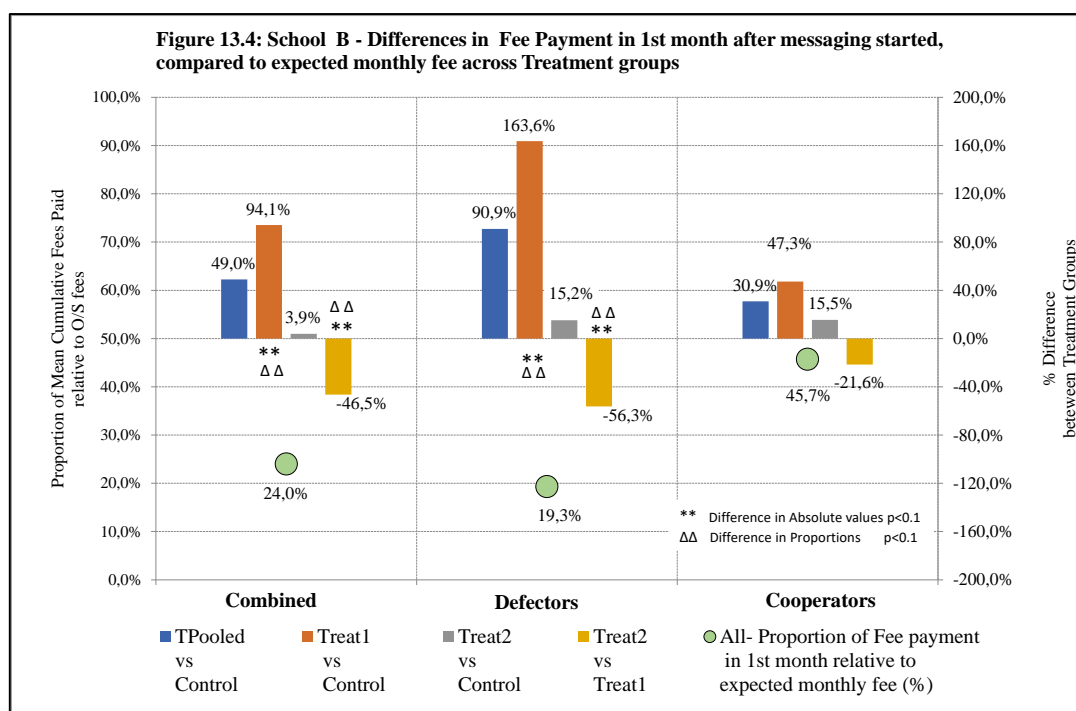
The above shows that the key significant differences that arise are a positive fee payment response from defector parents who received an affective message compared to receiving no message i.e. appealing to the sentiment that education provides a brighter future for children. The payment response from Defector parents who received a finance-framed message, was also positive (+15.2%) but not statistically significant. This is also the case for cooperator parents, who responded positively to both affective and finance-framed messages, but this result is not statistically.

6.5.2 Multivariate Regression – School B

This section employs the same multivariate regression specifications as used in the School A case study to corroborate the results described thus far by the summary statistics presented in Section 6.5.3. OLS and Tobit models are used, the latter to control for censoring at the upper and lower limit..

6.5.3 Summary of Regression Results

Result 9 : Individuals in the treatment group pay a smaller proportion of their annual fees on average although the effect is mainly driven by Defector parents who do not pay any fees at all

Table 10.1 presents the output from the OLS and Tobit models. The OLS results (Columns 1-3) suggest that treatment group individuals pay a smaller proportion of annual fees than those in the control group on average (of the order of -8.1% , see Column 1). However, once controls are included for behavioural type (i.e. Co-operator or Defector), the coefficients are not significant anymore. In Column 3, the results indicate that parents who had not paid fees consistently prior to messaging, paid 5.9% less of their annual school fees, whilst Co-operator parents who had paid fees consistently prior to messaging, respond positively to messaging, but the net effect is they still pay 0.7% less (Column 3) of their annual school fee compared to parents in the control group, and the result is not significant anymore. This negative effect is mainly due to a larger impact of Defectors not paying school fees, and a large percentage of free-riders, i.e. those parents who pay zero fees.

Columns 4-5 repeat the analysis using a Tobit model to account for double censoring in the data. Whilst the pooled treatment co-efficient remains large and negative, the results are not statistically significant. Co-operator parents pay significantly higher proportions of their annual school fee on average.

Table 10.1: School B - Regression Results for Proportion of Annual fees Paid

Dep Var: Fraction of Annual School Fees Paid	OLS			Tobit	
	1	2	3	4	5
Pooled Treatment	-8.05*	-4.72	-5.92	-8.51	-12.51
	(3.84)	(3.04)	(3.55)	(5.49)	(6.44)
Cooperator (Paid fees prior)		52.65**	48.95**	79.96**	69.75**
		(3.03)	(5.74)	(5.94)	(10.41)
Treatment x Cooperator			5.26		14.47
			(6.67)		(12.31)
n	469	469	469	469	469
(Pseudo) R-squared	0.071	0.432	0.432	0.071	0.071

Notes:
Standard errors in parentheses
Additional controls included but not reported: Race, Home Language, Grade, Household Income/Capita
* p<0.05, ** p<0.01

In Table 10.2 below, the pooled treatment is disaggregated and result shows that parents in treatment 2 (those who received a finance-framed message) pay a significantly smaller proportion of the annual fee than parents in the control group, who received no message (Columns 1-5). The result for treatment 1 is not as pronounced, but still negative. There is no statistically significant difference (Prob > F = 0.153) between treatment 1 and treatment 2 which means there is not a differentially different response between treatment 1 and treatment 2.

Table 10.2: School B - Regression Results for Proportion of Annual fees Paid

Dep Var: Fraction of Annual School Fees Paid	OLS			Tobit	
	1	2	3	4	5
Treatment 1	-5.58	-2.69	-4.01	-3.80	-7.78
	(4.32)	(3.43)	(3.97)	(6.15)	(6.80)
Treatment 2	-10.33*	-6.61*	-7.70*	-13.09*	-17.22*
	(4.15)	(3.25)	(3.77)	(6.16)	(6.85)
Cooperator (Paid fees prior)		52.58**	48.88**	79.85**	67.76**
		(3.02)	(5.75)	(5.92)	(9.84)
Treatment 1 x Cooperator			5.93		11.18
			(7.76)		(13.28)
Treatment 2 x Cooperator			4.62		14.74
			(7.31)		(13.19)
n	469	469	469	469	469
(Pseudo) R-squared	0.074	0.434	0.435	0.072	0.072

Notes:
Standard errors in parentheses
Additional controls included but not reported: Race, Home Language, Grade, Household Income/Capita
* p<0.05, ** p<0.01

The above analysis is repeated for the other 4 outcomes variables, using the same specifications as above. Table 10.3 below now summarises a disaggregated view of the co-efficients for the Tobit Model for the five outcome variables which have been analysed, to make a comparison of the outcome of the various models. The detailed tables are summarised in Appendix 16.

The summary below shows that the Tobit model using the variable "proportion of annual fees" is the only model where treatment effects are statistically significant, and this has already covered in the description Table 10.2 above. All the models 1-5 do not show any significance for treatment effects, although the co-efficients are large for both treatment 1 and treatment 2. The outcome across all five variables confirm that Cooperators pay significantly more than Defectors.

Table 10.3: School B- Regression Results for Treatment Effects (Tobit)					
Dependent Variable	Proportion of Annual Fees	Proportion of Outstanding Fees	Proportion of Monthly Payments	1st Month Payment	Proportion of 1st Month Fee Payment
	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
Treatment 1	-7.78	-9.48	-1.53	257.37	87.84
	(6.80)	(13.30)	(8.72)	(219.84)	(75.03)
Treatment 2	-17.22*	-21.43	-13.34	-242.30	-82.70
	(6.85)	(13.36)	(8.82)	(244.25)	(83.36)
Cooperator (Paid fees prior)	67.76**	52.73**	39.71**	619.22*	211.34*
	(9.84)	(18.68)	(12.25)	(293.93)	(100.32)
Treatment 1 x Cooperator	11.18	24.89	4.25	47.91	16.35
	(13.28)	(25.28)	(16.52)	(376.94)	(128.65)
Treatment 2 x Cooperator	14.74	23.10	11.79	247.70	84.54
	(13.19)	(25.03)	(16.42)	(396.50)	(135.32)
n	469	469	469	469	469
(Pseudo) R-squared	0.072	0.037	0.037	0.037	0.041
<u>Notes</u>: Standard errors in parentheses Additional controls included but not reported: Race, Home Language, Grade, Household Income/Capita * p<0.05, ** p<0.01					

To pay or not to pay fees? A question parents face every month.

The results above mask the fact that messaging could operate in different ways. On the one hand, messaging might prompt parents to pay something as opposed to nothing, even if they do not pay in full. Alternatively, messaging might prompt parents to pay their fees in full. In order to consider whether such differential responses might be at play, the analysis switches to analysing whether the decision to pay any fee at all as opposed to paying zero is the key behavioural bottleneck, or whether all parents pay fees but differ in the amount they choose to pay. Identifying where the hurdle lies is important in terms of policy implications. As with the previous section, we discuss the results fully in relation to the dependent variable "Proportion of annual fees paid", and then provide an overview summary of the same specifications when we alter the dependent variable used.

**Result 10**: **Heterogeneity in response to messaging is not significant in terms of the decision to pay or not to pay, as well as in how much to pay.**

Using the proportion of annual fees paid, Table 10.4 examines whether any significant differences arise between treatment and control parents in terms of the decision to pay fees or not (1=Pay fees, 0=Pay zero) compared to how much of the fee to pay once the decision-to-pay threshold has been crossed. Columns 1 and 3 of Table 10.4 present linear probability estimates for the decision to pay versus not to pay. Columns 2 and 4 examine how much is paid amongst parents who do make a payment.

Column 1 suggests that parents in the treatment groups are 7% less likely to pay any fee at all compared to those in the control group, but the result is not statistically significant. However, in Column 3, it is again evident that this negative treatment group effect is influenced by the free-riding of Defector parents. Also, once the decision to pay threshold has been crossed (Columns 2 and 4), the pooled treatment group pays less than the control group by 4.1% (Column 2). There is not a significant

treatment effect, and the coefficients are small. The trend of parents who were already paying fees prior to messaging i.e. cooperators, paying significantly more fees than those who were not paying fees consistently prior to messaging remains.

Table 10.4: School B - Regression Results for Proportion of Annual fees Paid				
Dep Var: Fraction of Annual School Fees Paid	OLS			
	1	2	3	4
	Pr (Pay fee=1)	Fee Paid>0	Pr (Pay fee=1)	Fee Paid>0
Pooled Treatment	-0.07	-4.06	-0.09	-6.81
	(0.05)	(4.27)	(0.06)	(6.14)
Cooperator (Paid fees prior)	0.63**	27.01**	0.56**	22.41**
	(0.03)	(3.76)	(0.06)	(7.21)
Treatment x Cooperator			0.10	6.54
			(0.06)	(8.26)
n	469	229	469	229
(Pseudo) R-squared	0.274	0.297	0.275	0.299
Notes: Standard errors in parentheses Additional controls included but not reported: Race, Home Language, Grade, Household Income/Capita * p<0.05, ** p<0.01				

Table 10.5 disaggregates treatment effects into their 2 separate groups. Columns 3 and 4 control for parental type, and these results suggest divergent responses from co-operator parents compared to defector parents. Parents in the treatment 1 and 2 are less likely to pay any fee at all (between 3 and 5%) compared to those in the control group, but the result is not statistically significant. The likelihood of Cooperators paying are higher than for Defectors, and this is enhanced for co-operator parents who receive the financially framed message. Conversely, defector parents pay significantly less, and this is especially the case for defector parents in Treatment 2, as already evidenced in the summary statistics presented earlier. The differences between the co-efficients of treatment 1 and treatment 2 are also small.

Table 10.5: School B - Regression Results for Proportion of Annual fees Paid

Dep Var: Fraction of Annual School Fees Paid	OLS			
	1	2	3	4
	Pr (Pay fee=1)	Fee Paid>0	Pr (Pay fee=1)	Fee Paid>0
Treatment 1	-0.03	-2.73	-0.05	-6.40
	(0.05)	(4.83)	(0.07)	(6.80)
Treatment 2	-0.10	-5.49	-0.13	-7.40
	(0.05)	(4.79)	(0.07)	(6.88)
Cooperator (Paid fees prior)	0.63**	27.09**	0.56**	22.35**
	(0.03)	(3.76)	(0.06)	(7.23)
Treatment 1 x Cooperator			0.07	9.11
			(0.07)	(9.43)
Treatment 2 x Cooperator			0.14*	4.32
			(0.07)	(9.24)
n	469	229	469	229
(Pseudo) R-squared	0.277	0.298	0.279	0.301
Notes:				
Standard errors in parentheses				
Additional controls included but not reported: Race, Home Language, Grade, Household Income/Capita				
* p<0.05, ** p<0.01				

Table 10.6 below now summarises a disaggregated view of the co-efficients for the Tobit Model for the five outcome variables which have been analysed, to make a comparison of the outcome of the various models. The detailed tables are summarised in Appendix 16.

The results suggests that parents in the treatment groups 1 and 2 are less likely to pay any fee at all compared to those in the control group and the outcome is influenced by the negative treatment group effect of the counter-opposing decisions being made by cooperator and defector parents. The analysis for 1st month fee payments (Column 8 and 10) shows large co-efficients for especially treatment 2, but it is not significant.

Table 10.6: School B - Regression Results for payment threshold - OLS										
Dependent Variables	Prop. of Annual Fees		Prop. of Outstanding Fees		Prop. of Monthly Payments		1st Month Fee Payment		Prop. of 1st Month Fee Payment	
	1	2	3	4	5	6	7	8	9	10
	Pr (Pay fee=1)	Fee Paid>0	Pr (Pay fee=1)	Fee Paid>0	Pr (Pay fee=1)	Fee Paid>0	Pr (Pay fee=1)	Fee Paid>0	Pr (Pay fee=1)	Fee Paid>0
Treatment 1	-0.05	-6.40	-0.03	-6.29	-0.03	10.06	0.05	95.35	0.05	32.54
	(0.07)	(6.80)	(0.06)	(8.86)	(0.06)	(5.59)	(0.04)	(334.28)	(0.04)	(114.09)
Treatment 2	-0.13	-7.40	-0.08	-9.60	-0.08	-3.07	-0.03	251.30	-0.03	85.77
	(0.07)	(6.88)	(0.06)	(8.43)	(0.06)	(5.19)	(0.04)	(264.55)	(0.04)	(90.29)
Cooperator (Paid fees prior)	0.56**	22.35**	0.28**	11.83	0.28**	19.27**	0.22*	-183.38	0.22*	-62.59
	(0.06)	(7.23)	(0.11)	(10.18)	(0.11)	(6.76)	(0.09)	(231.88)	(0.09)	(79.14)
Treatment 1 x Cooperator	0.07	9.11	0.09	10.41	0.09	-17.21	0.05	-15.85	0.05	-5.41
	(0.07)	(9.43)	(0.14)	(13.76)	(0.14)	(9.14)	(0.13)	(344.88)	(0.13)	(117.71)
Treatment 2 x Cooperator	0.14*	4.32	0.09	3.43	0.09	-4.63	0.02	-189.37	0.02	-64.63
	(0.07)	(9.24)	(0.14)	(13.46)	(0.14)	(9.07)	(0.12)	(294.38)	(0.12)	(100.47)
n	469	229	469	140	469	140	469	64	469	64
(Pseudo) R-squared	0.279	0.301	0.123	0.196	0.123	0.212	0.132	0.281	0.132	0.281

Notes:

Standard errors in parentheses

Additional controls included but not reported: Race, Home Language, Grade, Household Income/Capita

* $p<0.05$, ** $p<0.01$

In this final section, sub-group analysis is conducted as a robustness check. Separate regressions are done for parents with a history of fee payment prior to messaging and those without a history of consistent fee payment. Since School B does not utilise debit orders, this arm of the analysis is not repeated.

Result 11: There is no correlation between parental history of fee payment prior to messaging and treatment status on average

Table 10.7 presents sub-group analysis, focusing on fee payment consistency prior to messaging. Columns 1 and 2 confirm that the proportion of annual fees paid amongst parents with a positive track record of fee payment prior to messaging is 1.2% higher for those in the pooled treatment group compared to the control group, and the result is not statistically significant. Amongst parents who had not been paying fees consistently prior to messaging, those who received messaging paid 14.4% less of the annual fee compared to similar parents in the control group, and this result is also not statistically significant.

Table 10.7: School B - Regression Results for Proportion of Annual fees Paid		
Dep Var: Fraction of Annual School	Tobit	
	1	2
	Cooperator	Defector
Pooled Treatment	1.20	-14.38
	(5.42)	(8.11)
Observations	89	380
Pseudo R-squared	0.034	0.012
Notes: Standard errors in parentheses Additional controls included but not reported: Race, Home Language, Grade, Household Income/Capita * p<0.05, ** p<0.01		

Table 10.8 disaggregates the treatment effect, and the result shows there is only a significant treatment effect for defector parents, who received a financial-framed message. It shows a negative response to the text message as the annual fees paid is 19.7% lower than parents in the control group. The results suggest that amongst parents with a history of prior fee payment, there are no differential treatment responses.

Table 10.8: School B - Regression Results for Proportion of Annual fees Paid		
Dep Var: Fraction of Annual School	Tobit	
	<u>1</u>	<u>2</u>
	Cooperator	Defector
Treatment 1	3.22	-8.90
	(6.33)	(9.02)
Treatment 2	-0.54	-19.74*
	(6.10)	(9.08)
Observations	89	380
Pseudo R-squared	0.035	0.013
<u>Notes:</u> Standard errors in parentheses Additional controls included but not reported: Race, Home Language, Grade, Household Income/Capita * p<0.05, ** p<0.01		

Table 10.9 below now summarises a disaggregated view of the co-efficients for the Tobit Model for the five outcome variables which have been analysed, to make a comparison of the outcome of the various models. The detailed tables are summarised in Appendix 17.

Treatment messaging does not appear to significantly influence payment rates (or annual fees or outstanding fees) for co-operator parents relative to control group parents who also had a prior history of paying fees (Columns 1 and 3). However, the results do suggest that in the first month after messaging starts, co-operator and defector parents receiving the affective message pay a higher fee amount. For Cooperators, the 1st month payment is on the order of R205 (70%) and R298, compared to control group co-operator parents who received no message. (Colum 7 & 9). For Defectors, the 1st month payment is on the order of R298 (101%) and R298, compared to control group defector parents who received no message. (Colum 8 & 10).Conversely, finance-framed treatment messaging, appears to significantly reduce the fee payment rate for parents with no prior history of fee payment relative to their control group counterparts who also had not paid fees prior to messaging (Columns 2 & 4). A similar response is shown for the 1st month fee payment after messaging started (Column 8)

Table 10.9: School B - Regression Results for Cooperators and Defectors fee payment behaviour - Tobit										
Dependent Variables	Prop. of Annual Fees		Prop. of Outstanding Fees		Prop. of Monthly Payments		1st Month Fee Payment		Prop. of 1st Month Fee Payment	
	1	2	3	4	5	6	7	8	9	10
	Cooperator	Defector	Cooperator	Defector	Cooperator	Defector	Cooperator	Defector	Cooperator	Defector
Treatment 1	3.22	-8.90	15.92	-11.16	3.45	-2.15	205.36	298.07	70.09	101.73
	(6.33)	(9.02)	(18.36)	(14.04)	(11.70)	(9.44)	(145.04)	(304.29)	(49.50)	(103.85)
Treatment 2	-0.54	-19.74*	4.45	-21.68	0.81	-13.68	8.23	-353.76	2.81	-120.74
	(6.10)	(9.08)	(17.88)	(14.08)	(11.43)	(9.53)	(145.01)	(340.25)	(49.49)	(116.12)
Observations	89	380	89	380	89	380	89	380	89	380
Pseudo R-squared	0.035	0.013	0.036	0.015	0.031	0.018	0.048	0.031	0.055	0.034

Notes:

Standard errors in parentheses

Additional controls included but not reported: Race, Home Language, Grade, Household Income/Capita

* $p<0.05$, ** $p<0.01$

Overall Summary of Regression Analysis for School B

Based on the above, the results from the three key areas evaluated show that the Cooperator parents pay higher proportions of their fees. This is consistent with the findings from the descriptive statistical analysis. In addition, important effects are observed, although not statistically significant, which shows that treatment group 2 pay a smaller proportion of their annual fees on average. Interestingly, Cooperators appear to be more responsive to affect-framed messages and indifferent to finance-framed messages. Defectors however respond more negatively to finance-framed messaging than to affective-framed messaging. Finally, heterogeneity in response to messaging appears not to be significant in terms of the decision to pay or not to pay, as well as how much to pay. This means efforts need to focus on what is missing for parents to cooperate, and pay their school fees.

6.5.4   Overall Descriptive Results Analysis Summary for School A and B

Considering the differing socio-economic and fee-payment equilibrium environment in School A and B, the overall results indicate similar findings in both School A and B. The findings suggest that parents who consistently pay their school fees i.e. Cooperators, respond positively to behaviourally framed text messaging and therefore pay a higher proportion of their school fees compared to parents who received a "reminder" or "no" message. In addition, the findings for Defectors i.e. parents who do not pay school fees consistently, pay less of the school fees if they received a behaviourally framed test messages, compared to those who received just a "reminder" message or "no" message.

For Cooperators in School A, both the affective-framed and finance-framed message evoke a positive fee payment behaviour compared to the control. In School B, the affective-framed message evokes a more neutral fee-payment behaviour from Cooperator parents and both affective and finance-framed text message results in large negative impacts in fee payments from Defector parents. The analysis confirms that the differences in fee payment between Cooperators and Defectors in School A and B are statistically significant.

7.   Propensity to pay school fees - Analysis of school fees payment behaviour

Household financial decision-making requires making important trade-offs, especially where the socio-economic situations means that financial resources are limited. This context is relevant for parents who are deciding if, when and how school fees will to be paid. Scarcity and affordability are two of the key considerations for parents paying school fees i.e. in the household budget, what is the value proportion of school fees in relation to household income, and what trade-offs do parents make i.e. what do parents not pay if there is varying level of scarcity in financial resources every month.

For this reason, this analysis looked at assess the propensity of households to pay school fees i.e. analyse the relationship between household income per capita compared with the mean fees paid during the messaging period, for School A and B. For the purposes of the analysis, the fee payment propensity is defined as the ratio between the expected school fees to be paid compared to the monthly household income per capita, expressed as a percentage. The analysis of the actual data for School A and B is shown in the two-way scatter diagrams in Figure 14.1 for Control versus Pooled Treatment, and in Figure 14.2 for Defectors versus Cooperators.
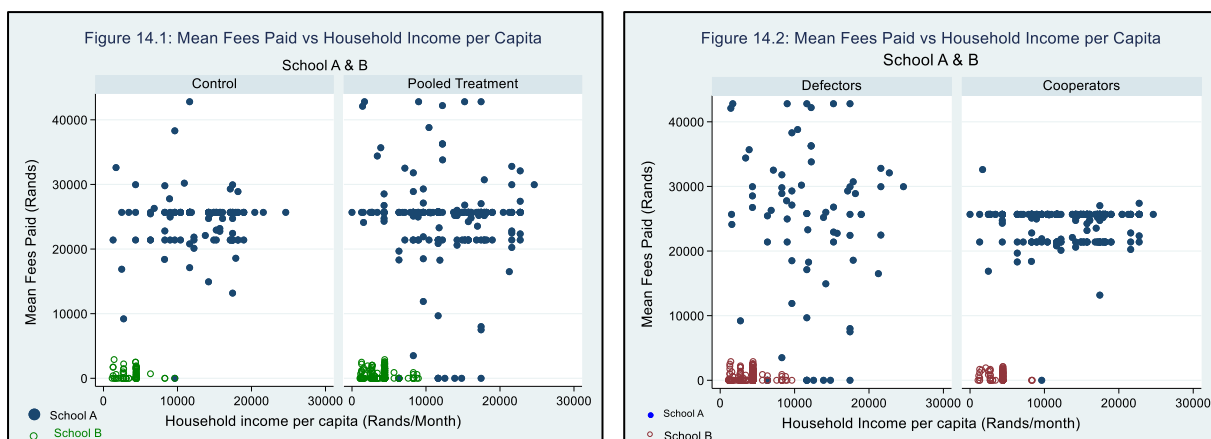
The graphs above show that there is a wide spread of data for both control and pooled treatment sample groups. In Figure 14.2, the Defector group show a widespread and as expected, the Cooperators show a central tendency around the mean of the expected fees to be paid. This graph also shows that the

payment of required mean cumulative fees during the messaging period of 6 months, was consistent across the cooperator household income per capita range, and at the required fee payment level, whereas it shows far more variation in the defector group - some defectors paid all their required school fees for the year, whilst others paid nothing, during the messaging period. The underlying reasons for this variation in defector behaviour are not immediately obvious.

Given the importance of the financial trade-off dynamic in households with limited resources, the expectation is that the lower the fee payment propensity is, the higher the fee payment rate which means that a larger proportion of parents choose to pay the full amount of expected school fees. The outcomes of the statistical analysis for the household income per capita in School A and B is summarised in Table 11 below.

Table 11: Monthly household income per capita (Rands) - Table of Means

Analysis	Baseline Variable = Monthly Household Income per Capita (Rands) (Standard deviation)						T-Stat					All	
	Size	Actual ALL	Control	Pooled Treatment	Treatment 1	Treatment 2	TPooled vs Control	Treat1 vs Control	Treat2 vs Control	Treat1 vs Treat2	All Defect vs Coop	Fee Payment Rate	Propensity Ratio
School A - Combined	349	12782 (5326)	12910 (4636)	12713 (5666)	12616 (5737)	12807 (5621)	0,35	0,43	0,15	-0,25		92,2%	33,5%
Defectors	77	11777 (5631)	12005 (4979)	11685 (5912)	11655 (6870)	11711 (5101)	0,24	0,20	0,21	-0,03	-1.8**	68,9%	36,3%
Cooperators	272	13066 (5212)	13112 (4559)	13040 (5564)	12893 (5382)	13189 (5770)	0,12	-0,35	-0,10	0,30		99,2%	32,8%
School B - Combined	469	3957 (1330)	3834 (1322)	3996 (1332)	4044 (1435)	3951 (1230)	-1,13	-1,27	-0,76	0,65		16,2%	7,4%
Defectors	380	3964 (1332)	3788 (1334)	4016 (1329)	4064 (1455)	3970 (1203)	-1,39	-1.46*	-1,05	0,60	0,25	10,8%	7,4%
Cooperators	89	3925 (1327)	3978 (1295)	3901 (1351)	3947 (1351)	3856 (1373)	0,26	0,09	0,35	0,26		40,8%	7,5%

Note: Primary statistic is sample Mean, standard deviation is in parentheses for All, Control, Pooled Treatment, Treatment 1 and Treatment 2.
Results of T-tests - Outcome Variable Treatment versus Control: * * * * p<0.01, * * * p<0.05, * * p<0.1, * p<0.15

In School A for the combined sample, the monthly household income per capita of R12 910 is higher for the control group compared to the pooled treatment group of R12 713. The propensity ratio is 33.5% and the fee payment rate is 93%. For the Defector group, the monthly household income per capita of R12 005 is higher for the control group compared to the pooled treatment group of R11 685. The propensity ratio is 36.3% and the fee payment rate is 71.3%. For the Cooperator group, the monthly household income per capita of R13 112 is higher for the control group compared to the pooled treatment group of R13 040. The propensity ratio is 32.8% and the fee payment rate is 99.5%.

The differences between control and treatment groups are not statistically significant. However, the differences based on the "All sample" between Defectors and Cooperators are statistically significant[51] (refer Table 11).

In School B for the combined sample, the monthly household income per capita of R3 834 is slightly lower for the control group compared to the pooled treatment group of R3 996. The propensity ratio is 7.4% and the fee payment rate is 16.2%. For the Defector group, the monthly household income per capita of R3 788 is higher for the control group compared to the pooled treatment group of R4 016, and for treatment 1 vs control only, this result is statistically significant[52]. The propensity ratio is 7.4% and the fee payment rate is 10.8%. For the Cooperator group, the monthly household income per capita of R3 978 is higher for the control group compared to the pooled treatment group of R3 901. The propensity ratio is 40.8% and the fee payment rate is 7.5%. The differences between Defectors and Cooperators are not statistically significant (refer Table 11).

Result 12: In School A, the fee payment propensity for Defectors is 36.3% and the fee payment rate is 71.3%. For Cooperators, the fee payment propensity is 32.8% and the fee payment rate is 99.5%. **It is expected that fee payment rate for Cooperators should be higher than for Defectors. The data analysis shows that this is true for the messaging period.**

Result 13: In School B, the fee payment propensity for Defectors is 7.4% and a fee payment rate is 10.8%. For Cooperators, the fee payment propensity is 7.5% and a fee payment rate is 40.8%. It is therefore expected that fee payment rate for Cooperators and Defectors should be similar. **The data analysis shows that this is not true for the messaging period, with the fee payment rate being significantly lower for Defectors compared to Cooperators.** School B has a large number of zero or partial payments which is an indication of significant free-riding.

---

[51] T-test results: All Defectors vs All Cooperators - t= -1.80, p= 0.06
[52] T-test results: Treatment 1 vs Control – t = -1.46, p= 0.14

8.   Limitations of the Study

Care was taken to ensure the robustness of the experiment in all aspects i.e. experimental design, cooperation from the school administrators, intervention implementation and in statistical analysis and interpretation of results. There are a few limitations of the study that must be noted.

SMS Messaging

The sms delivery rates at a message level, was the only summary information that indicated to what extent messages were delivered. SMSWeb was not able to provide a parent level analysis to verify if messages did go to designated parents in the various treatment groups. The sms delivery analysis also showed a lower level of SMS delivery rate for defectors versus cooperators, which can influence if all parents were being nudged in the way the experiment anticipated. Getting this type of analysis will be important in a subsequent experiment of this nature, especially for the defector groups.

SMS Design

The design of the SMS messages was based on the behavioural insights to ensure that key aspects of the key treatments are simply communicated, and it resonates with parents. It was also important to not send the same monthly message, as it would become more boring and therefore less effective over the duration of the messaging period. For this reason the three different messages were sent in the first three months, and then repeated again for the next three months. This may introduce some confusion, with parents when in month 1, the message says, " together building a brighter future for our children" and the next month it says, " Appreciating being part of a school of excellence". We know that adaptation in humans (Kahneman and Tversky, 1979), is one of the key reasons why maybe fees in the 1st month of messaging was positive, but the effect is not sustained over the messaging period.

9. Discussion

The research set out to understand and find a solution to this school fee-payment social dilemma in Section 21 Schools, using behaviourally framed text messaging. These messages aim to communicate and reinforce the benefits of education to parents, and through this promote cooperative parent behaviour to pay school fees more consistently and in full. Solving for this fee-payment dilemma is done in the context that a fee exemption is available to all parents in Section 21 schools, if households meet the affordability criteria (Governing Body Foundation, 2015) as prescribed by The South African Schools Act. The research question is seeking to establish if text messaging in schools is an effective and low-cost "call to action" fee-payment mechanism i.e. can it increase the proportion of fees that parents pay? Does the type of messaging have differential effect on fee-payment behaviour? Is there a difference between the fee-payment behaviour of Defectors versus Cooperators ? The study designed a behaviourally framed message for treatment 1, which has an affective theme, and for treatment 2, the message had a finance theme.

The findings of this research provide empirical evidence that a behaviourally framed text message has a positive effect (1.0%-5.2%) on fee payments from Cooperators i.e. parents who pay school fees consistently. The surprising result is that parents in the Defector group who received a behaviourally framed text message, pay much less (11.7% and 14.4%) of their school fees, compared to if they received just a reminder message (School A) or even no message (School B). The key learning here is that messaging can make things worse, so be careful. It is emerging that parental type and whatever causes parents to pay fees or not in the first place is quite dominant, and quite hard to change through messaging. In some cases, like school A, messaging reinforces these types. However, this is less of the case in School B although defectors respond more negatively to finance-framed message, whereas in School A, it is the affective message that alienates defectors.

The research confirms that Cooperators on average, pay a much higher proportion of their school fees (School A = 99.5%, School B=69.3%) than do Defectors (School A=71.3%, School B=14.1%). The findings are consistent in the two schools that participated in the experiment, despite the demographic differences i.e. value of school fees to be paid and the socio-economic aspects, of the two school environments.

The results also show that the use of debit orders, can make a positive difference to the frequency of parents making payments, but there is no evidence to indicate that parents with debit orders pay more of their fees. Debit orders can help parents cross the threshold to pay or not to pay, and it can be an effective commitment mechanism but attracts a minimum bank administrative charge which does not work well for small payments.

Surprisingly, the wish of parents for a good education (affective message) for their children does not always translate into them paying the agreed school fees in full and on time, as is the case for Defectors. At the centre of understanding these results, it is important to consider the governing factors that are at play which influences the contribution made by parents to a public good like Education. Environmental context (Kagel and Roth, 1995) which relates to beliefs, effort, fairness, culture or compliance and which are more difficult to control in any experiment, can play an important role in establishing a stable equilibrium of either cooperation or defection. It is therefore not unusual that the School A environment, which is a cooperative, still attracts a smaller level of defection. In this research the behaviourally framed text message informing parents about good reasons to pay school fees, resulted in Defectors paying less fees than parents who received only a reminder or no message. What is does say about Defectors, is that behaviourally framed text messages do not align with the preferences or beliefs of Defector parents regarding paying school fees or not. There are many reasons why Defectors respond negatively, and this could include scarcity of money or even emotional resources, and the text message offers a benefit, but it does not offer a solution which solves for tunnelling (Mullainathan & Shafir, 2014) caused by the immediate scarcity state e.g. lack of funds.

Parents in the Defector group may exhibit varying degrees of conditional cooperation (Chaudhuri, 2008), and it is not necessarily in their cooperative relationship with other parents, but instead it could be with government, whom they expect should be funding the total cost of education. Instead Defectors could be frustrated with government mismanagement of resources e.g. corruption, which is diverting public funding away from where it is needed most i.e. basic education It is this inconsistent fee-payment and free-riding behaviour of Defectors, which is the catalyst of the tipping phenomenon (Thomas Schelling, 1971) and which disrupts the dynamic relationship between self-interested individual behaviour and the collective results which government and school management are seeking to strengthen i.e. ensure all parents pay fees, so that the financial sustainability of the school can be assured. The question here is that if a stable equilibrium of defection has already been established, what mechanism can be explored to initiate mutual reciprocity (Axelrod and Hamilton, 1981) in order to reverse this tipping point phenomena.

In a school setting, defections generally go unpunished and the only recourse that schools have is to take legal action for non-payment of fees, but only after it has been established that the parents do not qualify for an exemption. The longer defections go unchallenged (Fehr and Fischbacher, 2004), the less likely it is that Defectors will cooperate in future interactions. Public suasion for non-payment is not allowed as the learner school fee status is a confidential matter between the School Governing Body (SGB) and the parent.

Cooperators on the other hand, may exhibit conditional cooperation with other fee-paying parents, and therefore embrace the need to make decisions which are in everyone's collective best interest i.e. foster a stable multiplayer cooperative equilibrium (Hilbe, 2014).

The results also show that treatment 1 messaging which was framed to connect with the affective human appeal was preferred to treatment 2 which was framed to connect with the financial econ appeal. This insight is quite useful, because it provides clear evidence that the narrative in schools be focused

on the affective benefits of educational outcomes, rather than any communication that refers to financial benefits of education. This can be used effectively to prime new parents who are joining the school, and to reinforce the educational benefits with existing parents.

Reference points are an important consideration in parents' readiness to pay school fees. The presence of a minimum payment threshold requires even fee exempted parents to pay a nominal fee which is normally about 10% of the school fees and reduces the level of free-riding in school A and was under consideration in School B in the year following this research. The presence of significant levels of free-riding at school B, is surprising given the fee payment propensity ratio discussed in section 7 of this paper. However, it is known that in School B, many parents apply for full fees exemption because the children are receiving a SASSA grant, and in addition there are large numbers of parents who don't pay fees and also do not apply for an exemption. School management are obliged to remind parents of their right to apply for a fee exemption if they cannot afford the fees and if the household is supported by a SASSA grant. School B communicates the reminder for parents to apply for fees exemption at the annual budget meeting, as well as via text messaging to all parents during the school term. It is responsibility of school management and the SGB to ensure that every parent complies with the Schools Act and has written approval of fee exemption granted by the SGB. In contrast, School A remind parents in the annual school fees budget meeting and reinforces it in the school letter, of their right to apply for fee exemption. There is also a written notice at the school fees office, to ensure that parents are aware of this.

The findings in this paper suggests that a change in the text-messaging strategy be considered for each parent fee payment behaviour type. The recommendations for School A and School B, are summarised Table 12.1 and Table 12.2 below.

Table 12.1: School A – Summary Text-framing and Messaging Outcomes

School A: Summary Text-framing and Messaging Outcomes	
Typology	**Overarching Recommended Text-Messaging Approach**
Defectors	Monthly Reminder message only
Cooperators	Monthly affective-framed message alternating with finance-framed message.
^^Cooperators (without debit orders)	Monthly affective-framed message message.

Table 12.2: School B – Summary Text-framing and Messaging outcomes

School B: Summary Text-framing and Messaging Outcomes	
Typology	**Overarching Recommended Text-Messaging Approach**
Defectors	Monthly Reminder message only
Cooperators	Send a monthly affective-framed message

What the above says is that the school text messaging strategy needs to be adapted to the prevailing environment. This means that in a cooperative fee-paying school, that Defectors receive a reminder message, and that cooperators are sent an affective or finance-framed message. In a school where cooperation is low, and significant levels of free-riding is the norm, send just a reminder message on a monthly basis, to ensure that parents are reminded of their responsibility to pay. An improvement in cooperation is only likely once all parents realise that their collective efforts of non-payment is negatively impacting the school services and hence the development of their children. The challenge is, that reversing the defection tipping point will require much more than text messaging to rebuild collective parent cooperation within the school.

10. Conclusion

This paper focuses on the important governing dynamics that inform the decision of parents to pay or not to pay school fees and ensure that the educational institution remains financially sustainable. In South Africa, the introduction of Section 21 schools, created a fee-payment social dilemma because it gave every parent the right to apply for a fee exemption if they cannot afford the school fees. The dilemma is created because the government does not re-imburse the school for this lost income. The government expects existing fee-paying parents to pay the shortfalls, created by the granting of a fee exemption. It means that the more parents apply for a fee exemption, the closer the financial equilibrium of the school shifts towards a tipping point. Over time, this leads to financial failure of the school and in these instances, the government has converted these schools to non-fee-paying schools.

This paper shows that text messaging can be effective and evokes a positive fee payment response, but it can also make things worse, so we need to be careful. The findings show improved fee payment cooperation if a behaviourally framed message (i.e. affective or financial) is sent to parents who already consistently pay their school fees (Cooperators). However, sending a behaviourally framed message to parents that are not paying their school fees consistently (Defectors), evokes a negative response resulting in these parents paying less of the school fees than if they received just a reminder message or no message. In this case, a monthly reminder to parents is possibly a more effective response. The paper also confirmed that Cooperators pay a higher proportion of their school fees compared to Defectors, and the level of defection is strongly influenced by the existing number of parents that are free-riding i.e. paying little or no school fees.

Making it easy for parents to pay, is also an important outcome, as shown by the effects of debit orders on the no. of payments made. In a school where payments are small, alternative payment methods like

mobile money in Benin (Adida et al, 2018) or use of M-Pesa to pay school fees in Kenya (Hughes et al, 2012) can be considered and could make it as easy as buying pay-as-you go airtime.

Text messaging to communicate cooperative fee payment behaviour shows promise as a low-cost mechanism that can be used by schools towards sustaining the financial robustness of existing Section 21 schools. Going forward, its efficacy can be tested by experimenting with different messages that can connect with the fee-paying preferences of Defectors and possibly help to improve the financial situation in schools that have already passed through the tipping point.

References

Adida, C., Bouko, A., Verink, A. Chockalingam, G. Burney, J., (2012). *Pilot of a mobile money school fee payment system in rural Benin*

Andersen, S. C., & Nielsen, H., (2016). Reading intervention with a growth mindset approach improves children's skills. *Proceedings of the National Academy of Sciences of the United States of America*, 113(43), pp.12111–12113.

Ariely, D. (2009). The end of rational economics. *Harvard Business Review,* 87(7-8), pp. 78-84.

Axelrod, R. and Hamilton, W. (1981). Evolution of Cooperation, Science, New Series, Vol. 211, No. 4489, pp.1390-1396.

Banerjee, A. and Duflo, E. (2011). Why Aren't Children Learning. *Development Outreach*, 13(1), pp.36-44.

Banerjee, A. and Duflo, E. (2012). *Poor Economics: A Radical Rethinking of the Way to Fight Global Poverty*. 1st ed. New York: Public Affairs, pp.1-320.

Bell, L. (2002). *Strategic Planning and School Management: full of sound and fury, signifying nothing,* Centre for Educational Leadership and Management, School of Education, University of Leicester.

Bergman, P. and Rogers, T. (2017). The impact of defaults on technology adoption, and its underappreciation by policymakers. HKS Faculty Research Paper Working Paper Series RWP17-021.

Bergman, P., Edmond-Verley, C. and Notario-Risk, N., (2018). Parent skills and information asymmetries: Experimental evidence from home visits and text messages in middle and high schools. *Economics of Education Review*, 66(1), pp.92-301.

Bertrand, M., Mullainathan, S. and Shafir, E., (2006). Behavioural Economics and Marketing in Aid of Decision Making Among the Poor. *Journal of Public Policy and Marketing*, 25(1), pp.8-23.

Chaudhuri, A., (2008). *Experiments in Economics – Playing Fair with Money*. 1st ed. Abingdon: Routledge, pp.1-249.

Coleman, A., (2006). Thomas C. Schelling's psychological decision theory: Introduction to a special issue. *Journal of Economic Psychology*, 27(5), pp.603-608.

Meghir, C. and Rivkin, S., (2011). Econometric Methods for Research in Education. *Handbook of the Economics of Education*, 3(1), pp.1-87.

Daminger, A., Hayes, J., Barrows, A. and Wright, J., (2015). *Poverty Interrupted Applying Behavioral Science to the Context of Chronic Scarcity*. Available at: http://www.ideas42.org/wp-content/uploads/2015/05/I42_PovertyWhitePaper_Digital_FINAL-1.pdf

Dawes, R. M. (1980). *Social dilemmas*. Annual Review of Psychology, 31, 169–193.

De Meza, D., Irlenbusch, B., Reyniers, D. (2008). *Financial Capability: A Behavioural Economics Perspective*. Financial Conduct Authority. Available at: https://www.fca.org.uk/publication/research/fsa-crpr69.pdf

Dubofsky, D, and Sussman, L. (2009). The Changing Role of the Financial Planner Part 1: From Financial Analytics to Coaching and Life Planning. *Journal of Financial Planning*, 22(8), pp.48-57.

Dubofsky, D, and Sussman, L. (2009). The Changing Role of the Financial Planner Part 2: Prescriptions for Coaching and Life Planning. *Journal of Financial Planning*, 22(9), pp. 1-50.

Easterly, W., (2001). *The Elusive Quest for Growth Economists' Adventures and Misadventures in the Tropics*. 1st ed. Cambridge, Massachusetts, London, England: The MIT Press, pp.1-333.

Esarey, J., (2010). *A Formal Test of Substantive Significance*. [online] Experimental Economics Center - Georgia State University. Available at: https://excen.gsu.edu/docs/Justin%20Esarey.pdf [Accessed 8 March 2021].

Escueta, M., Quan, V., Joshua Andre, J., Oreopoulos, NP, (2001), *Education technology: an evidence-*

based review , Working Paper 23744 http://www.nber.org/papers/w23744 National Bureau of Economic research

Fallow, S., (2016). *Financial Behaviors & Wealth Potential*. [online] DataPoints. Available at:https://www.datapoints.com/2016/02/16/financial-behaviors-wealth-potential/ [Accessed 8 March 2021].

Fehr, E. and Fischbacher, U., (2004). Third-party punishment and social norms. *Evolution and Human Behavior*, 25(2), pp.63-87.

Fehr, E. and Gachter, U., (2000). Cooperation and Punishment in Public Goods Experiments. *The American Economic Review*, Vol. 90, No. 4 , pp. 980-994.

Frederick, S., Loewenstein, G. and O'Donoghue, T., (2002). Time Discounting and Time Preference: A Critical Review. *Journal of Economic Literature*, 40(2), pp.351-401.

Gneezy, U., Meier, S., Rey-Biel, P., (2011) When and Why Incentives (Don't) Work to Modify Behaviour, *Journal of Economic Perspectives*, 25(4), pp. 191-210

Governing Body Foundation (GBF), (2015), Undercurrents, August Edition, www.gbf.co.za

Harris, A. and Goodall, J., (2007). Engaging Parents in Raising Achievement Do Parents Know They Matter? Research Report DCSF-RW004, University of Warwick

Heckman, J.J (2000), Policies to Foster Human Capital. *Research in Economics*, 54(1), pp. 3-56.

Hilbe, C., Wu, B., Traulsen, A. and Nowak, M., (2014). Cooperation and control in multiplayer social dilemmas, *National Academy of Sciences*, 111(46), pp. 16425–30.

Hughes, N., Ivatury, G., Petrides, J., Rutherford, S. , (2012), Liquidity and Savings in the Age of M-PESA Innovations Case Narrative

Isaac, R.M., Walker, A.M., and Thomas, A.W. (1994), Group size and the voluntary provision of Public Goods, Journal of Public Economics, 54(1), pp. 1-36

Kagel, J.H. and Roth, A.E. (1995), The Handbook of Experimental Economics, Princeton University Press, Princeton, New Jersey

Kahneman, D. (2003), Maps of Bounded Rationality: A Perspective of Intuitive Judgement and Choice. *The American Economic Review, 93(5)*, pp. 1449-1475

Kahneman, D., Tversky, A. (1979). Prospect Theory: An Analysis of Decision under Risk, Econometrica, 47(2), pp. 263-292

Kahneman, D., (2011). *Thinking, Fast and Slow*. 1st ed. New York: Farrar, Straus and Giroux, pp.1-499.

Karlan, D. (2005), Using Experimental Economics to Measure Social Capital and Predict Financial Decisions, *The American Economic Review,* 95(5), pp. 1688-1699

Koch, A., Nafziger, J., Nielsen H.S. (2015), Behavioural Economics of Education, *Journal of Economic Behaviour & Organisation*, 115(1), pp. 3-17.

Kraft M.A., and Rogers, T. (2015),The Underutilized Potential of Teacher-to-Parent Communication: Evidence from a Field Experiment, *Economics of Education Review*, 47(1), pp. 50-63.

LeBoeuf, R. A., and Shafir, E. (2003), Deep thoughts and shallow frames: On the Susceptibility to Framing Effects, *Journal of Behavioural Decision Making*, 16(2), 77–92.

Ledyard, J., (1995). *The Handbook of Experimental Economics*. 1st ed. Princeton: Princeton University Press, pp.111-194.

Locke, A. and Latham, G. (2006). New Directions in Goal-Setting Theory. *Current Directions in Psychological Science*, 15(5), pp.265-268.

Mayer, S., Kalil, A., Gallegos, S.,(2015), *Using Behavioural Insights to Increase Parental Engagement: The Parents and Children Together (PACT) Intervention,* Working Paper 21602, National Bureau of Economic Research

Mincer, J. (1958). Investment in Human Capital and Personal Income Distribution. *Journal of Political Economy*, 66(4), pp. 281–302.

Mullainathan, S. and Shafir, E. (2014). *Scarcity: The True Cost of Not Having Enough*. 1st ed. London: Penguin Books, pp.1-304.

Mullainathan, S. (2004), Psychological and Development Economics

Nguyen, T. (2008), Information. Role Models and Perceived Returns to Education: Experimental Evidence from Madagascar

Psacharopoulos, G., and Patrinos, H. (2004). Returns to investment in education: a further update. *Education Economics*, 12(2), pp.111-134

Rabin, M. (1993). Incorporating Fairness in Game Theory and Economics, *The American Economic Review,* 83(5), pp. 1281-1302.

Rizvi, F. and Lingard, B. (2010). *Globalizing Education Policy*. 1st ed. Abingdon: Routledge, pp.1-240.

Rubinstein, A. (1998). *Modeling Bounded Rationality*. 1st ed. Cambridge: MIT Press, pp.1-208.

Spencer, N., Nieboer, J. and Elliot, A.(2015). *Wired for Imprudence, Behavioural hurdles to financial capability and challenges for financial education*. RSA. Available at: https://www.thersa.org/globalassets/pdfs/reports/rsa_wired_for_imprudence.pdf

Samson, A., (2015). *The Behavioral Economics Guide 2015 (with an introduction by Dan Ariely)*. [online] Behavioral Economics. Available at: http://www.behavioraleconomics.com/wp-content/uploads/delightful-downloads/2015/06/BEGuide2015.pdf

Schelling, T. (1971), Dynamic Models of Segregation, *Journal of Mathematical Sociology*, 1(2), pp. 143-186.

Scheunpflug, A. and Asbrand, B. (2006). Global education and education for sustainability, *Environmental Education Research*, 12(1), pp. 33-46.

Schoar, A. and Tantia, P. (2014). *The Financial Health Check, A Behavioral Approach to Financial Coaching*. New America. Available at: https://static.newamerica.org/attachments/1673-the-financial-health-check/The_Financial_Health_Check.pdf

Schwarz, N., Bless, H., Strack, F., Klumpp, G., Rittenauer-Schatka, H., & Simons, A., (1991). Ease of Retrieval as Information – Another Look at the Availability Heuristic, *Journal of Personality and Social Psychology,* 61(2), 195–202.

Clancy, M., Orszag, P., & Sherraden, M. (2004). College savings plans: A platform for inclusive saving policy? (CSD Perspective 04-25). St. Louis, MO: Washington University, Center for Social Development.

Taylor, N., Muller, J. and Vinjevold, P. (2003). *Getting schools working: Research and systemic school reform in South Africa*. 1st ed. Cape Town: Pearson, p.1-151.

Thaler, R. and Sunstein, C. (2009). *Nudge: Improving Decisions About Health, Wealth, and Happiness Paperback*. 1st ed. Cape Town: Penguin Books, pp.1-312.

Tversky, A., and Shafir, E. (1992), Choice under conflict: The dynamics of deferred decision.

Psychological Science, 3(6), 358-361

Zak, P. (2006). *The Neuroeconomics of Trust*. [online] Digital Commons. Available at:

https://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1008&context=politicalsciencehen

dricks

Ziliak, S. and McCloskey, D. (2009) *The Cult of Statistical Significance*. Roosevelt University and

University of Illinois-Chicago. Available at: https://www.deirdremccloskey.com/docs/jsm.pdf

Appendix 1: School A – Detailed SMS Text Messages

		School A: SMS Text Messages sent between May and October 2018		
Month	**Household Typology**	**Control**	**Treatment 1**	**Treatment 2**
May & Aug	**Defectors**	Fee Reminder May 2018, School A Message:Thank you for paying Monthly school fees which are due by 31May2018.	School A Message:Education 1st-Together, restoring our children's Hope and Optimism for a brighter future. Monthly school fees of Rxxxx due by 31May2018. Thank you.	School A Message:Education 1st-Closing the gap to a brighter Financial Future for our children. Monthly school fees of Rxxxx due by 31May2018. Thank you.
	Cooperators	School A Message:Thank you for paying Monthly school fees which are due by 31May2018.	School A Message:Education 1st-Together, restoring our children's Hope and Optimism for a brighter future. Monthly school fees due by 31May2018. Thank You.	School A Message:Education 1st-Closing the gap to a brighter Financial Future for our children. Monthly school fees due by 31May2018. Thank You.
	Rebators	School A Message:Thank you for paying Monthly school fees which are due by 31May2018.	School A Message:Education 1st-Together, restoring our children's Hope and Optimism for a brighter future. Agreed school fees due by 31May2018. Thank You.	School A Message:Education 1st-Closing the gap to a brighter Financial Future for our children. Agreed school fees due by 31May2018. Thank You.
	Mid-Month	School A Message:Thank you for your commitment to pay school fees.	School A Message:Education 1st-Thank you for your commitment to pay school fees. Together we are restoring our children's Hope and Optimism for a brighter future.	School A Message:Education 1st-Thank you for your commitment to pay school fees. Together we are closing the gap to a brighter Financial Future for our children.
Jun & Sept	**Defectors**	Fee Reminder June 2018, School A Message:Thank you for paying Monthly school fees which are due by 30June2018.	School A Message:Education 1st-Our choice to sustain Excellence in our School. Monthly school fees of Rxxxx due by 30Jun2018. Thank you.	School A Message:Education 1st-The Best Investment Return is a quality education for our children. Monthly school fees of Rxxxx due by 30Jun2018. Thank you.
	Cooperators	Fee Reminder June 2018, School A Message:Thank you for paying Monthly school fees which are due by 30June2018.	School A Message:Education 1st-Our choice to sustain Excellence in our School. Monthly school fees due by 30Jun2018. Thank You.	School A Message:Education 1st-The Best Investment Return is a quality education for our children. Monthly school fees due by 30Jun2018. Thank You.
	Rebators	Fee Reminder June 2018, School A Message:Thank you for paying Monthly school fees which are due by 30June2018.	School A Message:Education 1st-Our choice to sustain Excellence in our School. Agreed school fees due by 31May2018. Thank You.	School A Message:Education 1st-The Best Investment Return is a quality education for our children. Agreed school fees due by 30Jun2018. Thank You.
	Mid-Month	School A Message:Thank you for your commitment to pay school fees.	School A Message:Education 1st-Thank you for your commitment to pay school fees. Together we are choosing to sustain excellence in our School.	School A Message:Education 1st-Thank you for your commitment to pay school fees. Together we achieve the Best Investment Return in a quality education for our children.
Jul & Oct	**Defectors**	Fee Reminder July 2018, School A Message:Thank you for paying Monthly school fees which are due by 31July2018.	School A Message:Education 1st-Collectively, appreciating our childrens' growth and learning opportunities. Monthly school fees of Rxxxx due by 31July2018. Thank you.	School A Message:Education 1st-Don't lose the opportunity to unlock our children's Wealth Potential. Monthly school fees of Rxxxx due by 31July2018. Thank you.
	Cooperators	Fee Reminder July 2018, School A Message:Thank you for paying Monthly school fees which are due by 31July2018.	School A Message:Education 1st-Collectively, appreciating our childrens' growth and learning opportunities. Monthly school fees due by 31July2018. Thank You.	School A Message:Education 1st-Don't lose the opportunity to unlock our children's Wealth Potential. Monthly school fees due by 31July2018. Thank You.
	Rebators	Fee Reminder July 2018, School A Message:Thank you for paying Monthly school fees which are due by 31July2018.	School A Message:Education 1st-Collectively, appreciating our childrens' growth and learning opportunities. Agreed school fees due by 31July2018. Thank You.	School A Message:Education 1st-Don't lose the opportunity to unlock our children's Wealth Potential. Agreed school fees due by 31July2018. Thank You.
	Mid-Month	School A Message:Thank you for your commitment to pay school fees.	School A Message:Education 1st-Thank you for your commitment to pay school fees. Collectively, we appreciate our childrens' growth and learning opportunities	School A Message:Education 1st-Thank you for your commitment to pay school fees. Let us not lose the opportunity to unlock our children's Wealth Potential.

Appendix 2: School B - Detailed SMS Text Messages

Month	Household Typology	Control	Treatment 1	Treatment 2
School B: SMS Text Messages sent between June and November 2018				
Jun & Sept	**Defectors "Education 1st"**	No Message	School B Message:Education 1st-Together, restore our children's Hope and Optimism for a brighter future. Pay monthly school fees of Rxxx at the office by 22Jun2018.	School B Message:Education 1st-Closing the gap to a brighter Financial Future for our children. Pay monthly school fees of Rxxx at the office by 22Jun2018.
	Defectors "#FeesFirst"	No Message	School B Message: #FeesFirst-Together, restore our children's Hope and Optimism for a brighter future. Pay monthly school fees of Rxxx at the office by 22Jun2018.	School B Message:#FeesFirst-Closing the gap to a brighter Financial Future for our children. Pay monthly school fees of Rxxx at the office by 22Jun2018.
	Cooperators	No Message	School B Message:Education 1st-Together, restore our children's Hope and Optimism for a brighter future. Pay monthly school fees of Rxxx at the office by 22Jun2018.	School B Message:Education 1st-Closing the gap to a brighter Financial Future for our children. Pay monthly school fees of Rxxx at the office by 22Jun2018.
	Rebators	No Message	School B Message:Education 1st-Together, restore our children's Hope and Optimism for a brighter future. Pay agreed school fees at the office by 22Jun2018.	School B Message:Education 1st-Closing the gap to a brighter Financial Future for our children. Pay agreed school fees at the office by 22Jun2018.
	Mid-Month	No Message	School B Message:Education 1st -Thank you for your commitment to pay school fees. Together we are restoring our children's Hope and Optimism for a brighter future.	School B Message:Education 1st-Thank you for your commitment to pay school fees. Together we are closing the gap to a brighter Financial Future for our children.
Jul & Oct	**Defectors "Education 1st"**	No Message	School B Message:Education 1st-Our choice to sustain Excellence in our School. Pay monthly school fees of Rxxx at the office by 31Jul2018.	School B Message:Education 1st-The Best Investment Return is a quality education for our children. Pay monthly school fees of Rxxx at the office by 31Jul2018.
	Defectors "#FeesFirst"	No Message	School B Message: #FeesFirst-Our choice to sustain Excellence in our School. Pay monthly school fees of Rxxx at the office by 31Jul2018.	School B Message:#FeesFirst-The Best Investment Return is a quality education for our children. Pay monthly school fees of Rxxx at the office by 31Jul18.
	Cooperators	No Message	School B Message:Education 1st-Our choice to sustain Excellence in our School. Pay monthly school fees at the office by 31Jul2018.	School B Message:Education 1st-The Best Investment Return is a quality education for our children. Pay monthly school fees of Rxxx at the office by 31Jul2018.
	Rebators	No Message	School B Message:Education 1st-Our choice to sustain Excellence in our School. Pay agreed monthly school fees at the office by 31Jul2018.	School B Message:Education 1st-Closing the gap to a brighter Financial Future for our children. Pay agreed school fees at the office by 22Jun2018.
	Mid-Month	No Message	School B Message:Education 1st-Thank you for your commitment to pay school fees. Together we are choosing to sustain excellence in our School.	School B Message:Education 1st-Thank you for your commitment to pay school fees.Together we achieve the Best Investment Return & quality education for our children.
Aug & Nov	**Defectors "Education 1st"**	No Message	School B Message:Education 1st-Collectively, appreciate our children's growth and learning opportunities. Pay monthly school fees of Rxxx at the office by 31Aug18.	School B Message:Education 1st-Don't lose the opportunity to unlock our children's Wealth Potential. Pay monthly school fees of Rxxx at the office by 31Aug18.
	Defectors "#FeesFirst"	No Message	School B Message: #FeesFirst-Collectively, appreciate our children's growth and learning opportunities. Pay monthly school fees of Rxxx at the office by 31Aug18.	School B Message:#FeesFirst-Don't lose the opportunity to unlock our children's Wealth Potential. Pay monthly school fees of Rxxx at the office by 31Aug18.
	Cooperators	No Message	School B Message:Education 1st-Collectively, appreciate our children's growth and learning opportunities. Pay monthly school fees at the office by 31Aug18.	School B Message:Education 1st-Don't lose the opportunity to unlock our children's Wealth Potential. Pay monthly school fees of Rxxx at the office by 31Aug18.
	Rebators	No Message	School B Message:Education 1st-Collectively, appreciate our children's growth and learning opportunities. Pay agreed monthly school fees at the office by 31Aug18.	School B Message:Education 1st-Don't lose the opportunity to unlock our children's Wealth Potential. Pay agreed school fees at the office by 31Aug18.
	Mid-Month	No Message	School B Message:Education 1st-Thank you for your commitment to pay school fees. Collectively, we appreciate our childrens' growth and learning opportunities.	School B Message:Education 1st-Thank you for your commitment to pay school fees. Let us not lose the opportunity to unlock our children's Wealth Potential.

Appendix 3: School A - Derived Household Income per Capita Data by Suburb

Household Income (per month)	School A (Suburb X)	
	%	Rand
No Income	7,3	0
R1 - R1600	3,3	53
R1601 - R3200	4,3	138
R3201 - R6400	9,3	595
R6401 - R12800	13,8	1766
R12800 - R25600	21,1	5402
R25601 - R51200	21,7	11110
R51201 - R102400	13,7	14029
R102401 - R204800 or more	5,5	11264
Cummulative	100	44357
Average Household Size	2,34	
Monthly Household Income per Capita (Rands/month)	18956	

Source: Census 2011 for Cape Town – Income Dynamics and Poverty Status of Households in South Africa, Statistics South Africa 2015

Appendix 4: School B - Derived Household Income per Capita Data by Suburb

Sample of Monthly Household Income per Capita by Suburb		
Household Income (per month)	School B (Suburb Y)	
	%	Rand
No Income	12,8	0
R1 - R1600	13,1	210
R1601 - R3200	13,8	442
R3201 - R6400	15,4	986
R6401 - R12800	15,7	2010
R12800 - R25600	15,6	3994
R25601 - R51200	10,1	5171
R51201 - R102400	2,7	2765
R102401 - R204800 or more	0,7	1434
Cummulative	100	17010
Average Household Size	3,85	
Monthly Household Income per Capita (Rands/month)	4418	

Source: Census 2011 for Cape Town – Income Dynamics and Poverty Status of Households in South Africa, Statistics South Africa 2015

Appendix 5: Statistical Outcomes for School A - Variable 1= Mean Annual Fees Paid

School A				Mean (Standard Deviation)									T-Stat (% Difference in Mean between treatment groups)				P-Value			
No.	Typology	Outcome Variable	n	All	Control	Pooled Treatment	T-Stat TP vs C	Treatment 1	T-Stat T1 vs C	Treatment 2	T-Stat T2 vs C	T-Stat T2 vs T1	TPooled vs Control	Treat1 vs Control	Treat2 vs Control	Treat2 vs Treat1	TPooled vs Control	Treat1 vs Control	Treat2 vs Control	Treat1 vs Treat2
1	Combined (Defectors + Cooperators)	Mean Annual Fees Paid (Rands)	367	39 815 (9357)	40 679 (7021)	39 374 (10333)		39 026 (10498)	*	39 725 (10196)			1.425 -3,2%	1,45 -4,1%	.850 -2,3%	-0,53 1,8%	0,15	0,14	0,40	0,60
		Mean Annual Fees paid as a *proportion* of total annual fees (%)		93,0%	95,0%	92,0%		91,1%	Δ	92,8%			1.425 -3,0%	1,45 -3,9%	.850 -2,2%	-0,53 1,7%	0,15	0,14	0,40	0,60
1.1	Defectors	Mean Annual Fees Paid (Rands)	85	30 529 (16082)	33 771 (13122)	29 254 (17036)		27 992 (16545)		30 558 (17716)			1,31 -13,4%	1.444 -17,1%	.765 -9,5%	-0,58 9,2%	0,20	0,15	0,45	0,56
		Mean Annual Fees paid as a *proportion* of total annual fees (%)		71,3%	78,9%	68,3%		65,4%		71,4%			1,31 -10,6%	1.444 -13,5%	.765 -7,5%	-0,58 6,0%	0,20	0,15	0,45	0,56
1.2	Cooperators	Mean Annual Fees Paid (Rands)	282	42 614 (1668)	42 336 (2629)	42 766 (689)	*	42 785 (2629)	*	42 747 (491)	*		-1,60* 1,0%	-1,61* 1,1%	-1,53* 1,0%	0,38 -0,1%	0,11	0,11	0,13	0,71
		Mean Annual Fees paid as a *proportion* of total annual fees (%)		99,5%	98,9%	99,9%	Δ	100,0%	Δ	99,9%	Δ		-1,60* 1,0%	-1,61* 1,1%	-1,53* 1,0%	0,38 -0,1%	0,11	0,11	0,13	0,71
1.3	^^Cooperators (excluding debit orders)	Mean Annual Fees Paid (Rands)	137	42 448 (2358)	41 799 (3967)	42 735 (955)	*	42 775 (1110)	*	42 685 (723)			-1,51* 2,2%	-1,54** 2,3%	-1,42 2,1%	0,47 -0,2%	0,14	0,13	0,16	0,64
		Mean Annual Fees paid as a *proportion* of total annual fees (%)		99,2%	97,7%	99,9%	Δ	99,9%	Δ	99,7%			-1,51* 2,2%	-1,54** 2,3%	-1,42 2,1%	0,47 -0,2%	0,14	0,13	0,16	0,64

Note: Primary statistic is sample Mean, standard deviation is in parentheses for All, Control, Pooled Treatment, Treatment 1 and Treatment 2.
Results of T-tests of Mean Fees Paid- Treatment versus Control: * * * * p<0.01, * * * p<0.05, * * p<0.1, * p<0.15
Results of T-tests of Mean Fees Paid as proprotion of Outstanding Fees - Treatment versus Control: Δ Δ Δ Δ p<0.01, Δ Δ Δ p<0.05, Δ Δ p<0.1, Δ p<0.15

Appendix 6: Statistical Outcomes for School A - Variable 2= Mean Cumulative Fees Paid

School A				Mean (Standard Deviation)									T-Stat (% Difference in Mean between treatment groups)				P-Value			
No.	Typology	Outcome Variable	n	All	Control	Pooled Treatment	T-Stat TP vs C	Treatment 1	T-Stat T1 vs C	Treatment 2	T-Stat T2 vs C	T-Stat T2 vs T1	TPooled vs Control	Treat1 vs Control	Treat2 vs Control	Treat2 vs Treat1	TPooled vs Control	Treat1 vs Control	Treat2 vs Control	Treat1 vs Treat2
1	Combined (Defectors + Cooperators)	Mean Cumulative Fees Paid during messaging period (Rands)	367	24 062 (6760)	24 045 (5351)	24 071 (7386)		23 634 (7070)		24 511 (7696)			-0.04 0.1%	0.51 -1.7%	-0.55 1.9%	-0.92 3.7%	0.97	0.61	0.58	0.36
		Mean Cumulative Fees paid as a *proportion* of outstanding fees before messaging started (%)		92.0%	93.6%	91.2%		90.2%		92.1%			1.01 -2.4%	1.14 -3.4%	0.52 -1.5%	-0.58 1.9%	0.31	0.25	0.61	0.56
1.1	Defectors	Mean Cumulative Fees Paid during messaging period (Rands)	85	22 281 (13185)	23 337 (10035)	21 866 (14288)		20 324 (13297)		23 460 (15306)			0.54 -6.3%	0.96 -12.9%	-0.04 0.5%	-0.85 15.4%	0.59	0.34	0.97	0.40
		Mean Cumulative Fees paid as a *proportion* of outstanding fees before messaging started (%)		68.4%	76.0%	65.4%		61.8%	Δ	69.1%			1.25 -10.6%	1.46 -14.2%	0.67 -6.9%	-0.58 7.3%	0.22	0.15	0.50	0.56
1.2	Cooperators	Mean Cumulative Fees Paid during messaging period (Rands)	282	24 599 (2511)	24 214 (3467)	24 810 (1756)	*	24 762 (1789)		24 858 (1730)	*		-1.60* 2.5%	-1.39 2.3%	-1.64* 2.7%	-0.37 0.4%	0.11	0.17	0.10	0.71
		Mean Cumulative Fees paid as a *proportion* of outstanding fees before messaging started (%)		99.1%	97.9%	99.8%	Δ	99.9%	Δ	99.7%	Δ		-1.55 1.9%	-1.59 2.0%	-1.48 1.8%	0.47 -0.2%	0.12	0.12	0.14	0.64
1.3	^^Cooperators	Mean Cumulative Fees Paid during messaging period (Rands)	137	24 353 (3139)	23 459 (4880)	24 748 (1832)	*	24 841 (1767)	**	24 630 (1926)			-1.66* 5.5%	-1.74* 5.9%	-1.45 5.0%	0.55 -0.8%	0.10	0.09	0.15	0.58
		Mean Cumulative Fees paid as a *proportion* of outstanding fees before messaging started (%)		98.4%	99.4%	99.7%	Δ	99.9%	Δ	99.5%			-1.47 0.3%	-1.52 0.5%	-1.39 0.1%	0.56 -0.4%	0.15	0.14	0.17	0.58

Note: Primary statistic is sample Mean, standard deviation is in parentheses for All, Control, Pooled Treatment, Treatment 1 and Treatment 2.
Results of T-tests - Outcome Variable Treatment versus Control: * * * * p<0.01, * * * p<0.05, * * p<0.1, * p<0.15
Results of T-tests - Proportions Treatment versus Control: Δ Δ Δ Δ p<0.01, Δ Δ Δ p<0.05, Δ Δ p<0.1, Δ p<0.15
Results of T-tests - Outcome variable Treatment 2 versus Treatment 1: § § § § p<0.01, § § § p<0.05, § § p<0.1, §p<0.15

Appendix 7: Statistical Outcomes for School A - Variable 3 = Mean Cumulative No. of Monthly Fee Payments during messaging period

	School A			Mean (Standard Deviation)										T-Stat (% Difference in Mean between treatment groups)				P-Value			
No.	Typology	Outcome Variable	n	All	Control	Pooled Treatment	T-Stat TP vs C	Treatment 1	T-Stat T1 vs C	Treatment 2	T-Stat T2 vs C	T-Stat T2 vs T1	TPooled vs Control	Treat1 vs Control	Treat2 vs Control	Treat2 vs Treat1	TPooled vs Control	Treat1 vs Control	Treat2 vs Control	Treat1 vs Treat2
2	Combined (Defectors + Cooperators)	Mean cumulative no. of monthly fee payments during the messaging period	367	4.87 (1.61)	4.87 (1.53)	4.87 (1.65)		4.77 (1.68)		4.98 (1.62)			-0.03 / 0.0%	0.49 / -2.1%	-0.56 / 2.3%	-1.04 / 4.4%	0.97	0.63	0.58	0.30
		Mean cumulative no. of monthly fee payments as a proportion of expected total payments during the messaging period (%)		81.2%	81.2%	81.2%		79.5%		83.1%			-0.03 / 0.0%	0.49 / -1.7%	-0.56 / 1.9%	-1.04 / 3.6%	0.97	0.63	0.58	0.30
2.1	Defectors	Mean cumulative no. of monthly fee payments during the messaging period	85	3.52 (2.18)	3.70 (1.98)	3.45 (2.26)		3.16 (2.19)		3.76 (2.34)			0.49 / -6.8%	0.96 / -14.6%	-0.09 / 1.6%	-1.04 / 19.0%	0.61	0.33	0.92	0.30
		Mean cumulative no. of monthly fee payments as a proportion of expected total payments during the messaging period (%)		58.8%	61.8%	57.6%		52.6%		62.7%			0.49 / -4.2%	0.96 / -9.2%	-0.09 / 0.9%	-1.04 / 10.1%	0.61	0.33	0.92	0.30
2.2	Cooperators	Mean cumulative no. of monthly fee payments during the messaging period	282	5.28 (1.11)	5.15 (1.25)	5.35 (1.03)	0.33	5.31 (1.02)		5.38 (1.04)			-1.37 / 3.9%	-1.02 / 3.1%	-1.40 / 4.5%	-0.43 / 1.3%	0.17	0.30	0.16	0.66
		Mean cumulative no. of monthly fee payments as a proportion of expected total payments during the messaging period (%)		88.0%	85.8%	89.1%		88.6%		89.7%			-1.37 / 3.3%	-1.02 / 2.8%	-1.40 / 3.9%	-0.43 / 1.1%	0.17	0.30	0.16	0.66
2.3	^^Cooperators	Mean cumulative no. of monthly fee payments during the messaging period	137	4.98 (1.26)	4.69 (1.47)	5.11 (1.13)	*	5.18 (1.07)	**	5.02 (1.21)			-1.66 / 9.0%	-1.83 / 10.4%	-1.13 / 7.0%	0.69 / -3.1%	0.10	0.07	0.26	0.49
		Mean cumulative no. of monthly fee payments as a proportion of expected total payments during the messaging period (%)		83.1%	78.2%	85.3%	Δ	86.5%	Δ Δ	83.7%			-1.66 / 7.1%	-1.83 / 8.3%	-1.13 / 5.6%	0.69 / -2.7%	0.10	0.07	0.26	0.49

Note: Primary statistic is sample Mean, standard deviation is in parentheses for All, Control, Pooled Treatment, Treatment 1 and Treatment 2.
Results of T-tests - Outcome Variable Treatment versus Control: * * * * p<0.01, * * * p<0.05, * * p<0.1, * p<0.15
Results of T-tests - Proportions Treatment versus Control: Δ Δ Δ Δ p<0.01, Δ Δ Δ p<0.05, Δ Δ p<0.1, Δ p<0.15
Results of T-tests - Outcome variable Treatment 2 versus Treatment 1: § § § § p<0.01, § § § p<0.05, § § p<0.1, §p<0.15

Appendix 8: Statistical Outcomes for School A - Variable 4 = Mean Fee Payment in 1st month after messaging started

	School A			Mean (Standard Deviation)										T-Stat (% Difference in Mean between treatment groups)				P-Value			
No.	Typology	Outcome Variable	n	All	Control	Pooled Treatment	T-Stat TP vs C	Treatment 1	T-Stat T1 vs C	Treatment 2	T-Stat T2 vs C	T-Stat T2 vs T1	TPooled vs Control	Treat1 vs Control	Treat2 vs Control	Treat2 vs Treat1	TPooled vs Control	Treat1 vs Control	Treat2 vs Control	Treat1 vs Treat2
3	Combined (Defectors + Cooperators)	Fee payment in 1st month after messaging started (Rands)	367	1524 (3019)	1360 (2053)	1607 (3409)		1488 (2306)		1727 (7696)			-0.86 / 18.2%	-0.46 / 9.4%	-0.86 / 27.0%	-0.54 / 16.1%	0.39	0.65	0.39	0.59
		Proportion of fee payment in 1st month after messaging started, compared to expected monthly fee (%)		35.6%	31.7%	37.5%		34.7%		40.3%			-0.86 / 5.8%	-0.46 / 3.0%	-0.86 / 8.6%	-0.54 / 5.6%	0.39	0.65	0.39	0.59
3.1	Defectors	Fee payment in 1st month after messaging started (Rands)	85	2 362 (5041)	1 917 (2353)	2 537 (5774)		1 405 (2765)		3 706 (7635)		*	-0.70 / 32.3%	0.74 / -26.7%	-1.21 / 93.3%	-1.56 / 163.8%	0.48	0.46	0.23	0.13
		Proportion of fee payment in 1st month after messaging started, compared to expected monthly fee (%)		55.1%	44.7%	59.2%		32.8%		86.6%		§	-0.70 / 14.5%	0.74 / -11.9%	-1.21 / 41.9%	-1.56 / 53.8%	0.48	0.46	0.23	0.13
3.2	Cooperators	Fee payment in 1st month after messaging started (Rands)	282	1 271 (2000)	1 227 (1964)	1 295 (2025)		1 517 (2144)		1 074 (1884)		*	-0.28 / 5.5%	-0.97 / 23.6%	0.55 / -12.5%	1.48 / -29.2%	0.78	0.33	0.58	0.14
		Proportion of fee payment in 1st month after messaging started, compared to expected monthly fee (%)		29.7%	28.6%	30.2%		35.4%		25.1%		§	-0.28 / 1.6%	-0.97 / 6.8%	0.55 / -3.5%	1.48 / -10.3%	0.78	0.33	0.58	0.14
3.3	^^Cooperators	Fee payment in 1st month after messaging started (Rands)	137	1 969 (2190)	1 673 (2124)	2 099 (2217)		2 241 (2249)		1 920 (2189)			-1.07 / 25.5%	-1.26 / 34.0%	-0.52 / 14.8%	0.70 / -14.3%	0.29	0.21	0.60	0.49
		Proportion of fee payment in 1st month after messaging started, compared to expected monthly fee (%)		46.0%	39.1%	49.0%		52.3%		44.8%			-1.07 / 9.9%	-1.26 / 13.2%	-0.52 / 5.7%	0.70 / -7.5%	0.29	0.21	0.60	0.49

Note: Primary statistic is sample Mean, standard deviation is in parentheses for All, Control, Pooled Treatment, Treatment 1 and Treatment 2.
Results of T-tests - Outcome Variable Treatment versus Control: * * * * p<0.01, * * * p<0.05, * * p<0.1, * p<0.15
Results of T-tests - Proportions Treatment versus Control: Δ Δ Δ Δ p<0.01, Δ Δ Δ p<0.05, Δ Δ p<0.1, Δ p<0.15
Results of T-tests - Outcome variable Treatment 2 versus Treatment 1: § § § § p<0.01, § § § p<0.05, § § p<0.1, §p<0.15

Appendix 9: School A Detailed Regression Analysis Statistical Output

```
Table 1.1: School A - Proportion Annual Fees Paid
------------------------------------------------------------------------------------------------
                             (1)          (2)          (3)          (4)          (5)
                             OLS-1        OLS-2        OLS-3        Tobit-1      Tobit-2
------------------------------------------------------------------------------------------------

Pooled Treatment             -4.06*       -2.51        -18.05*      -5.95        -34.69
                             (-2.04)      (-1.45)      (-2.42)      (-0.43)      (-1.83)
Cooperator                                25.09**      11.40*       117.95**     76.32**
                                          (6.29)       (2.18)       (6.53)       (3.32)
Debit Order                               0.35         0.36         32.57        29.33
                                          (0.18)       (0.19)       (1.89)       (1.76)
TPool*Coop                                             19.50*                    61.02*
                                                       (2.58)                    (2.17)

Black                        0.00         0.00         0.00         0.00         0.00
                             (.)          (.)          (.)          (.)          (.)
Coloured                     -9.61**      -11.54       -13.83       -335.94      -338.71
                             (-3.08)      (-1.89)      (-1.93)      (-0.03)      (-0.03)
Indian                       -7.50        -8.76        -10.01       -311.06      -312.08
                             (-1.27)      (-1.14)      (-1.19)      (-0.02)      (-0.03)
Other                        -1.77        -8.51        -9.20        -288.26      -286.27
                             (-0.45)      (-1.47)      (-1.37)      (-0.02)      (-0.02)
White                        -3.50        -8.34        -9.38        -305.72      -305.39
                             (-1.35)      (-1.40)      (-1.35)      (-0.02)      (-0.02)
AFRIKAANS                    0.00         0.00         0.00         0.00         0.00
                             (.)          (.)          (.)          (.)          (.)
ENGLISH                      0.61         1.30         3.07         11.87        23.44
                             (0.13)       (0.80)       (1.24)       (0.21)       (0.44)
OTHER                        6.19         7.02         10.71        294.08       310.48
                             (0.94)       (0.71)       (0.92)       (0.02)       (0.03)
XHOSA                        -11.23       -11.81       -10.37       -361.66      -343.42
                             (-1.35)      (-1.29)      (-1.05)      (-0.03)      (-0.03)
grade=8                      0.00         0.00         0.00         0.00         0.00
                             (.)          (.)          (.)          (.)          (.)
grade=9                      -7.38*       -4.74        -3.68        -42.15*      -31.53
                             (-2.21)      (-1.61)      (-1.28)      (-2.00)      (-1.54)
grade=10                     -4.37        -5.62*       -5.65*       -22.88       -18.59
                             (-1.49)      (-2.27)      (-2.24)      (-1.03)      (-0.86)
grade=11                     -7.08*       -5.77        -6.21*       -43.66*      -38.38
                             (-2.10)      (-1.89)      (-2.09)      (-2.03)      (-1.84)
grade=12                     -8.85*       -5.00        -5.45        -7.32        -4.03
                             (-2.44)      (-1.59)      (-1.78)      (-0.36)      (-0.21)
HH Income per Capita         0.00         0.00         0.00         0.00         0.00
                             (0.88)       (0.51)       (0.22)       (1.03)       (0.82)

Constant                     104.39**     86.42**      97.98**      404.76       413.90
                             (18.16)      (13.48)      (10.91)      (0.03)       (0.03)
------------------------------------------------------------------------------------------------
Observations                 349          349          349          349          349
R-squared                    0.062        0.306        0.337
Pseudo R-squared                                                    0.175        0.182
------------------------------------------------------------------------------------------------
t statistics in parentheses
* p<0.05, ** p<0.01
```

```
Table 1.2: School A - Proportion Annual Fees Paid (OLS)
---------------------------------------------------------------------------------
                            (1)            (2)            (3)            (4)
                      FPaidYR_Prob    %FPaidYR>0    FPaidYR_Prob    %FPaidYR>0
---------------------------------------------------------------------------------
Pooled Treatment          -0.04**         0.65          -0.20**        -1.72
                         (-2.89)         (0.50)         (-3.52)        (-0.27)
Cooperator                 0.12**        15.26**        -0.02          13.30**
                          (3.29)         (5.00)         (-1.53)         (2.62)
Debit Order                0.00          -0.06           0.00          -0.05
                          (0.24)         (-0.06)         (0.26)         (-0.05)
TPool*Coop                                               0.20**         2.93
                                                        (3.50)         (0.45)

Black                      0.00           0.00           0.00           0.00
                           (.)            (.)            (.)            (.)
Coloured                  -0.07          -6.07          -0.09          -6.48
                         (-1.84)         (-1.58)        (-1.93)        (-1.56)
Indian                    -0.07          -2.22          -0.09          -2.47
                         (-1.24)         (-0.58)        (-1.35)        (-0.61)
Other                     -0.01          -7.48          -0.02          -7.59
                         (-0.36)         (-1.85)        (-0.44)        (-1.82)
White                     -0.04          -5.23          -0.05          -5.41
                         (-1.14)         (-1.39)        (-1.14)        (-1.36)
AFRIKAANS                  0.00           0.00           0.00           0.00
                           (.)            (.)            (.)            (.)
ENGLISH                   -0.01           2.29           0.01           2.54
                         (-0.43)         (0.87)         (0.46)         (0.89)
OTHER                      0.02           5.66           0.05           6.24
                          (0.22)         (1.01)         (0.65)         (1.01)
XHOSA                     -0.01         -11.21           0.01         -11.00
                         (-0.15)         (-1.49)         (0.14)        (-1.45)
grade=8                    0.00           0.00           0.00           0.00
                           (.)            (.)            (.)            (.)
grade=9                   -0.05          -0.55          -0.04          -0.42
                         (-1.75)         (-0.35)        (-1.42)        (-0.26)
grade=10                  -0.03          -3.47          -0.03          -3.50
                         (-1.29)         (-1.69)        (-1.33)        (-1.69)
grade=11                  -0.06          -1.00          -0.06*         -1.12
                         (-1.81)         (-0.66)        (-2.00)        (-0.73)
grade=12                  -0.04          -1.76          -0.04          -1.86
                         (-1.61)         (-0.70)        (-1.79)        (-0.73)
HH Income per Capita       0.00           0.00           0.00           0.00
                          (0.39)         (0.35)         (0.06)         (0.27)

Constant                   0.98**        87.82**         1.10**        89.54**
                         (23.71)        (18.03)        (21.71)        (12.94)
---------------------------------------------------------------------------------
Observations               349            339            349            339
R-squared                  0.140          0.245          0.189          0.247
---------------------------------------------------------------------------------
t statistics in parentheses
* p<0.05, ** p<0.01
```

```
Table 1.3: School A - Proportion Annual Fees Paid (Tobit)
--------------------------------------------------------------------------------
   fdiffyr                   (1)            (2)            (3)            (4)
                          coop=1         coop=0       D.order=1      D.order=0

Pooled Treatment          20.45*         -45.88*         13.48         -17.62
                          (2.14)         (-2.08)        (0.65)        (-0.98)
Cooperator                                              140.66**       107.33**
                                                        (4.37)         (5.05)
Debit Order               36.77*         -34.74
                          (2.36)         (-1.20)

Black                      0.00           0.00           0.00           0.00
                           (.)            (.)            (.)            (.)
Coloured                 -117.35        -313.07        -153.47        -376.20
                          (-0.00)        (-0.03)        (-0.00)        (-0.01)
Indian                     5.92         -298.35        -141.09        -349.05
                          (0.00)         (-0.03)        (-0.00)        (-0.01)
Other                     27.86         -289.09         -37.42        -326.62
                          (0.00)         (-0.03)        (-0.00)        (-0.01)
White                    -97.67         -290.99        -154.65        -340.50
                          (-0.00)        (-0.03)        (-0.00)        (-0.01)
AFRIKAANS                  0.00           0.00           0.00           0.00
                           (.)            (.)            (.)            (.)
ENGLISH                  -95.51         -15.10         -17.23        -288.73
                          (-0.00)        (-0.19)        (-0.38)        (-0.00)
OTHER                    -117.99         325.85         -32.73         23.61
                          (-0.00)        (0.02)         (-0.00)        (0.00)
XHOSA                    -241.75        -258.36        -151.21        -738.85
                          (-0.00)        (-0.02)        (-0.00)        (-0.01)
grade=8                    0.00           0.00           0.00           0.00
                           (.)            (.)            (.)            (.)
grade=9                   -9.14         -39.60        -116.82         -51.29*
                          (-0.72)        (-1.26)        (-0.00)        (-1.97)
grade=10                   9.04         -73.88*        -126.38         -30.51
                          (0.64)         (-2.10)        (-0.00)        (-1.17)
grade=11                  -8.58         -69.08*        -135.63         -46.70
                          (-0.69)        (-2.10)        (-0.00)        (-1.78)
grade=12                  10.30         -35.50        -155.42          -4.57
                          (0.62)         (-1.28)        (-0.00)        (-0.20)
HH Income per Capita       0.00          -0.00           0.00           0.00
                          (1.12)         (-0.22)        (0.74)         (0.82)

Constant                 313.46         493.14         331.34         763.37
                          (0.00)         (0.05)         (0.00)         (0.01)
--------------------------------------------------------------------------------
Observations              272             77            154            195
R-squared
Pseudo R-squared          0.183          0.047          0.362          0.123
--------------------------------------------------------------------------------
t statistics in parentheses
* p<0.05, ** p<0.01
```

```
Table 2.1: School A - Proportion Fees Paid vs Outstanding
-------------------------------------------------------------------------------------------
                              (1)          (2)          (3)          (4)          (5)
                            OLS-1        OLS-2        OLS-3       Tobit-1      Tobit-2
-------------------------------------------------------------------------------------------
main
Pooled Treatment            -3.40        -1.68       -18.10*       -2.44       -37.85
                           (-1.50)      (-0.82)      (-2.33)      (-0.15)      (-1.70)
Cooperator                               26.64**      12.17*      133.12**      82.70**
                                         (6.31)       (2.12)       (6.20)       (3.11)
Debit Order                               0.99         1.01        41.66*       38.20
                                         (0.45)       (0.46)       (2.05)       (1.95)
TPool*Coop                                            20.60**                   73.97*
                                                      (2.60)                    (2.26)
-------------------------------------------------------------------------------------------
Observations                 349          349          349          349          349
R-squared                   0.068        0.307        0.337
Pseudo R-squared                                                   0.173        0.181
-------------------------------------------------------------------------------------------
t statistics in parentheses
* p<0.05, ** p<0.01
```

```
Table 2.2: School A - Proportion Fees Paid vs Outstanding (OLS)
--------------------------------------------------------------------------------
                         (1)          (2)          (3)          (4)
                    FPaidOS_Prob   %FPaidOS>0  FPaidOS_Prob   %FPaidOS>0
--------------------------------------------------------------------------------
Pooled Treatment       -0.04**       0.68        -0.20**       -0.55
                       (-2.89)       (0.48)      (-3.52)       (-0.08)
Cooperator              0.12**       17.19**     -0.02          16.17**
                       (3.29)        (5.26)      (-1.53)        (3.06)
Debit Order             0.00         -0.52        0.00         -0.52
                       (0.24)        (-0.41)      (0.26)       (-0.40)
TPool*Coop                                        0.20**        1.53
                                                  (3.50)        (0.23)
--------------------------------------------------------------------------------
Observations            349          337          349          337
R-squared               0.140        0.247        0.189        0.247
--------------------------------------------------------------------------------
t statistics in parentheses
* p<0.05, ** p<0.01
```

```
Table 2.3: School A - Proportion Fees Paid vs Outstanding (Tobit)
--------------------------------------------------------------------------------
                         (1)          (2)          (3)          (4)
                       coop=1       coop=0      D.order=1    D.order=0
--------------------------------------------------------------------------------
%FPaidOS
Pooled Treatment        43.97*      -49.33*       18.06       -16.12
                       (2.14)       (-2.09)       (0.85)      (-0.75)
Debit Order             76.72*      -37.42
                       (2.30)       (-1.22)
Cooperator                                        143.22**     124.32**
                                                  (4.43)       (4.77)
--------------------------------------------------------------------------------
Observations            272          77           154          195
Pseudo R-squared        0.180        0.048        0.367        0.121
--------------------------------------------------------------------------------
t statistics in parentheses
* p<0.05, ** p<0.01
```

```
Table 3.1: School A - Proportion No of Monthly Fee Payments vs Expected No of Payments
--------------------------------------------------------------------------------------------
                         (1)          (2)          (3)          (4)          (5)
 fctp                    OLS-1        OLS-2        OLS-3        Tobit-1      Tobit-2
--------------------------------------------------------------------------------------------
main
Pooled Treatment        -1.47         0.81        -12.59        2.11        -16.02
                        (-0.63)      (0.38)       (-1.64)      (0.45)       (-1.76)
Cooperator                           19.06**       7.25        31.35**      14.21
                                     (4.65)       (1.21)       (5.93)       (1.59)
Debit Order                          10.11**      10.13**      29.62**      29.52**
                                     (4.36)       (4.41)       (5.55)       (5.60)
TPool*Coop                                        16.81*                    24.60*
                                                  (2.14)                    (2.31)
--------------------------------------------------------------------------------------------
Observations            349          349          349          349          349
R-squared               0.296        0.449        0.464
Pseudo R-squared                                               0.105        0.108
--------------------------------------------------------------------------------------------
t statistics in parentheses
* p<0.05, ** p<0.01
```

```
Table 3.2: School A - Proportion No of Monthly Fee Payments (OLS)
----------------------------------------------------------------------------------------
                         (1)          (2)          (3)          (4)
                         NoP_Prob     %NoP>0       NoP_Prob     %NoP>0
----------------------------------------------------------------------------------------
Pooled Treatment        -0.04**       3.67        -0.22**       2.29
                        (-3.03)      (1.95)       (-3.78)      (0.33)
Cooperator               0.13**      10.03**      -0.03         8.89
                        (3.48)       (2.88)       (-1.82)      (1.49)
Debit Order              0.01         9.52**       0.01         9.53**
                        (0.33)       (5.12)       (0.35)       (5.11)
TPool*Coop                                         0.22**       1.71
                                                  (3.76)       (0.24)
----------------------------------------------------------------------------------------
Observations            349          338          349          338
R-squared               0.155        0.483        0.211        0.484
----------------------------------------------------------------------------------------
t statistics in parentheses
* p<0.05, ** p<0.01
```

```
Table 3.3: School A - Proportion No of Monthly Fee Payments vs Expected No of Payments (Tobit)
------------------------------------------------------------------------------------
                              (1)            (2)            (3)            (4)
  fctp                      coop=1         coop=0       D.order=1      D.order=0
------------------------------------------------------------------------------------

Pooled Treatment            8.52*         -20.84          8.52          -0.45
                           (2.40)         (-1.60)        (1.40)         (-0.07)
Debit Order                26.95**         19.53
                           (6.83)         (1.02)
Cooperator                                               58.08**        28.71**
                                                         (5.90)         (4.74)
------------------------------------------------------------------------------------
Observations                272             77            154            195
R-squared
Pseudo R-squared           0.161          0.038          0.258          0.053
------------------------------------------------------------------------------------
t statistics in parentheses
* p<0.05, ** p<0.01
```

```
Table 4.1: School A - 1st Month Payment after messaging started
----------------------------------------------------------------------------------------------------
                      (1)            (2)            (3)            (4)            (5)
 fdiffMS             OLS-1          OLS-2          OLS-3         Tobit-1        Tobit-2
----------------------------------------------------------------------------------------------------
main
Pooled Treatment     237.00         24.56         272.98        -759.61       -1893.62
                    (0.79)         (0.09)         (0.30)        (-0.77)        (-0.92)
Cooperator                         -917.30        -698.43       -1057.22      -2077.06
                                   (-1.49)        (-1.16)        (-0.93)        (-1.05)
Debit Order                       -1410.01**     -1410.28**    -5520.84**    -5505.02**
                                   (-5.25)        (-5.24)        (-4.84)        (-4.83)
TPool*Coop                                        -311.69                      1491.35
                                                  (-0.33)                       (0.63)
----------------------------------------------------------------------------------------------------
Observations         349            349            349            349            349
R-squared            0.071          0.146          0.147
Pseudo R-squared                                                 0.022          0.022
----------------------------------------------------------------------------------------------------
t statistics in parentheses
* p<0.05, ** p<0.01
```

```
Table 4.2: School A - 1st Month Payment after messaging started (OLS)
-----------------------------------------------------------------------------
                             (1)            (2)            (3)            (4)
                     1MFPaid_Prob    1M FPaid>0    1MFPaid _P~b    1M FPaid>0
-----------------------------------------------------------------------------
Pooled Treatment           -0.06        1283.15          -0.21       4519.10*
                          (-1.16)         (1.95)        (-1.68)         (2.27)
Cooperator                  0.04       -3366.47*          -0.10        -489.23
                          (0.57)         (-2.37)        (-0.79)        (-0.82)
Debit Order              -0.29**        -239.76         -0.29**        -497.82
                          (-5.41)        (-0.43)        (-5.42)        (-0.95)
TPool*Coop                                                 0.19      -4393.48*
                                                        (1.40)        (-2.18)
-----------------------------------------------------------------------------
Observations                 349            106            349            106
R-squared                  0.135          0.254          0.141          0.306
-----------------------------------------------------------------------------
t statistics in parentheses
* p<0.05, ** p<0.01
```

```
Table 4.3: School A - 1st Month Payment after messaging started (Tobit)
-----------------------------------------------------------------------------
                             (1)            (2)            (3)            (4)
                          coop=1         coop=0      D.order=1      D.order=0
-----------------------------------------------------------------------------
1st Mnth FPaid
Pooled Treatment         -300.68       -3248.49       -2665.00         780.27
                          (-0.37)        (-0.96)        (-1.57)         (0.64)
Debit Order            -4301.54**      -6575.12
                          (-4.90)        (-1.19)
Cooperator                                            -2749.87       -1002.67
                                                       (-0.93)        (-0.81)
-----------------------------------------------------------------------------
Observations                 272             77            154            195
R-squared
Pseudo R-squared           0.027          0.025          0.021          0.010
-----------------------------------------------------------------------------
t statistics in parentheses
* p<0.05, ** p<0.01
```

```
Table 5.1: School A - Proportion 1st Month Payment
-----------------------------------------------------------------------------------------
                             (1)          (2)          (3)          (4)          (5)
                           OLS-1        OLS-2        OLS-3      Tobit-1      Tobit-2
-----------------------------------------------------------------------------------------
main
Pooled Treatment            5.54         0.57         6.38       -17.75       -44.24
                          (0.79)       (0.09)       (0.30)      (-0.77)      (-0.92)
Cooperator                              -21.43      -16.32       -24.70       -48.53
                                       (-1.49)      (-1.16)      (-0.93)      (-1.05)
Debit Order                             -32.94**    -32.95**    -128.99**    -128.62**
                                       (-5.25)      (-5.24)      (-4.84)      (-4.83)
TPool*Coop                                           -7.28                    34.84
                                                    (-0.33)                  (0.63)
-----------------------------------------------------------------------------------------
Observations                 349          349          349          349          349
R-squared                  0.071        0.146        0.147
Pseudo R-squared                                                  0.033        0.033
-----------------------------------------------------------------------------------------
t statistics in parentheses
* p<0.05, ** p<0.01
```

```
Table 5.2: School A - Proportion 1st Month Payment (OLS)
----------------------------------------------------------------------------------
                             (1)          (2)          (3)          (4)
                     %1MFPaid _~b  %1M FPaid>0  %FPaid _Prob  %1MFPaid>0
----------------------------------------------------------------------------------
Pooled Treatment           -0.06        29.98        -0.21       105.59*
                          (-1.16)       (1.95)      (-1.68)       (2.27)
Cooperator                  0.04       -78.66*       -0.10       -11.43
                          (0.57)       (-2.37)      (-0.79)      (-0.82)
Debit Order                -0.29**      -5.60        -0.29**     -11.63
                          (-5.41)      (-0.43)      (-5.42)      (-0.95)
TPool*Coop                                            0.19      -102.65*
                                                     (1.40)      (-2.18)
----------------------------------------------------------------------------------
Observations                 349          106          349          106
R-squared                  0.135        0.254        0.141        0.306
----------------------------------------------------------------------------------
t statistics in parentheses
* p<0.05, ** p<0.01
```

```
Table 5.3: School A - Proportion 1st Month Payment (Tobit)
--------------------------------------------------------------------------------
                           (1)            (2)            (3)            (4)
   fdiffMSp              coop=1         coop=0       D.order=1      D.order=0
--------------------------------------------------------------------------------
%1st Mnth FPaid
Pooled Treatment          -7.03         -75.90         -62.27          18.23
                         (-0.37)        (-0.96)        (-1.57)         (0.64)
Debit Order            -100.50**       -153.62
                         (-4.90)        (-1.19)
Cooperator                                             -64.25         -23.43
                                                       (-0.93)        (-0.81)
--------------------------------------------------------------------------------
Observations              272             77            154            195
R-squared
Pseudo R-squared         0.040          0.036          0.031          0.016
--------------------------------------------------------------------------------
t statistics in parentheses
* p<0.05, ** p<0.01
```

Appendix 10: Statistical Outcomes for School B - Variable 1= Mean Annual Fees Paid

No.	Typology	Outcome Variable	n	All	Control	Pooled Treatment	T-Stat TP vs C	Treatment 1	T-Stat T1 vs C	Treatment 2	T-Stat T2 vs C	T-Stat T2 vs T1	TPooled vs Control	Treat1 vs Control	Treat2 vs Control	Treat2 vs Treat1	TPooled vs Control	Treat1 vs Control	Treat2 vs Control	Treat2 vs Treat1
1	Combined (Defectors + Cooperators)	Mean Annual Fees Paid (Rands)		701	872	647	***	687	*	608	***		2,09***	1,56*	2,26***	0,83	0,04	0,12	0,02	0,41
			527	(242)	(1077)	(946)		(968)		(925)			-25,8%	-21,2%	-30,3%	-11,5%				
		Mean Annual Fees paid as a *proportion* of total annual fees (%)		23,9%	29,7%	22,1%	ΔΔΔ	23,5%	Δ	20,8%	ΔΔΔ		2,09***	1,56*	2,26***	0,83	0,04	0,12	0,02	0,41
													-25,6%	-21,0%	-30,1%	-11,4%				
1.1	Defectors	Mean Annual Fees Paid (Rands)		412	506	385		439		331	**		1,24	0,63	1,69**	1,34	0,22	0,53	0,10	0,18
			433	(765)	(866)	(734)		(772)		(691)			-23,9%	-13,2%	-34,6%	-24,6%				
		Mean Annual Fees paid as a *proportion* of total annual fees (%)		14,1%	17,3%	13,2%		15,0%		11,3%	ΔΔ		1,24	0,63	1,69**	1,34	0,22	0,53	0,10	0,18
													-23,8%	-13,2%	-34,6%	-24,6%				
1.2	Cooperators	Mean Annual Fees Paid (Rands)		2 031	2 085	2 007		2 038		1 978			0,45	0,23	-0,37	0,32	0,65	0,82	0,71	0,75
			94	(783)	(145)	(739)		(803)		(687)			-3,7%	-2,3%	-5,1%	-2,9%				
		Mean Annual Fees paid as a *proportion* of total annual fees (%)		69,3%	71,1%	68,5%		69,5%		67,5%			0,45	0,23	0,57	0,32	0,65	0,82	0,57	0,75
													-3,7%	-2,3%	-5,1%	-2,9%				

Note: Primary statistic is sample Mean, standard deviation is in parentheses for All, Control, Pooled Treatment, Treatment 1 and Treatment 2.
Results of T-tests - Outcome Variable Treatment versus Control: **** p<0.01, *** p<0.05, ** p<0.1, * p<0.15
Results of T-tests - Proportions Treatment versus Control: Δ Δ Δ Δ p<0.01, Δ Δ Δ p<0.05, Δ Δ p<0.1, Δ p<0.15

Appendix 11: Statistical Outcomes for School B - Variable 2= Mean Cumulative Fees Paid

No.	Typology	Outcome Variable	n	All	Control	Pooled Treatment	T-Stat TP vs C	Treatment 1	T-Stat T1 vs C	Treatment 2	T-Stat T2 vs C	T-Stat T2 vs T1	TPooled vs Control	Treat1 vs Control	Treat2 vs Control	Treat2 vs Treat1	TPooled vs Control	Treat1 vs Control	Treat2 vs Control	Treat2 vs Treat1
1	Combined (Defectors + Cooperators)	Mean Cumulative Fees Paid during messaging period (Rands)		335	386	319		347		290			0.99	0.51	1.30	0.92	0.33	0.61	0.20	0.36
			527	(636)	(684)	(620)		(652)		(587)			-17.4%	-10.1%	-24.9%	-16.4%				
		Mean Cumulative Fees paid as a proportion of outstanding fees before messaging started (%)		16.2%	19.7%	15.1%		16.6%		13.6%	Δ Δ		1.38	0.83	1.70	1.03	0.17	0.40	0.09	0.31
													-23.4%	-15.7%	-31.0%	-18.1%				
1.1	Defectors	Mean Cumulative Fees Paid during messaging period (Rands)		273	322	259		295		223			0.82	0.32	1.21	1.10	0.42	0.75	0.23	0.27
			433	(615)	(675)	(597)		(645)		(544)			-19.6%	-8.4%	-30.7%	-24.4%				
		Mean Cumulative Fees paid as a proportion of outstanding fees before messaging started (%)		10.8%	13.1%	10.2%		11.6%		8.8%			0.92	0.41	1.32	1.12	0.36	0.68	0.19	0.26
													-22.1%	-11.5%	-32.8%	-24.1%				
1.2	Cooperators	Mean Cumulative Fees Paid during messaging period (Rands)		619	601	627		633		621			-0.17	-0.19	-0.12	0.07	0.86	0.85	0.91	0.94
			94	(656)	(681)	(627)		(633)		(621)			4.3%	5.3%	3.3%	-1.9%				
		Mean Cumulative Fees paid as a proportion of outstanding fees before messaging started (%)		40.8%	41.9%	40.3%		43.6%		37.4%			0.16	-0.15	0.43	0.60	0.87	0.88	0.67	0.55
													-3.8%	4.1%	-10.7%	-14.2%				

Note: Primary statistic is sample Mean, standard deviation is in parentheses for All, Control, Pooled Treatment, Treatment 1 and Treatment 2.
Results of T-tests - Outcome Variable Treatment versus Control: **** p<0.01, *** p<0.05, ** p<0.1, * p<0.15
Results of T-tests - Proportions Treatment versus Control: Δ Δ Δ Δ p<0.01, Δ Δ Δ p<0.05, Δ Δ p<0.1, Δ p<0.15
Results of T-tests - Outcome variable Treatment 2 versus Treatment 1: § § § § p<0.01, § § § p<0.05, § § p<0.1, §p<0.15

Appendix 12: Statistical Outcomes for School B - Variable 3 = Mean Cumulative No. of Monthly Fee Payments during messaging period

No.	Typology	Outcome Variable	n	All	Control	Pooled Treatment	T-Stat TP vs C	Treatment 1	T-Stat T1 vs C	Treatment 2	T-Stat T2 vs C	T-Stat T2 vs T1	TPooled vs Control	Treat1 vs Control	Treat2 vs Control	Treat2 vs Treat1	TPooled vs Control	Treat1 vs Control	Treat2 vs Control	Treat2 vs Treat1
2	Combined (Defectors + Cooperators)	Mean cumulative no. of monthly fee payments during the messaging period	527	0.57	0.64	0.55		0.61		0.49			0.83	0.26	1.27	1.15	0.41	0.79	0.21	0.25
				(1.05)	(1.10)	(1.04)		(1.11)		(0.96)			-14.1%	-4.7%	-23.4%	-19.7%				
		Mean cumulative no. of monthly fee payments as a proportion of expected total payments during the messaging period (%)		11.5%	12.9%	11.0%		12.3%		9.9%			0.83	0.26	1.27	1.15	0.41	0.79	0.21	0.25
													-14.7%	-4.7%	-23.3%	-19.5%				
2.1	Defectors	Mean cumulative no. of monthly fee payments during the messaging period	433	0.40	0.40	0.40		0.48		0.33		*	0.02	-0.62	0.74	1.55	0.97	0.53	0.46	0.12
				(0.89)	(0.86)	(0.90)		(1.01)		(0.77)			0.0%	19.8%	-18.3%	-31.7%				
		Mean cumulative no. of monthly fee payments as a proportion of expected total payments during the messaging period (%)		8.1%	8.1%	8.7%		9.6%		6.5%		§	0.02	-0.62	0.74	1.55	0.97	0.53	0.46	0.12
													7.4%	18.3%	-19.3%	-31.7%				
2.2	Cooperators	Mean cumulative no. of monthly fee payments during the messaging period	94	1.37	1.45	1.34		1.35		1.32			0.35	0.25	0.35	0.09	0.73	0.79	0.72	0.92
				(1.36)	(1.42)	(1.34)		(1.35)		(1.38)			-7.6%	-6.8%	-8.8%	-2.2%				
		Mean cumulative no. of monthly fee payments as a proportion of expected total payments during the messaging period (%)		27.4%	29.0%	26.8%		27.1%		26.5%	19.3%		0.35	0.25	0.35	0.09	0.73	0.79	0.72	0.92
													-7.6%	-6.5%	-8.6%	-2.3%				

Note: Primary statistic is sample Mean, standard deviation is in parentheses for All, Control, Pooled Treatment, Treatment 1 and Treatment 2.
Results of T-tests - Outcome Variable Treatment versus Control: * * * * p<0.01, * * * p<0.05, * * p<0.1, * p<0.15
Results of T-tests - Proportions Treatment versus Control: Δ Δ Δ Δ p<0.01, Δ Δ Δ p<0.05, Δ Δ p<0.1, Δ p<0.15
Results of T-tests - Outcome variable Treatment 2 versus Treatment 1: § § § § p<0.01, § § § p<0.05, § § p<0.1, §p<0.15

Appendix 13: Statistical Outcomes for School B - Variable 4 = Mean Fee Payment in 1st month after messaging started

No.	Typology	Outcome Variable	n	All	Control	Pooled Treatment	T-Stat TP vs C	Treatment 1	T-Stat T1 vs C	Treatment 2	T-Stat T2 vs C	T-Stat T2 vs T1	TPooled vs Control	Treat1 vs Control	Treat2 vs Control	Treat2 vs Treat1	TPooled vs Control	Treat1 vs Control	Treat2 vs Control	Treat2 vs Treat1
3	Combined (Defectors + Cooperators)	Fee payment in 1st month after messaging started (Rands)	527	70	51	76		99	**	53		**	-1.24	-1.79*	-0.09	-1.75*	0.22	0.07	0.93	0.08
				(242)	(169)	(261)		(308)		(202)			49.0%	94.1%	3.9%	-46.5%				
		Proportion of fee payment in 1st month after messaging started, compared to expected monthly fee (%)		24.0%	17.6%	26.0%		33.9%	Δ Δ	18.3%		§§	-0.24	-1.79*	-0.09	-1.75*	0.22	0.07	0.93	0.08
													47.7%	92.6%	4.0%	-46.0%				
3.1	Defectors	Fee payment in 1st month after messaging started (Rands)	433	56	33	63		87	**	38		**	-2.31	-1.80*	-0.20	1.70*	0.19	0.07	0.84	0.09
				(248)	(167)	(266)		(317)		(201)			90.9%	163.6%	15.2%	-56.3%				
		Proportion of fee payment in 1st month after messaging started, compared to expected monthly fee (%)		19.3%	11.5%	21.6%		29.9%	Δ Δ	13.2%		§§	-1.31	-1.80*	-0.20	1.70*	0.19	0.07	0.84	0.09
													87.8%	160.0%	14.8%	-55.9%				
3.2	Cooperators	Fee payment in 1st month after messaging started (Rands)	94	133	110	144		162		127		26.4%	-0.82	-0.96	-0.37	0.63	0.42	0.34	0.71	0.53
				(165)	(165)	(233)		(250)		(198)			30.9%	47.3%	15.5%	-21.6%				
		Proportion of fee payment in 1st month after messaging started, compared to expected monthly fee (%)		45.7%	37.7%	49.2%		55.5%		43.5%			-0.82	-0.96	-0.37	0.63	0.42	0.34	0.71	0.53
													30.5%	47.2%	15.4%	-21.6%				

Note: Primary statistic is sample Mean, standard deviation is in parentheses for All, Control, Pooled Treatment, Treatment 1 and Treatment 2.
Results of T-tests - Outcome Variable Treatment versus Control: * * * * p<0.01, * * * p<0.05, * * p<0.1, * p<0.15
Results of T-tests - Proportions Treatment versus Control: Δ Δ Δ Δ p<0.01, Δ Δ Δ p<0.05, Δ Δ p<0.1, Δ p<0.15
Results of T-tests - Outcome variable Treatment 2 versus Treatment 1: § § § § p<0.01, § § § p<0.05, § § p<0.1, §p<0.15

Appendix 14: Summary Results for Descriptive Analysis for School A

School A: Summary Text-framing and Messaging Outcomes						Messaging Outcomes	Outcome Variable 1: Mean Fees Paid				Outcome Variable 2: No. of Monthly Fee Payments				Outcome Variable 3: 1st Month Fee Payment			
Typology	1. Mean Fees Paid	2. No. of Monthly Fee Payments	3. 1st Month Fee Payment	4. Annual Fees Paid	Overarching Recommended Text-Messaging Approach		TPooled vs Control	Treat1 vs Control	Treat2 vs Control	Treat2 vs Treat1	TPooled vs Control	Treat1 vs Control	Treat2 vs Control	Treat2 vs Treat1	TPooled vs Control	Treat1 vs Control	Treat2 vs Control	Treat2 vs Treat1
Defectors	Reminder	Reminder	Reminder	Reminder	Monthly Reminder message only	Message	Rem	Rem	Rem	Rem	Rem	Rem	Rem	Rem	Fin/Rem	Rem	Fin	Fin
						€	-6,9%	-11,9%	-1,8%	11,4%	-6,3%	-12,7%	0,3%	14,8%	16,8%	-13,1%	47,8%	70,1%
						€p	-10,9%	-14,4%	-7,3%	7,1%	-4,2%	-8,5%	0,1%	8,6%	9,6%	-9,1%	28,8%	37,9%
Cooperators	Affect/Finance	Finance	Affect	Affect/Finance	Monthly affective-framed message alternating with finance-framed message.	Message	Aff/Fin	Aff	Fin	Aff/Fin	Rem	Rem	Rem	Rem	Aff/Rem	Aff	Rem	Aff
						€	2,9%	2,3%	3,4%	1,1%	4,2%	3,0%	5,2%	2,2%	6,9%	9,5%	4,4%	-4,7%
						€p	1,9%	2,0%	1,8%	-0,2%	4,0%	2,9%	2,4%	-0,5%	5,8%	8,7%	2,9%	-5,8%
^^Cooperators (without debit orders)	Affective	Affective	Affect	Affect	Monthly affective-framed message message.	Message	Aff	Aff	Rem	Aff/Rem	Aff	Aff	Rem	Aff/Rem	Aff/Fin	Aff	Fin	Aff
						€	5,1%	5,6%	4,4%	-1,1%	8,0%	9,4%	6,4%	-2,7%	13,2%	17,1%	8,3%	-7,5%
						€p	4,2%	4,4%	3,9%	-0,5%	6,9%	8,1%	5,6%	-2,5%	10,8%	14,0%	1,8%	-12,2%
Note : The above is based on statistical significance							Statistical Significance											
							Substantive significance											

Appendix 15: Summary Results for Descriptive Analysis for School B

School B: Summary Text-framing and Messaging Outcomes						Messaging Outcomes	Outcome Variable 1: Mean Fees Paid				Outcome Variable 2: No. of Monthly Fee Payments				Outcome Variable 3: 1st Month Fee Payment			
Typology	1. Mean Fees Paid	2. No. of Monthly Fee Payments	3. 1st Month Fee Payment	4. Annual Fees Paid	Overarching Recommended Text-Messaging Approach		TPooled vs Control	Treat1 vs Control	Treat2 vs Control	Treat2 vs Treat1	TPooled vs Control	Treat1 vs Control	Treat2 vs Control	Treat2 vs Treat1	TPooled vs Control	Treat1 vs Control	Treat2 vs Control	Treat2 vs Treat1
Defectors	No Message	*Affective	Affective	No Message	Monthly Reminder message only	Message	NoM	NoM	NoM	NoM	Aff/NoM	Aff	NoM	Aff	Aff/Fin	Aff	Fin	Aff
						€	-19,6%	-8,4%	-30,7%	-24,4%	0,0%	19,8%	-18,3%	-31,7%	90,9%	163,6%	15,2%	-56,3%
						€p	-22,1%	-11,5%	-32,8%	-24,1%	7,4%	18,3%	-19,3%	-31,7%	87,8%	160,0%	14,8%	-55,9%
Cooperators	*Affective	No Message	*Affective	No Message	Send a monthly affective-framed message	Message	Aff/NoM	Aff	NoM	Aff	NoM	NoM	NoM	NoM	Aff/Fin	Aff	Fin	Aff
						€	4,3%	5,3%	3,3%	-1,9%	-7,6%	-6,8%	-8,8%	-2,2%	30,9%	47,3%	15,5%	-21,6%
						€p	-3,8%	4,1%	-10,7%	-14,2%	-7,6%	-6,5%	-8,6%	-2,3%	30,5%	47,2%	15,4%	-21,6%
* based on substantive result - statistically not significant							Statistical Significance											
							Substantive significance											

Appendix 16: School B Detailed Regression Analysis Statistical Output

```
Table 1.1: School B - Proportion Annual Fees Paid
----------------------------------------------------------------------------------------------
                          (1)          (2)          (3)          (4)          (5)
                        OLS-1        OLS-2        OLS-3      Tobit-1      Tobit-2
----------------------------------------------------------------------------------------------
main
Pooled Treatment        -8.05*        -4.72        -5.92        -8.51       -12.51
                       (-2.10)      (-1.55)      (-1.67)      (-1.55)      (-1.94)
Cooperator                          52.65**      48.95**      79.96**      69.75**
                                    (17.37)       (8.53)      (13.46)       (6.70)
TPool*Coop                                         5.26                     14.47
                                                  (0.79)                   (1.18)

Black                    0.00         0.00         0.00         0.00         0.00
                          (.)          (.)          (.)          (.)          (.)
Coloured                -1.50        -5.41        -5.56       -13.07       -13.57
                       (-0.19)      (-0.62)      (-0.63)      (-1.05)      (-1.09)
Indian                  13.48         5.22         5.22         3.05         2.93
                        (1.53)       (0.56)       (0.56)       (0.23)       (0.22)
White                  -23.61*      -17.29       -17.10      -201.55      -200.70
                       (-2.29)      (-1.78)      (-1.76)      (-0.03)      (-0.03)
AFRIKAANS                0.00         0.00         0.00         0.00         0.00
                          (.)          (.)          (.)          (.)          (.)
ENGLISH                 12.32*        3.46         3.53         7.57         8.07
                        (2.46)       (0.94)       (0.97)       (0.63)       (0.67)
OTHER                   18.80        15.40        15.61        34.64        35.62
                        (1.21)       (0.96)       (0.97)       (1.38)       (1.42)
XHOSA                   29.33*       18.88        19.11        28.57        29.48
                        (2.26)       (1.47)       (1.49)       (1.33)       (1.37)
grade=1                  0.00         0.00         0.00         0.00         0.00
                          (.)          (.)          (.)          (.)          (.)
grade=2                  8.85         4.74         4.72        -0.39        -0.34
                        (1.78)       (1.31)       (1.30)      (-0.05)      (-0.04)
grade=3                 10.67*        8.67*        8.62*        6.81         6.71
                        (2.10)       (2.08)       (2.06)       (0.85)       (0.83)
grade=4                 11.90*        6.90         6.72         6.67         6.16
                        (2.39)       (1.72)       (1.69)       (0.84)       (0.77)
grade=5                  7.59         5.43         5.58         3.04         3.54
                        (1.49)       (1.43)       (1.47)       (0.35)       (0.41)
grade=6                  8.34         9.44*        9.37*       10.02         9.84
                        (1.59)       (2.11)       (2.10)       (1.15)       (1.14)
grade=7                  8.16         9.00         8.98         9.03         9.01
                        (1.29)       (1.59)       (1.58)       (0.90)       (0.90)
HH Income per Capita    -0.00        -0.00        -0.00        -0.00        -0.00
                       (-0.40)      (-0.05)      (-0.02)      (-0.27)      (-0.23)

Constant                11.70        12.07        12.95        -5.69        -2.98
                        (1.05)       (1.08)       (1.15)      (-0.30)      (-0.15)
----------------------------------------------------------------------------------------------
Observations              469          469          469          469          469
R-squared               0.071        0.432        0.432
Pseudo R-squared                                                0.071        0.071
----------------------------------------------------------------------------------------------
t statistics in parentheses
* p<0.05, ** p<0.01
```

```
Table 1.2: School B - Proportion Annual Fees Paid (OLS)
--------------------------------------------------------------------------------
                          (1)           (2)           (3)           (4)
                     FPaidYR_Prob   %FPaidYR>0   FPaidYR_Prob   %FPaidYR>0
--------------------------------------------------------------------------------
Pooled Treatment         -0.07         -4.06         -0.09         -6.81
                        (-1.46)       (-0.95)       (-1.52)       (-1.11)
Cooperator                0.63**       27.01**        0.56**       22.41**
                        (22.71)        (7.18)        (9.97)        (3.11)
TPool*Coop                                            0.10          6.54
                                                     (1.65)        (0.79)

Black                     0.00          0.00          0.00          0.00
                          (.)           (.)           (.)           (.)
Coloured                 -0.14         -2.30         -0.14         -2.75
                        (-1.19)       (-0.22)       (-1.21)       (-0.26)
Indian                   -0.06          8.58         -0.06          8.22
                        (-0.47)        (0.75)       (-0.47)        (0.73)
White                    -0.45**                     -0.44**
                        (-3.00)                      (-2.95)
AFRIKAANS                 0.00          0.00          0.00          0.00
                          (.)           (.)           (.)           (.)
ENGLISH                   0.01         10.36          0.02         11.13
                         (0.14)        (1.27)        (0.16)        (1.36)
OTHER                     0.38         19.85          0.38         20.94
                         (1.93)        (1.42)        (1.95)        (1.49)
XHOSA                     0.07         26.54          0.08         27.34
                         (0.37)        (1.71)        (0.39)        (1.77)
grade=1                   0.00          0.00          0.00          0.00
                          (.)           (.)           (.)           (.)
grade=2                  -0.14*        17.50**       -0.14*        17.64**
                        (-2.13)        (2.94)       (-2.14)        (2.93)
grade=3                  -0.08         20.47**       -0.08         20.48**
                        (-1.13)        (3.13)       (-1.14)        (3.12)
grade=4                  -0.06         15.37*        -0.06         15.14*
                        (-0.87)        (2.54)       (-0.92)        (2.53)
grade=5                  -0.07         12.06*        -0.07         12.38*
                        (-0.96)        (2.01)       (-0.91)        (2.04)
grade=6                  -0.04         17.92**       -0.04         17.97**
                        (-0.51)        (2.69)       (-0.52)        (2.71)
grade=7                  -0.05         19.35*        -0.05         19.42*
                        (-0.54)        (2.45)       (-0.54)        (2.44)
HH Income per Capita     -0.00          0.00         -0.00          0.00
                        (-0.27)        (0.46)       (-0.23)        (0.49)

Constant                  0.60**       16.52          0.62**       17.97
                         (3.44)        (1.17)        (3.49)        (1.25)
--------------------------------------------------------------------------------
Observations              469           229           469           229
R-squared                0.274         0.297         0.275         0.299
--------------------------------------------------------------------------------
t statistics in parentheses
* p<0.05, ** p<0.01
```

```
Table 1.3: School B - Proportion Annual Fees Paid (Tobit)
----------------------------------------------------
                                 (1)             (2)
                               coop=1          coop=0
----------------------------------------------------
%FPaidYR
Pooled Treatment                1.20          -14.38
                              (0.22)         (-1.77)


Black                           0.00            0.00
                                (.)             (.)
Coloured                      45.51**         -25.23
                              (2.65)         (-1.51)
Indian                        62.87**          -4.51
                              (3.43)         (-0.25)
AFRIKAANS                       0.00            0.00
                                (.)             (.)
ENGLISH                       -15.90            7.45
                             (-0.66)          (0.47)
XHOSA                         34.98           25.77
                              (1.02)          (0.89)
grade=1                         0.00            0.00
                                (.)             (.)
grade=2                       32.58**         -13.67
                              (3.88)         (-1.15)
grade=3                       24.03**          1.04
                              (2.78)          (0.09)
grade=4                       16.03            1.67
                              (1.95)          (0.14)
grade=5                       30.02**          -4.40
                              (3.21)         (-0.36)
grade=6                       18.03            7.29
                              (1.73)          (0.61)
grade=7                       14.85            8.30
                              (1.29)          (0.59)
HH Income per Capita          -0.00           -0.00
                             (-0.64)         (-0.35)
White                                        -256.29
                                             (-0.03)
OTHER                                          30.51
                                              (0.95)


Constant                      20.83            8.43
                              (0.67)          (0.33)
----------------------------------------------------
Observations                    89             380
Pseudo R-squared              0.034           0.012
----------------------------------------------------
t statistics in parentheses
* p<0.05, ** p<0.01
```

```
Table 2.1: School B - Proportion Fees Paid vs Outstanding
---------------------------------------------------------------------------------------
                              (1)          (2)          (3)          (4)          (5)
                            OLS-1        OLS-2        OLS-3       Tobit-1      Tobit-2
---------------------------------------------------------------------------------------
main
Pooled Treatment            -4.50        -2.78        -4.30        -8.47       -15.53
                          (-1.26)      (-0.83)      (-1.27)      (-0.84)      (-1.30)
Cooperator                              27.14**      22.45**      69.84**      52.97**
                                        (5.99)       (2.78)       (6.50)       (2.83)
TPool*Coop                                            6.67                     23.91
                                                     (0.69)                   (1.08)
---------------------------------------------------------------------------------------
Observations                 469          469          469          469          469
R-squared                  0.053        0.169        0.171
Pseudo R-squared                                                   0.036        0.036
---------------------------------------------------------------------------------------
t statistics in parentheses
* p<0.05, ** p<0.01
```

```
Table 2.2: School B - Proportion Fees Paid vs Outstanding (OLS)
-----------------------------------------------------------------------------------
                              (1)          (2)          (3)          (4)
                        FPaidOS_Prob  %FPaidOS>0   FPaidOS_Prob  %FPaidOS>0
-----------------------------------------------------------------------------------
Pooled Treatment            -0.07        -5.19        -0.09        -8.08
                          (-1.46)      (-0.90)      (-1.52)      (-1.06)
Cooperator                  0.63**       16.74**      0.56**       11.61
                          (22.71)       (2.85)       (9.97)       (1.15)
TPool*Coop                                            0.10         7.27
                                                     (1.65)       (0.62)
-----------------------------------------------------------------------------------
Observations                 469          140          469          140
R-squared                  0.274        0.186        0.275        0.189
-----------------------------------------------------------------------------------
t statistics in parentheses
* p<0.05, ** p<0.01
```

```
Table 2.3: School B - Proportion Fees Paid vs Outstanding (Tobit)
----------------------------------------------------
                              (1)          (2)
                            coop=1       coop=0
----------------------------------------------------
%FPaidOS
Pooled Treatment             9.88       -16.53
                           (0.62)      (-1.31)
----------------------------------------------------
Observations                  89          380
Pseudo R-squared           0.035        0.015
----------------------------------------------------
t statistics in parentheses
* p<0.05, ** p<0.01
```

```
Table 3.1: School B - Proportion No of Monthly Fee Payments
--------------------------------------------------------------------------------------------
                              (1)          (2)          (3)          (4)          (5)
                            OLS-1        OLS-2        OLS-3      Tobit-1      Tobit-2
--------------------------------------------------------------------------------------------
main
Pooled Treatment            -2.31        -1.13        -1.05        -5.08        -7.49
                           (-0.95)      (-0.51)      (-0.48)      (-0.77)      (-0.95)
Cooperator                               18.58**      18.84**      45.65**      39.98**
                                         (5.94)       (3.25)       (6.56)       (3.24)
TPool*Coop                                            -0.37                      8.07
                                                     (-0.05)                    (0.55)
--------------------------------------------------------------------------------------------
Observations                  469          469          469          469          469
R-squared                   0.054        0.165        0.165
Pseudo R-squared                                                    0.035        0.035
--------------------------------------------------------------------------------------------
t statistics in parentheses
* p<0.05, ** p<0.01
```

```
Table 3.2: School B - Proportion No of Monthly Fee Payments (OLS)
------------------------------------------------------------------------------------
                              (1)          (2)          (3)          (4)
                          NoP_Prob       %NoP>0     NoP_Prob       %NoP>0
------------------------------------------------------------------------------------
Pooled Treatment            -0.04        -0.71        -0.06         3.48
                           (-0.72)      (-0.18)      (-1.03)       (0.71)
Cooperator                  0.35**       11.58**      0.28**       19.00**
                           (6.01)       (2.89)       (2.68)       (2.82)
TPool*Coop                                            0.09        -10.52
                                                     (0.73)      (-1.32)
------------------------------------------------------------------------------------
Observations                  469          140          469          140
R-squared                   0.120        0.160        0.121        0.172
------------------------------------------------------------------------------------
t statistics in parentheses
* p<0.05, ** p<0.01
```

```
Table 3.3: School B - Proportion No of Monthly Fee Payments (Tobit)
----------------------------------------------------------
                              (1)          (2)
                            coop=1       coop=0
----------------------------------------------------------
%NoP
Pooled Treatment             2.06        -8.03
                            (0.20)      (-0.94)
----------------------------------------------------------
Observations                   89          380
Pseudo R-squared            0.031        0.016
----------------------------------------------------------
t statistics in parentheses
* p<0.05, ** p<0.01
```

160

```
Table 4.1: School B - 1st Month Payment after messaging started
-------------------------------------------------------------------------------------
                              (1)          (2)          (3)          (4)          (5)
                            OLS-1        OLS-2        OLS-3      Tobit-1      Tobit-2
-------------------------------------------------------------------------------------
main
Pooled Treatment            24.61        29.16        23.86        86.67        45.14
                           (1.01)       (1.21)       (0.87)       (0.53)       (0.22)
Cooperator                               71.91**      55.54       717.45**     637.62*
                                         (2.81)       (1.43)       (4.21)       (2.14)
TPool*Coop                                            23.23                    111.16
                                                      (0.47)                    (0.32)
-------------------------------------------------------------------------------------
Observations                  469          469          469          469          469
R-squared                   0.045        0.058        0.058
Pseudo R-squared                                                    0.031        0.032
-------------------------------------------------------------------------------------
t statistics in parentheses
* p<0.05, ** p<0.01
```

```
Table 4.2: School B - 1st Month Payment after messaging started (OLS)
------------------------------------------------------------------------------
                              (1)          (2)          (3)          (4)
                     1MFPaid_Prob   1M FPaid>0   1MFPaid _P~b   1M FPaid>0
------------------------------------------------------------------------------
Pooled Treatment            0.01       114.32         0.00       151.58
                           (0.33)       (0.93)       (0.13)       (0.59)
Cooperator                  0.24**     -231.18         0.22*     -179.40
                           (4.70)      (-1.62)        (2.36)      (-0.79)
TPool*Coop                                             0.03       -70.83
                                                      (0.30)      (-0.25)
------------------------------------------------------------------------------
Observations                  469           64          469           64
R-squared                   0.119        0.273        0.119        0.274
------------------------------------------------------------------------------
t statistics in parentheses
* p<0.05, ** p<0.01
```

```
Table 4.3: School B - 1st Month Payment after messaging started (Tobit)
------------------------------------------------------
                              (1)          (2)
                           coop=1       coop=0
------------------------------------------------------
1M FPaid
Pooled Treatment           107.01        19.32
                           (0.83)       (0.07)
------------------------------------------------------
Observations                   89          380
Pseudo R-squared            0.044        0.023
------------------------------------------------------
t statistics in parentheses
* p<0.05, ** p<0.01
```

```
Table 5.1: School B - Proportion 1st Month Payment
--------------------------------------------------------------------------------------------
                              (1)           (2)           (3)           (4)           (5)
                            OLS-1         OLS-2         OLS-3        Tobit-1       Tobit-2
--------------------------------------------------------------------------------------------
main
Pooled Treatment             8.40          9.95          8.14         29.58         15.41
                           (1.01)        (1.21)        (0.87)        (0.53)        (0.22)
Cooperator                               24.54**        18.96       244.86**      217.62*
                                         (2.81)        (1.43)        (4.21)        (2.14)
TPool*Coop                                              7.93                       37.94
                                                       (0.47)                     (0.32)
--------------------------------------------------------------------------------------------
Observations                  469           469           469           469           469
R-squared                   0.045         0.058         0.058
Pseudo R-squared                                                      0.035         0.035
--------------------------------------------------------------------------------------------
t statistics in parentheses
* p<0.05, ** p<0.01
```

```
Table 5.2: School B - Proportion 1st Month Payment (OLS)
--------------------------------------------------------------------------------
                              (1)           (2)           (3)           (4)
                        %1MFPaid _~b   %1M FPaid>0   %FPaid _Prob   %1MFPaid>0
--------------------------------------------------------------------------------
Pooled Treatment             0.01         39.02          0.00         51.73
                           (0.33)        (0.93)        (0.13)        (0.59)
Cooperator                  0.24**       -78.90          0.22*       -61.23
                           (4.70)       (-1.62)        (2.36)       (-0.79)
TPool*Coop                                              0.03        -24.18
                                                       (0.30)       (-0.25)
--------------------------------------------------------------------------------
Observations                  469            64           469            64
R-squared                   0.119         0.273         0.119         0.274
--------------------------------------------------------------------------------
t statistics in parentheses
* p<0.05, ** p<0.01
```

```
Table 5.3: School B - Proportion 1st Month Payment (Tobit)
-----------------------------------------------------
                              (1)           (2)
                            coop=1        coop=0
-----------------------------------------------------
%1M FPaid
Pooled Treatment            36.52          6.59
                           (0.83)        (0.07)
-----------------------------------------------------
Observations                   89           380
Pseudo R-squared            0.050         0.026
-----------------------------------------------------
t statistics in parentheses
* p<0.05, ** p<0.01
```