THE SOCIETAL IMPLICATIONS OF MARKETING

by

RACHEL RAMEY

(Under the Direction of Sundar Bharadwaj)

ABSTRACT

There have been several calls in the discipline of marketing to study marketing for a better world, and to increase the impact of marketing research. To address this, I examine the societal implications of marketing through three essays. Essay 1 focuses on how marketing strategy can be used to make the world a better place. Through a multi-year randomized controlled trial (RCT) field study in Malawi, I show how a marketing strategy intervention can be used to increase financial access for women in emerging markets thus attempting to address the United Nations Sustainability Development Goals (SDGs) #1, No Poverty, #5, Gender Equality, and #10, Reduced Inequalities. Essays 2 and 3 address the darker side of marketing. They use the opioid epidemic as a case study and examine the role of marketing in the negative societal outcome of the public health crisis. Essay 2 introduces the concept of marketing transgressions which I define as *strategic marketing actions that result in negative externalities to society or the environment.* It provides a descriptive overview of classic marketing strategies used by pharmaceutical companies and how they contributed to the opioid epidemic. A framework of strategic decisions that lead to responsible marketing or marketing transgressions is presented. Essay 3 builds upon essay 2 by examining the empirical link

between marketing strategy and negative societal outcomes. Advertising and detailing spending in the opioid epidemic are linked to inappropriate prescriptions and subsequent overdose deaths, providing empirical support for the dark side of marketing strategy. This dissertation shows how marketing can be used to make the world a better place through increasing financial access for women, as well as how marketing strategy can result in marketing transgressions such as the opioid epidemic. By researching when marketing gets it right, and also when marketing gets it wrong, we can move towards a future of marketing for a better world.

INDEX WORDS: marketing strategy, SDG, randomized controlled trials, emerging markets, marketing for a better world, responsible marketing, marketing transgressions, dark side of marketing, opioid epidemic

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DEDICATION

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CHAPTER 1

INTRODUCTION

Can marketing strategy be used to positively impact society? Marketing research has traditionally focused on helping firms generate greater profits, but there has been a recent push to examine the impact of marketing and business actions on society. Recent calls in the discipline of marketing have called for research in responsible marketing (de Ruyter et al. 2022) better marketing for a better world (Chandy et al. 2021), as well as marketing and sustainability (Ekici, Genc, and Celik 2021; Gonzalez-Arcos et al. 2021; Sheth and Parvatiyar 2021).

In this dissertation, I respond to these calls by examining the societal implications of firm marketing actions from both a positive and a negative perspective. By understanding situations when our discipline gets it right, and also when we get it wrong, we can work towards ensuring that marketing strategy is used to positively impact society and that it is never used again to create egregious societal harm.

In this essay, I begin by examining how marketing strategy can be used to make the world a better place. Through a partnership with CARE International, I conduct a randomized controlled trial in Malawi to examine how a marketing strategy intervention can be used to increase financial access for women in emerging markets. Economic feasibility is a challenge that nonprofits face when implementing social interventions around the world. Interventions such as the formation of savings groups are both resource and labor intensive, and nonprofits are often limited by funding. They are also often

prohibited from motivating participants with financial incentives, a challenge also faced by certain industries and policy makers. I examine the use of non-financial incentives for sales force motivation, specifically the use of identity-based motivation implemented through seeding and word of mouth. The context is increasing access to financial savings groups through the use of identity-based motivation as a non-financial incentive to promote replication.

I theorize that the process works through linking social or individual identities to the goal of new savings group formation, thus motivating women to increase their word of mouth and influence the creation of replicated groups. I conduct a large-scale randomized controlled trial field study with a sample of 1120 savings groups to causally examine the effect of the type of identity-based motivation intervention (social or individual) on the replication rate and quality of savings groups. To address endogeneity concerns, I design and implement a control intervention to complement the two treatment arms. The findings of this essay research is relevant to addressing SDG goals #1, No Poverty, #5, Gender Equality, and #10, Reduced Inequalities.

In addition to studying the positive societal implications of how marketing strategy can be used to improve the world, it is also necessary to examine the negative societal implications of marketing strategy, or marketing transgressions. Essays 2 and 3 focus on the role of pharmaceutical marketing actions in the opioid epidemic, the ongoing public health crisis which has resulted in more than a half million deaths due to opioid overdoses. These essays focus on the dark side of marketing by examining the impact of deceptive marketing practices. I conclude with a framework for how marketing strategy decisions can lead to marketing transgressions or responsible marketing actions.

Essay 2 is a descriptive case study of the opioid epidemic. I provide a contextual overview of the events of the opioid epidemic and present the classic marketing strategies used by pharmaceutical firms that led to the negative societal outcomes. I position these insights into the literature as how classic marketing strategies can lead to marketing transgressions. By drawing on qualitative data sources such as legal documents, online pharmaceutical representative chat forums, internet archives of pharmaceutical company advertisements and promotions as well as interview transcripts, I examine what led to the marketing transgressions, why they were not stopped, and what can be done in the future to prevent marketing strategies from resulting in such societal harm. I conclude with a framework for how marketing strategy decisions can lead to marketing transgressions or responsible marketing actions.

Essay 3 builds on the case study of essay 2 and presents an empirical examination of the relationships between marketing actions and inappropriate opioid prescribing behavior and overdose-related deaths. To empirically test the proposed relationships, I compiled a unique large-scale panel dataset by integrating data from CDC Multiple Cause of Death Mortality files, national Drug Enforcement Administration (DEA) records of pill shipments, records of pharmaceutical representative visits to physicians (from legal documents recently made public), and hand-coded medical journal advertisements. I develop the model through a theory building from cases method and test the theoretical model utilizing a panel regression model that accounts for endogeneity. The results provide empirical support for the dark side of legitimate marketing actions.

This dissertation seeks to broaden the discipline of marketing by examining societal outcomes of strategic marketing decisions. Through a field study in Malawi of using marketing strategy to increase financial access for women, and a secondary data study of the role of marketing in the opioid epidemic, I seek to move the discipline towards responsible marketing.

CHAPTER 2

ESSAY 1: THE IMPACT OF SOCIAL VERSUS INDIVIDUAL IDENTITY-BASED MOTIVATION ON THE REPLICATION OF VILLAGE SAVINGS AND LOANS GROUPS IN MALAWI[1]

[1] Ramey, R., S. Bharadwaj, and E. McCullough. To be submitted to the *Journal of Marketing*.

Abstract

Nonprofit organizations and social enterprises have spent decades investing in initiatives to increase financial access and alleviate global poverty. A popular approach to enable access is through informal savings groups although they require significant monetary and human resources from nonprofits or from governments to form. The desire to reach as many communities as possible while responsibly spending donor funds has encouraged nonprofit organizations to seek economical ways to increase the rate of new savings group formation. In this study, I examine an approach to efficiently scale new savings group formation through organic replication. In this essay, organic replication is when members of an existing savings group form a new savings group in their community without reliance on the nonprofit's resources. The thesis examines the relative efficacy of two non-monetary, identity-based motivation approaches to increase the organic replication rate of savings groups, thus increasing their reach. I conduct a large-scale randomized controlled trial (RCT) with a sample of 1120 Village Savings and Loan Association (VSLA) groups in Malawi using the two non-monetary motivations as treatments along with a control (no motivation group) as the intervention. These savings groups are comprised of 15-30 low-income members, primarily women, who are trained to collectively save money. I find that consistent with my hypotheses, individual and social identity-based motivation increase the number of replicated groups created by an existing group by 0.456 and 0.503 groups, respectively. I do not find a significant difference between the two types of motivation. Replicated groups are found to be of comparable quality to original savings groups. This research contributes to the marketing

literature by examining a non-monetary incentive in a field study and by studying the use of identity as a motivational tool over a long-term period. It also brings a motivational component into the replication literature.

Introduction

There are significant gaps in access to financial services around the globe. Worldwide, 1.7 billion adults are unbanked, with women being unbanked at much higher rates than men (Demirguc-Kunt et al. 2018). In fact, 72 countries forbid women from opening bank accounts or accessing credit (CARE 2023). Access to savings accounts in emerging markets is significantly lower than the high-income country average of 55%. At the extreme, sub-Saharan Africa has a formal savings rate percentage of 15% of the population (Innes and Andrieu 2022).

Increased access to finance has been shown to be positively related to GDP growth, increased resilience to financial shocks, as well as in the narrowing of gender gaps (Innes and Andrieu 2022). International and domestic nonprofit organizations, governments and social entrepreneurs invest in a variety of methods to enable financial access to the unbanked in emerging markets aimed at alleviating global poverty. A variety of products, business models, and financial inclusion initiatives have been developed to address the financial services gap. Most recently, fintech companies have attempted to increase access to financial services through digital products such as Airtel digital financial services platform and M-PESA mobile phone-based money transfer service. Business models such as the microfinance and community development bank pioneered by the Grameen Bank in Bangladesh have been around for decades and work

to increase financial inclusion. A financial inclusion initiative by CARE International is Village Savings and Loans Associations (VSLA) which are community savings groups that increase financial security and empower women. VSLAs also provide women a safe space to meet regularly to save money for micro-entrepreneurial ventures and for insurance purposes. These VLSAs serve as the context for this essay.

Solutions such as VSLAs that are pioneered by nongovernmental organizations (NGO's) have significant impact but are often expensive to execute and scale both in monetary and human resource terms. A desire to reach as many communities as possible while responsibly spending donor funds has encouraged them to seek financially efficient ways to scale these solutions and increase the impact on mitigating global poverty.

Marketing theory and concepts can be used to increase the impact of existing solutions to global poverty. By taking concepts that have been successful in the business world in developed countries and adapting them in emerging markets to achieve both economic and social objectives, it is possible to make progress towards alleviating some of the world's greatest challenges and achieving the United Nations Sustainable Development Goals (SDGs) (United Nations 2022) . Recent illustrations include enhancing the customer engagement ability (Anderson, Iacovone, and Kankanhalli 2022), marketing skills (Anderson and McKenzie 2022; Anderson, Chandy, and Zia 2018), product mix offerings (Anderson et al. 2021), and distribution skills (Anderson, Iacovone, Kankanhalli, and Narayanan 2022) of small and micro entrepreneurs. Another recent illustration is the use of marketing tools to increase eco-friendly product adoption by rural farmers in China (Zhang, Chintagunta, and Kalwani 2021). These studies address

the SDGs #8, Decent Work and Economic Growth, #12, Responsible Consumption and Production, and #15, Life on Land.

In this research, I examine one approach to efficiently scale new savings group formation utilizing the marketing approaches of identity-based motivation through seeding and word of mouth. Specifically, I examine the outcome of organic self-replication. Organic self-replication is when members of an existing savings group form a new savings group in their community without reliance on the NGO resources or volunteers to form the groups. Motivating existing groups to self-replicate increases the scale and impact of savings group initiatives by involving more communities in VSLA groups. The outcome of interest to this thesis research increases financial access to low income women and in the process helps address SDG goals #1, No Poverty, #5, Gender Equality, and #10, Reduced Inequalities.

Traditional methods of motivation involve financial incentives, for example, rewarding groups with prizes such as supplies, T-shirts, or even cash in exchange for creating new replicated groups. However, the NGO partner in this study does not allow financial incentives to be given. Additionally, providing financial incentives also increases the resources required. As a result, this essay examines the use of the non-financial incentive based approach of identity-based motivation. Identity-based motivation is linking the motivation to achieve a goal to an existing identity that an individual already possesses in order to increase the likelihood of goal achievement. It is not creating identities, but using the power of existing identities to create motivation. In this research, I provide groups with training to learn how to replicate their savings groups

and I link the motivation to create a replicated savings group to either the personal or social identity of the group member.

Most research on identity-based motivation has three characteristics as shown by Oyserman (2009): (1) they examine only short-term immediate effects, (2) they are usually conducted in a laboratory setting and (3) conducted in contexts relevant to students. However, the motivation required for savings group replication is longer term (as the replication takes place over several months). Given this context, this thesis essay contributes to the current research stream by applying identity-based motivation in a long-term setting, in a real-world context and on a societally relevant issue of increasing financial access for women. Oyserman (2015b) calls on researchers to use identity-based motivation research with real world populations to leverage behavioral change. This research responds to that call by applying it with real world savings groups to leverage financial access opportunities.

This research seeks to address the research question: 'Does identity-based motivation influence the self-replication of women's savings groups?' Specifically, I examine the relative efficacy of two non-monetary motivation approaches; social and individual identity-based motivation as a part of a replication training module. I build on identity-based motivation theory to develop the theoretical expectations that individual identity-based motivation will lead to increased replication through members' desires to gain leadership skills and respect in their communities. I also predict that social identity-based motivation will lead to increased replication through members' desires to give back to their communities. I also expect that social identity-based motivation will increase

replication more than individual identity-based motivation due to the societal nature of the savings groups.

Partnering with CARE International, this research involves a randomized controlled trial (RCT) with a sample of 1120 VSLA (Village Savings and Loans Associations) savings groups formed by CARE. These groups are comprised of approximately 22,000 members in rural Malawi. CARE International has spent decades investing in developing semi-formal savings groups (VSLAs) around the world to alleviate global poverty through providing financial access to the unbanked in emerging markets. The participants are assigned to one of three treatment arms: individual identity-based motivation, social identity-based motivation, and a control. I use an intervention of replication training modules with components of social or individual identity-based motivation to examine the effect on the increased replication rates and quality of savings groups. The main intervention ran from August to September 2021, and primary data collection occurred until 18 months post intervention in March 2023.

By applying the marketing concept of identity-based motivation, this research seeks to increase the replication rate of savings groups thus increasing their reach and global impact. By training existing savings groups on how to create new replicated groups and by linking the motivation to create a new savings group to an individual or social identity that the group members already possess, NGOs can economically increase the rate at which savings groups are formed.

I find that both social and individual identity-based motivation replication training lead to increased replication rates of savings groups in rural Malawi. Individual identity-based motivation increases the number of replicated groups created by an existing group

by 0.456 groups, and social identity-based motivation increases the number of replicated groups created by 0.503 groups. I do not find a significant difference between the two types of motivation on the number of replicated groups. Moreover, the interventions strengthen the groups by increasing the number of members, allowing financial access to more low income women. When comparing replicated groups to original groups, replicated groups loan and save less money than original groups, but they do not have higher default rates and they adhere to the CARE guidelines.

This research shows the impact of a non-monetary incentive in a field study context. This thesis essay contributes to the literature in identity-based motivation by demonstrating its effect over a long time period. The research contributes to the replication literature by the addition of a motivational component as a driver of replication. The managerial implications are that identity-based motivation can be used as a non-monetary incentive by NGOs, development organizations, and governments to increase the scale of impact and the sustainability of projects. Moreover, for the research partner, CARE International, the replication training module developed for this research project can be implemented around the globe to increase financial access for women in emerging markets. The limitations of this study are that it was conducted in a specific field setting in rural Malawi, therefore further research could examine the generalizability of findings across other contexts and geographies.

In this essay, I first provide research context about financial access for the unbanked and the use of informal savings groups in emerging markets. I then introduce identity-based information and discuss the details of the study intervention. I present the

results of the study and conclude with unintended consequences, implications for literature and society, as well as directions for future research.

Research Context

Financial Access for the Unbanked

Banking access has important impact on growth and development worldwide (Dupas et al. 2018). Financial access for the unbanked is a pressing problem for society due to its close relationship with GDP, gender gaps and resilience (Innes and Andrieu 2022). Unbanked consumers are consumers without access to a financial account through a financial institution or a mobile money provider. Of the 1.7 billion unbanked adults worldwide, unbanked consumers are more likely to be women, more likely to have lower education, and more likely to be outside of the labor force. When surveyed, the main reasons for being unbanked include having too little money to open an account or not having access to a financial account. Cost, distance, and already using the account of a family member were the other most common reasons cited (Demirguc-Kunt et al. 2018).

Research has examined the unbanked context in both high-income countries and emerging markets. In high-income countries such as the United States, most commercial banks have ignored unprofitable low-income, underbanked consumers forcing them to turn to alternative banking options such as pay-day lenders (Servon 2017). Commercial banks fail to profitably serve low income customers because they make the erroneous assumption that they can offer the same banking services to low-income consumers that they offer to high income consumers, when in reality, the model must be adopted for success (Baradaran 2013). For example, Mende et al. (2019) find that communal financial orientation can lead to bank entry success in underbanked areas. In an applied

field study, they found that the consumer's perception that the bank was beneficial for community well-being increased the likelihood of consumers in banking deserts engaging with the credit union. The integration of the bank with the community led to increased financial access in an unbanked region. By adopting traditional approaches, the firm was successfully able to provide formal savings opportunities to unbanked consumers.

In emerging markets, where financial access is significantly lower than in high-income countries, governments, NGO's and for profit companies have experimented with and implemented a variety of solutions intended to increase financial access.

The literature has examined the impact of a variety of financial inclusion interventions in emerging markets. Commonly studied interventions to increase financial access in emerging markets include business models such as microfinance loans as well as handouts from charity or government support such as conditional cash transfers. Other solutions include financial technology (fintech) innovations, and self-help models like semi-formal savings groups.

Financial inclusion through microloans has been studied extensively (Karlan et al. 2012). Microcredit loans are small loans offered by commercial banks or NGO's to individuals who would be ineligible for loans from traditional banks. The Grameen Bank was created around this idea by Muhammad Yunus who won the Nobel Peace Prize in 2006. The Grameen Bank has loaned more than $6.5 billion to low income individuals and has seen a repayment rate consistently above 98% ("Leadership: Muhammad Yunus" 2022). The impact of microfinance on poverty alleviation has been extensively studied through RCTs around the world in the discipline of development economics (Banerjee, Duflo, and Kremer 2016). There has been extensive debate over the years about the

effectiveness of these initiatives as well as the external validity of the studies, with Karlan and Zinman (2011) finding that microcredit may not lead to increased subjective well-being, but did increase ability to cope with risk and increase to formal credit. Meager (2019) use Bayesian hierarchical analysis to evaluate the external validity of multiple RCTs published in the American Economic Journal and find that microcredit access did not measurably improve the lives of poor households, but also does not cause over-indebtedness or destroy livelihoods.

An alternative to providing a loan is to give money without expectation of repayment. Cash transfers are one-time money transfers, made either with conditions or unconditional, to low income consumers that have also been studied. There is evidence that a one-time grant can have lasting impacts for certain types of individuals or subsistence businesses (De Mel, McKenzie, and Woodruff 2012), however there is also evidence that cash transfers do not keep small entrepreneurs out of debt long-term (Karlan, Mullainathan, and Roth 2019).

Fintech innovations also can be used to increase financial access. This is most obvious in Sub-Saharan Africa which accounted for almost 2/3 of global mobile money transactions (Parekh and Hare 2022). Jack and Suri (2014) show that fintech innovations such as the mobile money service M-PESA reduce transaction costs of financial transfers and help households regulate consumption when faced with economic shocks.

In emerging markets, an alternative to formal saving is semi-formal saving with a savings club or a person outside the family. 25% of people who save in emerging markets save through semi-formal methods accounting for 11% of all adults (Demirguc-Kunt et al. 2018). Semi-formal savings groups such as rotating savings and credit associations

(ROSCAs), self-help groups (SHG) and village savings and loan associations (VSLA) are also utilized by policy makers and nonprofits in emerging markets to increase financial inclusion. They differ from microfinance organizations in that the money for loans comes from members rather than an outside institution which reduces the financial dependence on external sources (Bannor et al. 2020).

Benefits of Informal Savings Groups

VSLA groups have currently reached ten million people in 59 countries. Although their primary function is a savings group, they have become building blocks of change in communities and "powerful, endlessly reproducible engines of community development and gender equality" (pg. 4 CARE 2021). VSLA groups have come to represent a path towards female empowerment and they are important to support entrepreneurship and businesses in communities. A plethora of studies have shown that VSLAs have a positive impact on women, entrepreneurs, and communities in countries across the globe (Karlan et al. 2017; Ksoll et al. 2016). The goal of the intervention in this thesis research is to increase the rate at which savings groups are replicated which will expose more individuals to the benefits of informal savings groups.

How Savings Groups Work

VSLA savings groups are comprised of 15-30 low-income members, mostly women, who are trained to collectively save money. Members are usually self-employed and often smallholder farmers since wage jobs are rare.

The savings group follows a loan cycle that is standardized across groups formed in every country. First, the groups are formed by employees or volunteers of local CARE offices. These employees recruit a minimum of 15 community members to join the group

and provide training and support through a series of training modules to teach the members the rules of procedures of a VLSA group. To start the loan cycle, the members begin to buy shares and store their money collectively in a physical lockbox with multiple locks that must be opened simultaneously by separate members with keys. Members can save at each weekly meeting by buying shares, or they can take out loans throughout the cycle to pay for a variety of small expenses such as school or medical fees, food, or farming supplies. They might also use the money to invest in small business opportunities such as selling tomatoes or making donuts to sell. The loans are repaid with interest over the cycle. At the end of the cycle (most commonly 6 months or 1 year) the money saved plus interest accumulated is shared out among group members providing a large cash flow. This is known as the "share-out." The share-out usually coincides with harvest season and members frequently use the money to purchase larger items such as farming materials like fertilizer or seed or other assets like mattresses, roofing sheets, or other household items. After share-out, the group usually reforms and begins the cycle again. Figure 1.1 shows a visual representation of the Loan Cycle of VSLA groups and the ideal timing of replication and Figure 1.2 shows a typical VSLA group meeting in Malawi.

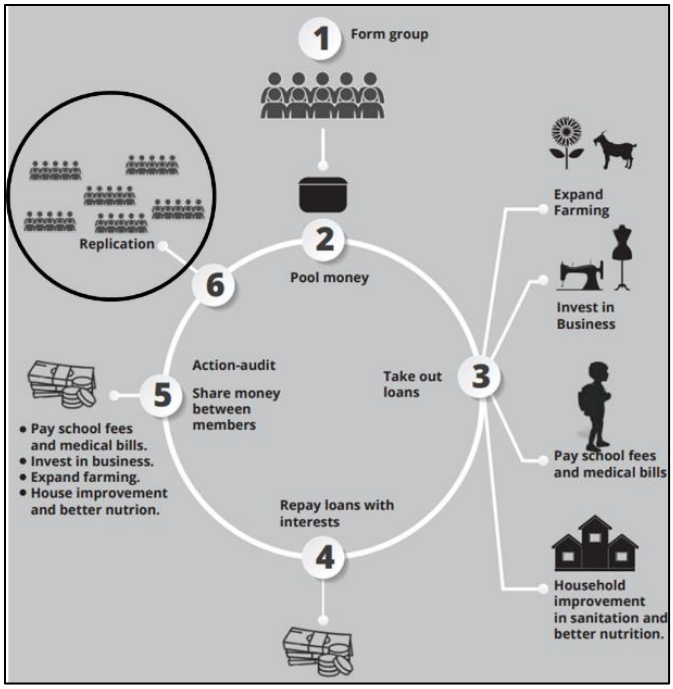

FIGURE 1.1: INFOGRAPHIC DESCRIBING THE LOAN CYCLE OF VSLA GROUPS AND THE TIMING OF REPLICATION[2].

FIGURE 1.2: EXAMPLE OF VSLA GROUP MEETING IN A MALAWI VILLAGE[3]

[2] Image Source: Infographic developed for reinforcement messaging for the project intervention.
[3] Image Source: The project. Picture taken during field data collection with consent of members. Image is blurred for member privacy.

Replication

The VSLA model has been extremely popular in the communities where it is implemented. So much so that other community members who are not in the original VSLA group see the benefits that the members experience and decide to form their own savings groups to gain similar savings benefits by copying the model. I refer to this as organic replication of savings groups. A leader of an organic replicated group told her story about forming the group to the research team:

> "I visited my friends in another village where I learnt about VSLAs. I brought the idea to my village, and we started a VSLA the next year."

Another woman shared her story:

> "We saw other people who were doing VSLAs, so we decided to try it ourselves. We organized ourselves to start saving giving loans, we found a date to meet and start our savings."

For existing members, replication is an optional step that can occur between share-out and reforming the group. Replication is when members of the existing savings group form a new additional savings group in their community. This allows more community members to participate in the savings model and thus increases the impact of financial access. This would most commonly occur after a group share-out, in the period before the group reforms.

Because the process of forming groups through CARE employees and volunteers is resource-intensive, CARE International began to explore the possibility of intentionally driving replication through seeding strategies. If current VSLA members can be trained to create new savings groups through replication training (seeding) strategies and this training successfully motivated them to start new savings groups, then the impact of

financial inclusion could be increased without additional financial input from the NGO. If, in turn, these replicated groups created their own new groups in the future, then the impact of the savings groups could expand exponentially. The primary focus in this study is to use a marketing intervention to increase replication and examine the drivers of replication and "paying it forward."

Word of Mouth and Seeding

The intervention in this study relies on the marketing strategies of word of mouth and seeding to result in the creation of new savings groups. Word of Mouth (WOM) is a marketing action when consumers share information about companies, brands, goods or services with others (Rosario et al. 2016). It refers to the sharing of opinions and information through social ties and influences the behavior of the receivers of the WOM (Berger 2014). WOM was originally conceptualized as a naturally occurring phenomenon, but research has shown that consumer-to-consumer communication can be influenced by firms through seeding strategies (Kozinets et al. 2010). The replication of women's savings groups can be considered a result of intentional efforts by NGOs (seeding) to encourage group members within their communities to spread opinions and information about savings groups (WOM).

Literature Review

In order to understand how savings group members can be motivated to self-replicate over time, I build on sales force motivation literature, particularly research on incentives. Motivation can either be extrinsic (comes from an outside source) or intrinsic (internal). Extrinsic motivation comes in the form of incentive awards such as cash and

merchandise (Viswanathan et al. 2018). Intrinsic motivation has little or no rewards except the activity itself (Deci 1971).

There is extensive research on intrinsic and extrinsic rewards structure and motivation for salesforces published in the marketing literature. See Table 1.1 for a summary of representative studies in major marketing journals. The studies primarily examine the effects of extrinsic motivation on sales performance. Many examine the effect of exclusively extrinsic motivations such as merchandise or cash incentives and bonuses (Chung and Narayandas 2017; Chung, Steenburgh, and Sudhir 2014; Li, Lim, and Chen 2020; Viswanathan et al. 2018), external control (Challagalla and Shervani 2018; Schepers et al. 2012), managerial tracking (Sabnis et al. 2013) or even the threat of punishment (Boichuk et al. 2019). Bommaraju and Hohenberg (2018) study the impact of both types of motivation in the form of goals setting and extrinsic motivation through cash rewards. However, this was limited to two cases in a developed market.

The existing literature primarily deals with formally structured firms in a developed market context with the exception of Chung and Narayandas (2017) and Li, Lim, and Chen (2020) who conduct studies in India and China, respectively. There is a lack of research in the marketing discipline examining intrinsic motivation. While most sales research examines monetary incentives, the research partner is prohibited from providing them for savings group members. Consequently, this research examines the effect of the non-monetary incentives of social and individual identity-based motivation (disseminated through WOM and seeding strategies) on the replication rates of VSLA savings groups in an emerging market setting. I contribute to the literature by studying a non-monetary incentive in marketing in a field study context with societal implications.

TABLE 1.1. REPRESENTATIVE MARKETING LITERATURE ON EXTRINSIC AND INTRINSIC MOTIVATION

Study	Method	Data	Type of Motivation	Firm Structure	Emerging Markets	Causal Method	Purpose
Challagalla and Shervani (2018)	Field Experiment	270 Salespeople in 2 Fortune 500 Companies	Extrinsic	Formal	No	Yes	Salesperson Performance and Satisfaction
Schepers et al. (2012)	Survey	Employees and managers	Extrinsic	Formal	No	No	Agency theory may limit the employees' ability to approach customers
Sabnis et al. (2013)	Survey	461 Sales Reps	Extrinsic	Formal	No	No	Sales lead blackhole
Chung, Steenburgh & Sudhir (2014)	Dynamic Structural Model, Field Data	Fortune 500 firm selling durable office products	Extrinsic	Formal	No	Yes	Salesforce response to bonus-based compensation plans
Chung and Narayandas (2017)	Randomized Field Experiment	80 full-time salespeople in India	Extrinsic	Formal	Yes	Yes	Evaluating the salesperson response to various incentive schemes
Bommaraju and Hohenberg (2018)	Field Experiment	2 Fortune 500 Companies	Extrinsic & Intrinsic	Formal	No	Yes	Test effects of self-selected incentive scheme
Viswanathan et al. (2018)	Field Study	Midwestern CPG manufacturer sales	Extrinsic	Formal	No	Yes	Explore merchandise incentive programs which have been understudied
Li, Lim, and Chen (2020)	Randomized Field Experiment	116 Salespeople at Major China Department Store	Extrinsic	Formal	Yes	Yes	How do salespeople adjust effort as the abilities of their coworkers change?
Boichuck et al. (2019)	Quasi-Experiment & Lab Experiment	Fortune 500 firm selling cleaning supplies	Extrinsic	Formal	No	Yes	Examine the effect of threat of punishment
This Study	Randomized Field Experiment	Replication of savings groups in Malawi	Intrinsic	Informal	Yes	Yes	Use of identity-based motivation when financial incentives are not feasible

Identity is defined as any category label to which a consumer self-associates either by choice or endowment. Identity Salience is the awareness of an identity, or a temporary state in which the identity is activated (Reed and Forehand 2012). Consumption behaviors and preferences change as a result of marketing stimuli that cause shifts in salient identity (Reed 2004). Identity has been shown to affect customer loyalty (Marin, Ruiz, and Rubio 2009), brand evaluations (Swaminathan, Page, and Gürhan-Canli 2007) and product attitudes and decisions (Mogilner and Aaker 2009).

Identity-based motivation draws a connection between motivation and an identity that an individual already possesses. Identity-based motivation refers to the readiness to engage in identity-congruent actions (Oyserman 2007). Identities carry action and procedural readiness which influences what actions they take and how they make sense of the world (Oyserman 2009). Choices are identity-based but sensitive to situational cues that may occur outside of conscious awareness. Once a choice becomes linked to identity, it can become automatized. Success of a goal is made by repeated choices, or choice automatization and success at pursuing a goal feels good because it reinforces the identity on which it was based (Oyserman 2007). For example, if a member makes a goal to start a replicated savings group, and she believes that by starting a replicated savings group she will be helping her community, then choices she makes towards forming a savings group are linked to social identity. Each time she makes a choice to tell a community member about the benefits of savings groups, recruits an additional member, or collects resources to start the group, her identity of helping the community will be reinforced. Eventually, the choices to take steps towards forming a savings group become automatized and the goal of forming a new group starts to be achieved.

By linking an existing identity to repeated choices, goals can be achieved. Identity-based motivation relies on linking a goal (in this case creating a replicated group) to an existing identity that is important to the individual. Once the identity is linked to the automated choices, it can result in long-term behavior. In this way, identity-based motivation can be used to bridge the gap between identity and long-term behavior. Identity-based motivation can lead to behavior successfully when three ingredients are met: when the identity invoked is psychologically relevant, there is a readiness on the part of the individual to act, and the interpretation of experienced difficulty is not too high (Oyserman 2015b).

The majority of studies conducted on identity have taken place in a single laboratory setting experiment (eg., Mogilner and Aaker 2009; Swaminathan, Page, and Gürhan-Canli 2007) through cross-sectional surveys (eg., Marin, Ruiz, and Rubio 2009), or in a classroom experimental setting (Nurra and Oyserman 2018). As an example to illustrate the prevalence of laboratory studies related to identity, Oyserman and Lee (2008) present a meta-analysis of 67 studies on how individualism and collectivism influence self-concept, values, and relational assumptions when primed for salience in a laboratory setting, primarily with undergraduate students. Laboratory and classroom experiment studies are short-term, usually involving only a single manipulation. Invoking identity for long-term behavior or consumption effects and studying them over a longer period is not prevalent in the marketing literature, with the exception of Oyserman (2015b) who reports the use of identity-based motivation in a long term classroom intervention to help students address aspiration-achievement gaps, although it is not in an experimental approach. I contribute to the literature by studying the use of identity as a

motivation tool over a long-term period with an RCT methodological approach in a field setting. Representative literature is summarized in Table 1.2.

TABLE 1.2. REPRESENTATIVE LITERATURE IN IDENTITY

Study	Method	Data	Long Term	Field Study
Swaminathan et al. (2007)	Lab Experiment	320 students- brand exposure and evaluations	No	No
Oyserman & Lee (2008)	Lab Experiment	Meta-analysis of 67 Laboratory Studies on Identity	No	No
Marin et al. (2009)	Cross Sectional Survey	Survey of 400 bank customers on customer loyalty	No	No
Mogilner & Aaker (2009)	Lab + Field Experiment	Lab Experiment with Field Study on Product attitudes and decisions	No	Yes
Landau et al. (2014)	Lab Experiment	College Students- effect of goals on imagined future academic ability	No	No
Oyserman (2015b)	Field Intervention	Career planning intervention during school year	Yes	Yes *
Nurra and Oyserman (2018)	Classroom Experiment	School age children- predictions of future selves, effect on current delinquent behavior	No	Yes
Herschfield et al. (2019)	Lab Experiment	Interactions with virtual reality future selves on savings behavior	No	No
This Study	RCT	Savings Group replication in low-income field study context	Yes	Yes

*Conducted in field, but not an experimental study

I use identity-based motivation as a mechanism to increase the replication rate of savings groups, and in doing so, I add a motivational component to the work in development research about the impact of informal savings groups. The impact of VSLA groups have been studied by many researchers in many different applied settings. Ksoll et al. (2016) found that VSLAs have a positive impact on poverty measures such as household consumption and expenditure and lead to an increase in agricultural

investments and income from small businesses in Northern Malawi. Karlan et al. (2017) found improvement in household business outcomes and women's empowerment in Ghana, Malawi, and Uganda. In Ethiopia, Beyene and Dinbabo (2019) found that VSLA participation increased average monthly household income of participant women, as well as improvement in her involvement in household decisions and household health.

The replication of VSLA groups has been studied qualitatively with small sample sizes. Odell and Rippey (2011) used in depth interviews to study program impacts fourteen months after VSLA implementation. They found that original groups had organically created on average two new groups. Sarah et al. (2013) used focus groups and surveys to estimate the rate of replication in Uganda and found a similar rate of replication of two replicated groups per original groups. Additionally, Anyango et al. (2007) studied replication in Zanzibar, where a local organization had adopted the VSLA groups after CARE left the area, and membership had expanded 37.5% after 4 years. These studies are single surveys with a small sample which measure organic replication without intervention. This research contributes to the replication literature by bringing in a motivational component to examine the drivers of replication. This study demonstrates the causal effect of motivation through an RCT methodology to study the impact on replication rates over time in a representative sample of CARE Malawi's beneficiaries.

In this thesis essay I make three contributions. First, I expand the literature on incentives by examining a non-monetary incentive applied in a field setting. Second, I expand the identity literature and the identity-based motivation research stream by demonstrating its causal effect not just in the short term but also the long-term by utilizing a causal (RCT) methodological approach. Finally, I contribute to development

studies by bringing in a psychological motivation lens as an approach to increase the scale and impact of programs without direct influence or increased financial resources from NGO's.

Theory and Hypothesis

Poverty impedes cognitive function (Mani et al. 2013) and people in poverty have limited bandwidth (Schilbach, Schofield, and Mullainathan 2016), thus they make short-term decisions or are present biased (Karlan, Mullainathan, and Roth 2019). It has been shown that reminders help increase commitment attainment and increase savings (Karlan et al. 2016). The semi-formal savings group structure helps low income members achieve their savings goals because it overcomes short-term present biased spending decisions. Participation in the weekly group saving activity reminds members to save frequently and removes the temptation for impulse purchases allowing members' savings to accumulate for a large, infrequent expenditure- such as large purchases at the end of the year. The limited bandwidth and present bias of low income savings group members may also present challenges to motivating members to achieve a long-term goal such as creating a replicated savings group, which requires repeated actions over time in order to form.

In this study, to overcome the limited bandwidth and present bias of savings group members, I draw on identity-based motivation. Providing savings group members with identity-based motivation training about replication is intended to increase members' intrinsic motivation to replicate a group. It promotes repeated choices to take the steps necessary to create a group, thus increasing the link to the identity and subsequent increased likelihood to follow through with all the steps necessary to create a replicated VSLA savings group. This intervention successfully fulfills the three

ingredients of identity-based motivation: *readiness to act*, *psychological relevancy*, and an *appropriate level of experienced difficulty*, meaning that the goal is challenging enough to be compelling, but not too hard to deter participants from trying (Oyserman 2015b). First, by tying replication strategies to the social or individual identity the member already possesses and providing the training, the participant's ability is developed, which in turn enhances the *readiness to act*. Second, the motivation is *psychologically relevant* because the identity of social or individual motivation is accessible even after the intervention through messaging reinforcements. Third, the training strives to have an *appropriate level of experienced difficulty* through positive reinforcement during training and hands-on training activities. This motivation approach should help overcome the challenges of cognitive bandwidth as mentioned above.

The replication training intervention used in the study motivates VSLA savings group members to replicate their savings groups through two types of identity-based motivations, namely a social and individual identity. Identity-based motivation links the motivation to achieve a goal to an identity that a person already possesses to incentivize long-term goal achievement. Social identity-based motivation is aimed at encouraging the effort to replicate a savings group in order to give back to the community and help members in the community to experience the benefits of financial inclusion. Individual identity-based motivation is targeted at influencing the effort to replicate a savings group in order to gain personal recognition or status as a leader in the community. It is important to note that the group member already possesses both an individual and a social identity, and the goal of the identity-based motivation intervention is to link the creation of replicated groups to one of those existing identities based on random assignment.

The cognitive processes of self-regulation are triggered by self-goals formulated as a personal or social identity and carried out with strategies that are identity congruent (Oyserman and Destin 2010). The identities that feel centrally defining and important are more likely to influence which strategies are adopted. This research seeks to expand the research on identity-based motivation by examining it in a long-term setting with goals to be achieved over several months, and by examining what type of identity-based motivation can lead to behavioral change in an emerging market financial inclusion context.

In the context of the goal to replicate VSLA groups to increase financial inclusion, social roles should be important in the context of self-regulation to achieve the creation of new savings groups. Communal financial orientation (the perception of a bank's benefit to the community) has been shown to positively impact success for financial initiatives in underbanked areas (Mende et al. 2019), showing that successful financial inclusion has been linked to the potential for positive societal benefits.

Group members will replicate their savings groups in order to give back to the community, which is in line with their social identities. Other NGO's draw on this social identity for community impact. For example, Heifer International uses values-based training in addition to technical training and self-help group formation to encourage recipients of their livestock transfer program to "pay-it-forward" in the future. "Paying-it-forward" involves giving an offspring of their livestock as well as technical training to another individual in the community to help them experience the benefits that the original recipient has received (Janzen et al. 2018).

The act of replicating a group has the potential for community benefits through paying it forward. By helping community members create a VSLA group the original member can give back to their community. She can help community members save and help them experience the same benefits as she has from being a part of a VSLA group. If a member sets a goal of replicating a group in order to give back to the community and help others save, then the repeated choices she makes to follow through on the steps of replicating a group will reinforce her social identity as a contributing member of the community. The automatization of choices to give back to the community will lead to goal achievement. Thus, social identity-based motivation can lead to successful VSLA group replication. Formally:

> H1: Social identity-based motivation training will result in greater replication of savings groups than not receiving training.

Alternatively, individual identity-based motivational messages may also lead to increased replication rates. Replication of a group is not a task that is conducted by the entire group, but rather by a single individual or a small group of 2-3 members. The action of replicating a group implies that the group member must take on a leadership role in recruiting, organizing, and creating a new savings group. The creation of a new group allows the replicating member to take on new responsibilities, perhaps even giving them the opportunity to make (minor) modifications to group rules and practices that she did not enjoy in the former group. The act of replicating a group has the potential for individual recognition such as respect and trust in the community as well as the development of leadership skills. If a member sets a goal of replicating a group in order to receive personal recognition, then the repeated choices she makes to follow through on

the steps of replicating a group will reinforce her personal identity as a leader. The automatization of choices to become a leader will lead to goal achievement. Thus, individual identity-based motivation can also lead to successful VSLA group replication. Formally:

> H2: Individual identity-based motivation training will result in greater replication of savings groups than not receiving training.

I hypothesize that both individual and social identity-based motivation will lead to increased replication over the control condition without replication training and motivation. The intention of this study is to implement the identity-based motivation and replication module across all countries where CARE International has VSLA groups. Thus, it is important to identify which type of identity-based motivation is most successful in incentivizing replication in order to incorporate that motivation into the module.

While both individual and social identity-based motivation should lead to increased replication, social identity-based motivation may lead to a greater increase in replication rates. Although all cultures value self-regulation to achieve goals, cultures differ in preference for social or personal framing. Oyserman (2007) posits, “All cultures value self-regulation- controlling the self and molding the self to become more like valued possible self-goals. However, cultures differ in which self-regulation is framed more in terms of fitting into a social role or creating a unique self.” Both social and personal identities are easily cued and the success of one over the other is best conceptualized as a difference in the relative salience of social vs. personal identities not as a difference in the existence of the identities (Oyserman 2009).

Due to the communal nature of the savings group, a social identity may be more salient to members than an individual identity in the context of working with and planning to create new savings groups. In order to create a replicated group, existing members would need to think about their role in a savings group, work with other community members, and convince potential new members of the benefits of savings groups. These thoughts are all communal in nature, thus making a social identity more salient than an individual identity during the process of replication. Social identity would be more easily cued in situations related to replication, making the link between the social motivation to create a replicated savings group and goal achievement more likely. Therefore, I predict that social identity-based motivation will result in a greater increase in replication than individual identity-based motivation. Formally:

> H3: Social identity-based motivation will result in a greater increase in replication of savings groups than individual identity-based motivation.

Methodology: Randomized Controlled Trial

Academic research in marketing is typically conducted using lab experiments and econometric approaches with participants or data from western Europe and the United States. Conducting studies in emerging markets such as Asia, Africa, and South and Central America provides opportunities to test the generalizability of theories and concepts long established in the discipline as well as to identify new moderators, mediators, and contextual approaches to enrich the theories.

Evaluating the causal impact of an intervention can present empirical challenges of endogeneity through omitted variables, self-selection, or reverse causality. To address these challenges, a rigorous field study approach can be adopted known as a randomized

controlled trial, or RCT, pioneered in social sciences (Banerjee, Duflo, and Kremer 2016). The biggest strength of an RCT is that it allows for causal testing. In an RCT, participants are randomly assigned to different variations of an intervention (treatment groups) as well as comparison control group. The comparison control group offers a counterfactual to the effects of the intervention if randomization is successful. Because the intervention is randomly assigned, it is possible to measure the causal impact on the intervention by comparing the outcomes in the treatment group with those in the control group.

RCT field experiments are increasingly being adopted in marketing as well as other business disciplines. This is especially true after the 2019 Nobel Prize in Economics was awarded to Abhijit Banerjee, Esther Duflo, and Michael Kremer "for their experimental approach to alleviating global poverty". The field of development economics has been transformed significantly by this approach, and it appears that marketing strategy research focusing on firm and societal impact is moving in this direction as well. There has been a number of research studies using the RCT experimental approach for impact evaluation that have been published recently in prominent marketing journals. Examples include the impact of modernization on sales performance (Anderson, Iacovone, and Kankanhalli 2022), the impact of finance versus marketing skills on business performance (Anderson, Chandy, and Zia 2018), the impact of marketplace literacy on consumer welfare (Viswanathan et al. 2021) and the impact of marketing mentorship for small-scale entrepreneurs (Anderson et al. 2021). Additional evidence of randomized controlled trials becoming an increasingly used method by marketing researchers is evidenced by the special session at the American Marketing

Association (AMA) Winter Conference 2022 entitled ‘Economic and Social Impact of Marketing Interventions in Emerging Markets: An Examination using Field Experiments’ which included presentations of five current RCT studies in progress in emerging markets by scholars from around the world. Unlike this study, none of the RCTs conducted in marketing have examined the impact of marketing strategy on individuals such as women in the context of banking. The RCT for this study was pre-registered in The American Economic Association's registry on May 4, 2021 (rct.7421-1.0).

Sample Description

This RCT is conducted with a sample of 93 village agent trainers (VA’s) who supervise 1120 VSLA original savings groups with a total of 22,051 members, 17,092 of whom are women, in the Kasungu and Mchinji regions of Malawi in Eastern Africa. The sample was constructed by recruiting all existing CARE trainers in the region and all of their VSLA savings groups were thus in the sample. As a result, the study sample is representative of CARE Malawi’s population of beneficiaries. For data collection rounds that were resource intensive I selected a random subset of the full intervention sample stratified by trainers for a total subsample of 279 VSLA groups. This subsample of original VSLA groups consisted of 4977 members.

Figure 1.3 illustrates the study sample and the organization structure. Each individual person graphic represents one person. This is meant to represent the organization structure and illustrate the level at which randomization and the intervention occur (trainer level).

The average member of a savings group is a 38 year-old married woman who lives in a rural area and has 1-4 years of education. She is a smallholder farmer (less than

1 acre of land) and may be involved in small scale business. The average length of time as a VSLA group member is 33 months. She also speaks the local language, Chichewa. The average VSLA group is made up of 18 members. Women make up 86% of the membership. They primarily have share-out cycles that last 1 year and have weekly meetings.

This study developed an additional, 11th training module about replication that was added to the existing 10-module course that VA trainers use to form and train new VSLA groups. This additional module serves as a seeding strategy to try to get existing members to replicate the VSLA module. The additional replication training module was developed in collaboration with the CARE Malawi field team to fit into the existing CARE training course.

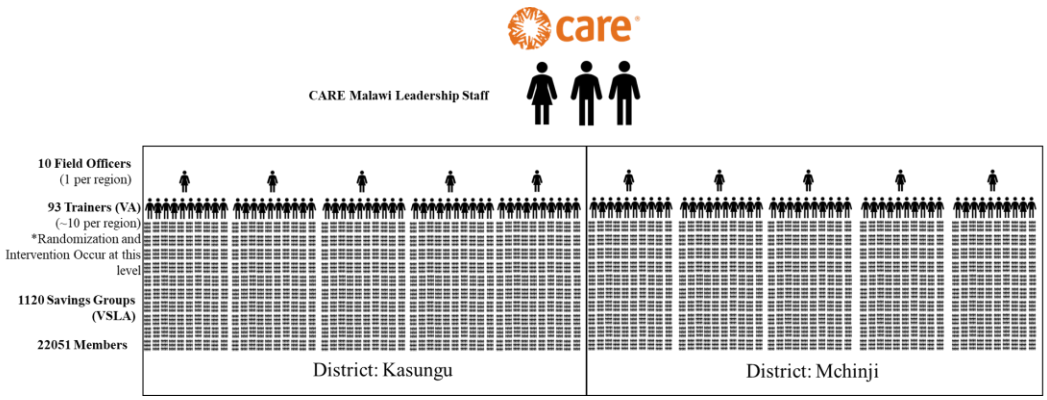

FIGURE 1.3. ILLUSTRATION OF STUDY SAMPLE AND ORGANIZATION STRUCTURE IN MALAWI

The study design has two intervention arms and one control arm. I randomly assign each trainer (VA) to one of the three arms. Field staff were concerned that it would not be possible for a trainer to transmit different motivation messages to different groups given low levels of trainer education and literacy, so it was not feasible to randomize at

the VSLA group level with trainers giving different trainings to different groups. Field officers were informed of the randomization, but trainers were not told that they had been assigned to a training that might differ from that received by other VAs in the same district. To minimize the risk of spillovers, trainings were held on different days (non-overlapping) for the different treatments, and participants were told they had been assigned to a day based on capacity restriction.

In the social identity-based motivation treatment (treatment A), the trainers learned how to deliver replication content to VSLA groups instructing them how to replicate and motivating them to replicate based on how it would give back to their community (social benefit). In the individual identity-based motivation treatment (treatment B), the trainers also learned how to deliver replication content to VSLA groups instructing them how to replicate, but their motivation for replication was based on how it would increase members' respect in the village (individual benefit). In the control group (treatment C), the trainers received an unrelated placebo training module which was a module that they had already received before about how to train their groups in share-out methodology which should have no impact on the likelihood of replication.

Trainers were randomly assigned to one of three treatment arms. The experimental groups are balanced based on pre-intervention covariates based on VA, VSLA, and VSLA member level observable characteristics. The differences between experimental groups are not economically meaningful, however variables with differences are included in the controls for the models. Additionally, I conducted attrition checks and I do not detect differential effects among groups. Attrition analysis is presented in Table 1.3, and balance checks are presented in Tables 1.4, 1.5, and 1.6.

TABLE 1.3. ATTRITION ANALYSIS at the Group Subsample Level at Endline)

(All Subsample groups were contacted in Round 1 of the survey)

	Group Responded to Endline Survey (without controls)	Group Responded to Endline Survey (with controls)
Individual Treatment	-0.0287 (0.067)	-0.0729 (0.073)
Social Treatment	0.0196 (0.0599)	-0.0225 (0.0618)
Individual Treatment – Social Treatment = 0	p=0.4282	p=0.4326
* p<.050; ** p<.01; ***p<.001		

TABLE 1.4. VSLA GROUP LEVEL SUMMARY STATISTICS BY TREATMENT ARM AND BALANCE TESTS

Original Group Subsample Level Variables	**Full Sample**		**Individual**		**Social**		**Control**		**A=B**	**B=C**	**A=C**
	n=279		n=87		n=102		n=90				
	mean	st. dev	mean	st. dev	mean	st. dev	mean	st. dev			
saturation_village	2.978495	2.164022	3.287356	2.302214	3.176471	2.240102	2.455556	1.843062	0.7381	0.0167	0.0086
saturation_30min	3.817204	3.238526	3.965517	3.02489	4.245098	3.577809	3.188889	2.960012	0.5664	0.0282	0.086
group_age	3.844803	2.839682	3.692529	2.745075	4.051961	2.895464	3.757222	2.883209	0.3848	0.4815	0.8787
group_formation	3.598566	8.239456	3.977011	10.39787	3.04902	1.367063	3.855556	10.24263	0.3731	0.4319	0.9377
new_enhanced	0.401434	0.491069	0.402299	0.493204	0.3921569	0.490642	0.411111	0.494792	0.8878	0.7905	0.9057
members_R1	18.12545	4.857913	19.47126	4.788161	18.33333	4.973859	16.58889	4.390732	0.1125	0.0112	0.000
Percent Women	0.8648	0.197032	0.842694	0.022703	0.8663382	0.020517	0.884724	0.01774	0.4399	0.5042	0.1449
leader_education	2.896057	1.17832	2.988506	1.186104	3.000000	1.160403	2.688889	1.176974	0.9465	0.0671	0.0934
cycle_length	10.65591	2.004462	10.96552	1.624294	10.32353	2.265373	10.73333	1.987602	0.0288	0.187	0.3968
loans_given_R1	450153.1	429097.4	501704.8	451451.5	483631.5	488076.9	362377.7	310129.2	0.7931	0.0444	0.0174
loans_paidback_R1	220031.2	276767	285827.5	339886.2	206910.1	283996.7	171298.7	171111.5	0.0837	0.3019	0.005
loans_default	61997.39	144705.2	71212.53	161612.8	47162.55	106676.2	69902.24	163877.9	0.2229	0.2508	0.9574
meetings_month	3.971326	0.222564	3.954023	0.301471	3.990196	0.099015	3.966667	0.234641	0.2548	0.3566	0.7554
entry_exit	1.010753	0.103322	1.011494	0.107211	1.009804	0.099015	1.011111	0.105409	0.9105	0.9295	0.9809
borrow_var	1.634409	0.482461	1.655172	0.478068	1.666667	0.473733	1.577778	0.496681	0.8687	0.2062	0.2926
save_var	1.939068	0.239635	1.954023	0.210649	1.941176	0.236456	1.922222	0.269322	0.696	0.6042	0.3838
lockbox_rules	1.139785	0.347387	1.08046	0.273581	1.1862	0.39125	1.144444	0.353509	0.0354	0.4403	0.1808

TABLE 1.5 VSLA MEMBER LEVEL SUMMARY STATISTICS BY TREATMENT ARM AND BALANCE TESTS

Member Level Variables	**Full Sample**		**Individual**		**Social**		**Control**		**A=B**	**B=C**	**C=A**
	n=3732		n=1190		n=1390		n=1152				
	mean	st. dev	mean	st. dev	mean	st. dev	mean	st. dev			
Age Member	38.490	13.510	37.973	13.262	38.787	13.620	38.673	13.647	0.126	0.833	0.208
Time Member	35.190	32.202	33.994	32.124	38.644	33.653	32.285	29.723	0.0004	0.000	0.182
Education Member	2.700	1.080	2.731	1.117	2.694	1.059	2.709	1.085	0.390	0.726	0.631

TABLE 1.6 VSLA MEMBER LEVEL SUMMARY STATISTICS BY TREATMENT ARM AND BALANCE TESTS

VA Level Variables	**Full Sample**		**Individual**		**Social**		**Control**		**A=B**	**B=C**	**C=A**
	n=96		n=29		n=34		n=30				
	mean	st. dev	mean	st. dev	mean	st. dev	mean	st. dev			
Number of VSLA Groups	12.11	5.45	13.655	5.5	11.0588	4.929	12.067	5.901	0.0528	0.460	0.290
Age	39.54	7.97	38.720	8.039	42.882	7.984	37.067	6.863	0.0443	0.003	0.397
Tenure	1.84	0.37	1.960	0.18	1.735	0.448	1.862	0.351	0.0122	0.222	0.166

Training Description

The replication training intervention used in the study motivates savings group members to replicate their savings groups through identity-based motivation, namely a social or individual identity. The training intervention took place over two weeks in August-September 2021 using a train-the-trainer model. Trainers were invited to a central location for a half-day additional training on how to teach the new replication motivation module to the VSLA groups they supervise. At the training, trainers were given materials to train their VSLA savings groups with instructions to train them over the next month or two at regular meeting times. The control group was still brought to an overnight training event for fairness among members, but they received a training module unrelated to replication. To support long-term identity-based motivation, the training is supplemented with identity salience reinforcement initiatives. Every VSLA member in the treated groups receives a flyer during training that they could take home with them. The flyer had either social or individual motivation messages combined with visual and written instructions for how to create a replicated group. Additionally, reinforcement messages with reminders about training content and motivation to replicate were sent to VSLA members to keep individual or social identities salient to members.

Measurement of Outcomes

The outcome variables important to the study are *replication sum*, *replicated group quality*, and qualitative *motivation for replication.* Medium-term and long-term post surveys were conducted 6 months, 12 months, and 18 months after the intervention. The 6-month post survey was the first count of *replication quantity*, i.e., how many replicated VSLA groups had been created by existing groups. This was conducted to get

a preliminary count of replication activities and the number of replicated groups although replication was expected to continue to occur. At the 12 month post survey, *replicated group quality* was measured along with another *replication quantity* count in August 2022, 1 year past the initial intervention. At this point, replicated groups were expected to have been formed and be partway through their loan cycle. *Replication group quality* included measures of group rules and savings activities. A summary of variables collected in each survey round is presented in Table 1.7. The18-month post survey in January and February 2023 is important because replicated groups would be mature and would have completed their loan cycle for the first year and completed a share-out. (See Timeline in Figure 1.4). Additionally, supplemental qualitative interviews about motivation for replication were conducted with members who created replicated groups. The results presented are the 18-month replication results.

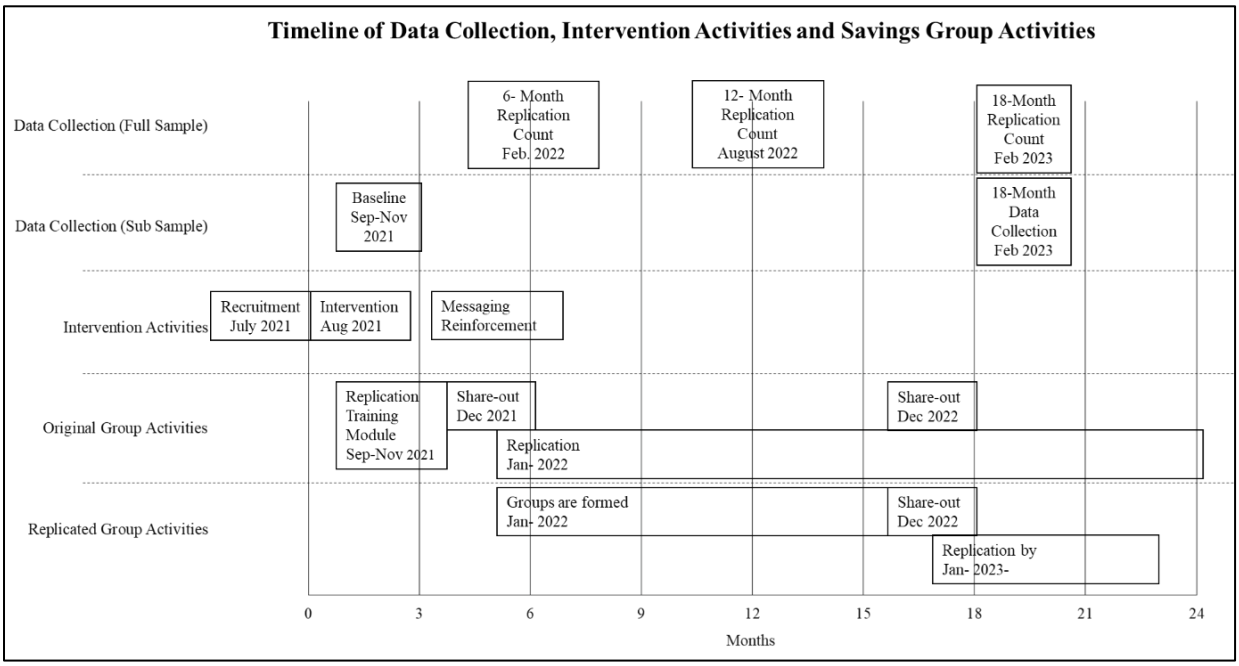

FIGURE 1.4. RESEARCH TIMELINE FOR VSLA REPLICATION IN MALAWI STUDY

TABLE 1.7. VARIABLES COLLECTED IN EACH SURVEY ROUND

Surveys	Respondents	Variables Collected
Baseline VA Data Collection (at time of VA intervention) August 2021 N=93 VA's	Trainer Level: • Trainers who attended Training (N=93)	• Demographics • Saturation (In Map form) • List of Original Groups and Basic Information – 1120 Original Groups Identified

Baseline Enumerator Data Collection (2 Rounds: at time of VSLA group training and 4 weeks post-training)	Original Group Subsample Level:
	• Randomized Subsample of Original Groups (N=279 groups)
	Member Level
	• Members of Original Group Subsample
	  • Round 1:
	  • (N=3993 Members)
	  • Round 2:
	  • (N=3726 Members)
	
	4977 members on the rosters
		• Training Outcomes
		• Collectivism
		• Individualism
		• Intention to Replicate/Initial Replication Activities
		• Saturation
		• Leader Demographics
		• Group Demographics
		• Group Quality (Rules, and savings amounts)

Replication Count (6 Months post intervention- February 2022)	Replicated Group Level: (N=103 Groups Interviewed)	• Contact Information • Group Demographics • Motivation for replication • Original Inspiration Group
Phone Enumerator Replication Tracking (12 Months post intervention) July-August 2022	Replicated Group Level: (N= 168 Groups Interviewed) 297 replicated groups verified	• Contact Information • Group Demographics • Original Inspiration Group
Qualitative Replicated Group Leader Interviews (12 Months post intervention)	Replicated Group Level: Interviews with Founders (N=10 founders interviewed)	• Contact Information • Motivation for Replication • Leader Demographics • Challenges • Rules • Risks • VA help
Final replication count and quality assessment (18 Month post intervention)	Trainer Level: • VA's (N=92) • Original Groups Subsample (N=235 Interviewed) • Replicated Groups (N=337 Groups Interviewed) 454 replicated groups Identified	• Demographic characteristics of member, original group, or VA • Share-out Statistics • Group Quality Metrics • Saturation • VA Support • Original Inspiration Group

Empirical Specification

The empirical specification for the data collected from the RCT reflects the impact of the random assignment to social or individual motivation training on the outcome measures and is shown in equation (1).

(1) $y_{ia} = \alpha + \beta_{1a} Social\ Motivation\ Training_i + \beta_{2a} Individual\ Motivation\ Training_i + X_i'\gamma + \epsilon_{ia}$

Where Y is the outcome measure for VSLA group *i* for outcome *a*, and α is a constant. The variable *social motivation training* indicates a VSLA was assigned to social motivation training while the variable *individual motivation training* indicates a VSLA was assigned to individual motivation training. X_i is a vector of group level controls including group level fixed effects, trainer fixed effects, as well as variables that were not balanced in balance checks analysis including leader education, saturation, number of members, and rules of the group. The groups were also clustered at the trainer level. ϵ_{ia} is a normally distributed error term reflecting a combination of group and trainer level unobservables.

Differences between social motivation and control group as well as between the individual motivation and control group will be observed. Additionally, the difference between social motivation and individual motivation will be observed. Due to the small sample size, there are challenges with power to compare the effectiveness of the two treatments. For each outcome *a*, a two-way test is applied to reject the null hypothesis β_a=0.

Results

Term Replication Results-Training Outcomes

The impact of the training on motivation and intentions to replicate are presented in Table 1.8. The identity-based motivation component of the training was measured to ensure participants believed the motivation to replicate a group was tied to the intended pre-existing social or individual identity. After participating in training, participants in all conditions were asked to identify the motivation they would have for creating a replicated VSLA group. They could choose between choices of *giving back to the community* (social), *helping others save* (social), *gaining respect in the community* (individual), or *the opportunity to lead* (individual). These results check that the treatments, which targeted trainers, affected group members' motivations as intended. Those who participated in the social-motivation module training were significantly more likely to be socially motivated to replicate (β=0.1829, p=.001) and those who participated in individual motivation module training were significantly more likely to be individually motivated to replicate (β=0.363, p=0.000). The treatment groups were significantly different (p=0.0003, p=0.005).

A preliminary outcome measure of *intention to replicate* was measured after the VSLA groups had been trained by the VA trainer to determine whether VSLA members intended to replicate their groups after receiving training from the trainers. VSLA members were asked if they intended to replicate their savings group and asked to rank their intention on a 9-point scale. *Intention to replicate* is measured both immediately after training and 3-4 weeks after training. There is a positive and significant increase in *intention to replicate* for members assigned to both treated groups (those who received

either individual or social replication training) over the control group both immediately after training (β=1.731, p=0.000, β=1.472, p=0.000) and 3-4 weeks later. This is important because it shows a long-term effect from the identity-based motivation training. In the later rounds of data collection, quantity, and quality of replicated VSLA groups were collected. On the intention to replicate measures, there is not a significant difference in the *intention to replicate* between the individual and social treatment conditions either right after training or 3-4 weeks after training (p=0.140, p=0.804). Members from both the individual and social treatment groups are more likely to state that they intend to replicate than the control group when asked right after they receive training and again 3-4 weeks later. Results are presented in Table 1.8.

TABLE 1.8: TRAINING RESULTS: MOTIVATION TO REPLICATE (MANIPULATION CHECK) AND PRELIMINARY INTENTION TO REPLICATE AT MEMBER LEVEL

	Social Motivation to Replicate	Individual Motivation to Replicate	Intention to Replicate (Immediately after training)	Intention to Replicate (3-4 weeks after training)
Individual Motivation Treatment	-0.797 (0.078)	0.363*** (0.072)	1.731*** (0.264)	1.564*** (0.298)
Social Motivation Treatment	0.1829*** (0.0535)	0.0602 (0.074)	1.472*** (0.257)	1.515*** (0.273)
Control Mean	0.6872	0.1567	4.756	5.493
Individual Treatment-Social Treatment=0	p=.0003	p=0.005	p=0.140	p=0.804
Observations	3725 Members	3725 Members	3992 Members	3725 Members

* p<.050; ** p<.01; ***p<.001, standard errors in parentheses

Long-Term Replication Results

While replication is on-going, data was collected over the 18 months following the intervention[4] (data collection occurred in February 2022- 6 months and January 2023- 18 months). Both 6 months and 18 months are considered long-term results. The results

[4] Field questionnaires and data collection protocols available from author upon request.

are expected to be strongest at the 18-month post survey data collection because it gives time for the replicated groups to form and mature. Replication can happen at any time of the year, but groups were expected to replicate after the end of the loan cycle in December 2022 when the annual "share-out" of savings funds is expected to occur. The optimal time for replication occurs post share-out when groups reform to begin a new savings cycle. At this point, any existing group member can help other community members form their own groups because they will have full knowledge of the full VSLA loan cycle and will be equipped to help replicated groups form.

Replication counts were conducted by phone, with enumerators calling all trainers and group members to ask them to identify all replicated groups they were aware of and share the contact information of those replicated groups. Multiple attempts were subsequently made to contact all identified replicated groups and verify their existence and status as replicated groups and uniquely identify replicated groups so that they were not double counted. After identifying potential replicated groups, the replicated groups were verified- either through talking with them over the phone or confirming with the VA trainer that they existed. Enumerators surveyed replicated group leaders by phone. The replicated groups were asked to identify the original group that inspired them. I then linked the groups they mentioned back to the original list of VSLA groups from the Intervention in August 2021. Linking back to the original VSLA was important because it allows me to evaluate the aspects of original groups that lead them to create replicated groups. Not all replicated groups could be linked back to the original group in the sample who formed them. Some replicated groups were never successfully contacted to complete a survey so I was unable to link them to their founding group. Additionally, some

replicated groups were formed without direct influence from original groups supervised by CARE Malawi- usually through the influence of other savings groups in the area. All replicated groups were linked back to VA trainers because trainers are assigned by region.

Replication was measured both as a binary indicator of whether replicated groups were created, and as a sum of how many replicated groups were created. To supplement analysis at the original group level, replicated groups were also linked back to original VA trainers. Therefore, replication was analyzed both at the original group level (did the original group create a replicated group, how many replicated groups did the original group create) and at the aggregate trainer level (did the trainer supervise the original groups that created replicated groups, how many replicated groups did the original groups that the trainer supervises create). The variable *normal sum* is giving each original group full credit for a replicated group even if it was shared, and *adjusted sum* is giving each original group fractional credit for a replicated group if it was shared: i.e.: 0.5 if a replicated group said it came from two original groups).

6-Month Results

Table 1.9 reports replication results at the VA trainer level at 6 months post intervention. I run this regression at the trainer level, which is the level at which treatment was randomized. 6-month post data collection results showed that social and individual training were significant in increasing both whether a group replicated and the number of groups. There is a positive and significant effect of both social and individual replication training on the likelihood of the creation of a replicated group, and there is a positive and significant effect of both social and individual training on the number of

replicated groups created. Individual identity-based motivation replication training leads to 1.321 new replicated groups per trainer on average 6 months after replication (β=1.321, p=0.035) and social training leads to 1.64 replicated groups on average (β=1.64, p=0.008). This shows support for H1 and H2. H3 is unsupported as shown by the insignificant t-tests across treatments (p=0.5915, p=0.590).

TABLE 1.9: 6-MONTH POST SURVEY RESULTS FOR *REPLICATION COUNT*

	VA Replication Occurs (Binary)	VA Replication Sum
Individual Motivation Treatment	0.141* (0.060)	1.321* (0.615)
Social Motivation Treatment	0.172** (0.059)	1.64** (0.607)
Control Mean	0.828	2.241
Individual Treatment – Social Treatment = 0	p=0.5915	p=0.590
Observations	93 VA's	93 VA's
* p<.050; ** p<.01; ***p<.001		

18 Month Results

18-month post data collection results showed that social and individual training were significant in increasing both whether an original group created any replicated groups and the number of replicated groups they created. This data was analyzed at both the trainer level and the original group subsample level because most groups could be linked back to their original groups. In support of hypothesis 1, there is a positive and significant effect of social replication training on the likelihood of the creation of a replicated group and on the number of groups created. In support of hypothesis 2, there is a positive and significant effect of individual replication training on the likelihood of the creation of a replicated group, and there is a positive and significant effect of both social and individual training on the number of replicated groups created. Individual Identity-

based Motivation replication training leads to 1.845 new replicated groups per trainer on average 18 months after replication (β=1.845, p=0.003) and social training leads to 2.32 replicated groups on average (β=3.23, p=0.000). At a group level individual identity-based motivation replication training leads to 0.456 new replicated groups per original group on average 18 months after replication (β=0.456, p=0.001) and social training leads to 0.503 replicated groups on average (β=0.503, p=0.000)- see Original VSLA Replication Adjusted Sum column in Table 1.10. There is no statistical difference between individual and social motivation treatment as shown in the Wald Test results in Table 1.10, which does not support hypothesis 3. 454 replicated groups were identified and verified as existing, although this model focuses on the replicated groups formed by the subsample of the original groups.

I conducted OLS regression to test the models. For robustness for the models with replication counts as dependent variables I conducted a Poisson regression, and for the models with binary dependent variables I ran a logit model, and the results remain consistent.

The data shows that the average replicated group has 19 members, this is within the CARE guidelines of 15-30 members. Women make up 82% of the membership. They primarily have share-out cycles that last 1 year and have weekly meetings. On average, there are 4 or 5 other savings groups in their village, and eight groups within 30 minutes walking time.

TABLE 1.10: 18-MONTH POST SURVEY RESULTS FOR *REPLICATION COUNT* AND *REPLICATION SUM*

	VA Replication Occurs	VA Replication Sum	Original VSLA Replication Occurs	Original VSLA Replication Sum	Original VSLA Replication Sum Adjusted
Individual Motivation	0.035	1.845***	0.198**	0.481***	0.456***
	(0.047)	(0.607)	(0.084)	(0.148)	(0.131)
Social Motivation	0.070	2.320***	0.204***	0.509***	0.503***
	(0.048)	(0.620)	(0.073)	(0.146)	(0.134)
Constant	0.9575***	-0.291	0.242	0.3602	0.160
	(0.140)	(0.1803)	(0.226)	(0.4507)	(0.398)
Control Mean	0.933	3.233	0.333	0.422	0.355
	(0.323)	(0.441)	(0.052)	(0.082)	(0.074)
Indiv-Social=0 (Wald Test)	P=0.4864	P=0.4466	P=0.9346	P=0.8633	P=0.7415
Observations	93 VA's	93 VA's	279 Original Groups	279 Original Groups	279 Original Groups
P<0.01= ***, p<0.05=**, P<0.1=*, Standard Errors in Parentheses					

Examining Unintended Consequences

It is important to explore unintended consequences of promoting replication such as degradation of the quality of replicated groups, or the cannibalization of members from original groups.

Quality Measures

I compare the groups created through replication to the original savings groups created by CARE in Table 1.11. I measure the *number of rules* followed by both types of groups to determine how closely replicated groups follow standard CARE methodology. There is no statistical difference between the number of rules followed by replicated groups and by original groups (p=0.1209). I measure the *total amount loaned* and the *total amount saved* by savings groups (in Malawian Kwacha) to determine whether replicated groups have the same level of funding and savings. Replicated groups save less money (p=0.0299) and give out less loans (p=0.0004) than original groups. I measure the

default rate of loans to see if replicated groups suffer from higher default rates than original groups, perhaps through lack of training, though there is no statistically significant difference in the default rate between original and replicated groups (p=0.5125). Finally, the percent of members who take out loans may suffer in replicated groups if there is not adherence to CARE methodology, however there is no difference between replicated and original groups (p=0.3171).

TABLE 1.11: QUALITY OF REPLICATED GROUPS COMPARED TO ORIGINAL GROUPS

VA Level Variables	Original Groups		Replicated Groups		T- Test Original= Replicated
	n=232		n=279		
	mean	st. dev	mean	st. dev	P
Total Amount Loaned (MWK)	743393.50	997925.9	509723.3	431271.8	0.0004***
Number of rules	10.73	1.46	10.934	1.512	0.1209
Default rate	0.03	0.096779	0.0361	0.113172	0.5125
Total Amount Saved (MWK)	774584.00	750928	650739.1	531001.3	0.0299**
% of Members who take out loans	0.921998	0.148237	0.93595	0.16358	0.3171

In addition to comparing the quality of replicated groups to original groups, I examined whether the training had any effect on replicated group quality. 337 of the 454 replicated groups (74.2%) were interviewed in the endline data collection, and 279 of the 337 replicated groups (82.8%) had completed a share-out cycle and reported on quality measures related to savings practices. The groups that completed the quality measures are not statistically different than the entire sample as shown by a chi-square test of the number of group members (p=0.789).

I measure the *total amount loaned* by the group, the number of traditional CARE savings group rules that the groups still follow, the *default rate* for paying back loans, the *total amount saved* by the group, and the percent of members who take out loans. These

measures reflect the health of the group and are indicators of how closely the groups adhere to the CARE methodology.

There was marginal effect on the number of rules kept by replicated groups in the individual training (β=-0.559, p=0.075) and the % of members who take out loans (β=0.064, p=0.013) as seen in Table 1.12. However, all other measures were not significantly different than the control groups. This indicates that there is no major impact of the replication treatment on the quality of the replicated groups.

TABLE 1.12: EFFECT OF TRAINING ON THE QUALITY OF REPLICATED GROUPS

	Amount of Loans Given	Number of Rules Kept (Poisson)	Default Rate	Amount Saved	% Members who take out loans
Individual	72365	-0.559*	0.013	94235	0.064**
	(101953.9)	(0.031)	(0.013)	(122037)	(0.025)
Social	-41612	-0.361	0.026	-23838	0.022
	(84745)	(0.620)	(0.017)	(97104)	(0.026)
Control Mean	505723	11.29	0.018	632368	0.906
	(75845)	(0.214)	(0.057)	(77971)	(0.022)
Indiv-Social=0 (Wald Test)	P=0.1471	P=0.5144	P=0.4682	P=0.2870	P=0.0239
Observations	279 Rep Groups	337 Rep Groups	279 Rep Groups	279 Rep Groups	279 Rep Groups
P<0.01= ***, p<0.05=**, P<0.1=*, Standard Errors in Parentheses					

Member Cannibalization

One of the concerns raised by the members of the partner organization was the concern that members may leave their original groups to create new replicated groups, perhaps negatively impacting membership of the original groups. At the 12-month post survey, original groups were asked about member cannibalization. The results are presented in Table 1.13. I found that 49% of replicated groups had members who had left the original group to join the replicated group, and on average 5.4 members left to join the replicated group. Additionally, I found that membership in multiple groups is

common. 107/165 surveyed groups had members who are members of multiple groups (65%), and on average there are 4.36 members who are members of multiple groups.

The main takeaway from this insight would be that cannibalization of membership is a risk of creating replicated groups, but with 15-30 members in each original savings group, the number of members who leave will not impact the existence of the original group. As a result, the total number of people with access to savings will increase which means the community should be better off.

TABLE 1.13 MULTIPLE GROUP MEMBERSHIP

Multiple Group Membership Stats	**Results about Multiple Group Membership**
Number of Replicated Groups who have members that left other groups to join Replicated Group	81/165 Replicated Groups Surveyed
Average Number of members who left	5.40 Members
Number of Replicated Groups who have members with multiple group memberships	107/165 Replicated Groups Surveyed
Average Number of members with multiple group membership	4.36 Members

Full Group Motivation for Replication - Qualitative Insight

Although I explored social and individual motivation for creating a replicated group, a lot of replicated groups are created due to existing groups being full in regard to the number of members, so a new group must be created.

The following two quotes from qualitative field interviews illustrate this point:

> "I: What I want to understand is that was this just a thought of your own to start a group? Or you saw other people? What really happened?
> R: We saw other people doing it and then we were also motivated to do the same.
> I: Why didn't you just join the same group?
> R: Their group had enough members and that's when we thought of starting ours."

> "R: People that had never belonged to village banks were inspiring to join village banks. We had seen that the Chikondi group had enough members… So, we had thought it wise not to refuse the other people that wanted to join but rather give them a chance of joining a new group."

Replication training may not just form new groups, it may also result in adding new group members to an existing group. If an existing group is not full, then community members can be invited to join to gain benefits instead of creating a completely new group. This addition of new members would be an unmeasured benefit of replication training. Although the number of replicated groups would not be increased, the total number of people with access to financial saving would increase, which is a positive benefit overall.

Discussion

In this study, an RCT is used to examine the impact of identity-based motivation replication training on the replication rates of savings groups in Malawi with the goal of increasing financial access for women. A sample of 22,000 members spread across 1120 savings groups was randomly assigned to one of three treatment arms, a social identity-based motivation condition, an individual identity-based motivation condition, and a control group. The results show that both social and individual identity-based motivation lead to increased replication rates of savings groups 18 months after the intervention. This research contributes to the literature streams on financial inclusion, identity theory, and sales motivation.

With 1.7 billion unbanked adults worldwide, financial inclusion initiative impact is a topic that researchers have studied extensively. Informal savings organizations are a popular financial inclusion initiative that has been shown to have significant benefits.

This study expands the literature on financial inclusion by examining the positive role a marketing intervention can play in increasing financial access, particularly for low income women in emerging markets. By adding a novel motivational component to the effort to increase the replication rate of informal savings groups, this study shows that identity-based motivation leads to increased replication and impact of savings groups over time. My essay introduces identity-based motivation to financial inclusion literature.

Identity theory extant literature is extensive, but primarily conducted in laboratory or classroom settings. It also usually involves a single manipulation which is immediately measured. This essay contributes to the identity theory literature through applying identity-based motivation in a field study context for a long-term goal. By linking the motivation to create a replicated savings group to the social or individual identity of a savings group member and tangibly increasing replication rates, I show that identity can lead to long-term achievement.

Finally, this study contributes to the sales motivation literature. The sales motivation literature in the discipline of marketing primarily focuses on motivation through extrinsic rewards including cash incentives. The constraint of working with an NGO that does not allow for financial incentives creates the opportunity to study the impact of a non-monetary incentive, identity-based motivation. By showing the increase in replicated group creation by savings group members (informal sales force) in response to identity-based motivation, this essay demonstrates the effective use of a non-monetary incentive to motivate an informal sales force in a field study context in the long-term.

Conclusion

This study expands the literature on Marketing for a Better World by showing how a marketing intervention results in increased financial inclusion for women in rural Malawi. There are several implications for marketing theory and for practitioners, as well as many opportunities for future research outlined below.

Implications for Theory in Marketing

This study examines the effect of a marketing intervention on financial access for women in emerging markets. This study serves as proof of the positive impact marketing strategy can play in increasing financial inclusion. Additionally, this study shows that identity-based motivation can be utilized in a real-world, long-term context for a societally relevant issue. It responds to the call by Oyserman (2015b) to use identity-based motivation research with real world populations to leverage behavioral change.

This research contributes to the marketing literature by examining identity-based motivation as a non-monetary incentive in a field setting. It also contributes to the literature by studying identity as a motivational tool over a long time-period rather than in the short-term in a laboratory or classroom setting. Finally, I contribute to the replication literature by adding a motivational component to examine the drivers of replication.

Implications for Practice

Identity-based motivation strategies could also be leveraged by non-profit and for-profit firms as well as governmental groups who seek to incentivize groups to spread ideas to increase their impact. Due to pandemic delays and other events, the timing of the replication training intervention in a related study in Tanzania was a few months before the coinciding CARE International project that formed groups (Blank Project/UCHUMI

Project) was scheduled to phase out. Because of this timing, replication training took on an unexpected role of being implemented along with project phase out. This brought the idea that replication training could be used as a tool for project phase out to increase the sustainability of the project initiatives after the funding has ended. By training existing members to create new groups and increase impact, replicated groups could form even after CARE International had ended funding in the region. Replication helps ensure that impact continues even after the project ends.

454 replicated groups were identified during the 18 months following the intervention, which means increased financial access for approximately 8600 members. Additionally, the results show that the intervention increases replication rates by approximately 50% for both social and individual treatments. These totals underestimate the lifetime value of the potential impact of the replication training because replication is only measured for 18 months. In this study only first order replication is measured, meaning that only groups that are directly created by groups that received the intervention are counted. However, it is reasonable to assume that organic replication will occur by replicated groups thus resulting in second and even third order replication and increased impact. Thus, the impact on increased financial access for women is underestimated in this model.

CARE International field offices are planning to hold research dissemination meetings for NGO and development organization practitioners in Malawi and Tanzania to describe how replication training can be used both to scale impact as well as in conjunction with exit plans for funded projects to ensure impact sustainability.

Although current results from this study do not indicate whether social or individual motivation training is more effective at incentivizing replication, additional analysis could be conducted to determine whether there are cases when one training is more effective. The best module will be incorporated into the CARE VSLA training methodology and disseminated across VSLA groups in the 59 countries CARE operates in to increase their global reach through replication.

Future Research

Several opportunities exist for future research based on the findings of this paper. A criticism of RCTs is that they are context specific. A single experiment cannot provide generalizability to other contexts and situations (Banerjee and Duflo 2011). This presents the opportunity for other researchers to expand the generalizability of this study by applying identity-based motivation interventions in other geographic regions and in new contexts. Identity-based motivation can be studied as a non-monetary incentive both in the field by other NGOs as well as by firms with formal sales forces as an alternative to monetary incentives. Other opportunities for research include expanding the understanding of the use of identity-based motivation in the long-term and outside of laboratory and classroom contexts, particularly to address additional SDGs. Researchers could explore the nuances of the use of identity in the long term and develop understanding around invoking the salience of identity over time. This thesis essay creates a strong foundation for future research on the use of marketing interventions in creating positive societal impact.

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CHAPTER 3

ESSAY 2: A CONCEPTUAL EXAMINATION OF MARKETING TRANSGRESSIONS IN THE OPIOID EPIDEMIC[5]

[5] Ramey, R. and S. Bharadwaj. To be submitted to the *Journal of Public Policy and Marketing*.

Abstract

Marketing transgressions are strategic marketing actions that result in negative externalities to society or the environment, whether intentionally or unintentionally. The process of how classic marketing activities lead to marketing transgressions remains understudied in the discipline. The opioid epidemic is an opportune case study to examine marketing transgressions. This essay provides a descriptive overview of the role of pharmaceutical marketing in the opioid epidemic through drawing on qualitative data sources including court documents, chat forum discussions, internet archives, and data on promotional activities. A framework is presented for how marketing strategy decisions can lead to responsible marketing or marketing transgressions. This essay provides conceptual and descriptive background for essay 3.

Introduction

In the early 1990's, no doctor would prescribe opioids for chronic pain- opioids were only prescribed to patients at the end of life. Pain was something to be dealt with, and the knowledge that opioids were a risk for addiction was prevalent (Harvard edX 2019). A decade later, pain had become a "5th vital sign" (Morone and Weiner 2013), and physicians were copiously prescribing opioids for chronic pain, often prescribing opioids in inappropriate situations. Addiction to opioids became rampant and overdoses from prescription opioids as well as street drug substitutions led to overdose deaths.

How did this happen? What role did pharmaceutical firm strategic marketing efforts play? This thesis essay reports on a case study of how established marketing actions led to a widespread marketing transgression, the opioid epidemic.

Prescription opioids marketing epitomizes transgressive marketing, and the insights gained from this extreme situation are valuable to marketing theory and practice. Pharmaceutical companies followed the traditional marketing strategy playbook of using accepted product-market strategies such as product development, market development, market penetration, targeting, as well as others. Unfortunately, the result of this successful use of marketing strategies was a public health crisis which has led to over half a million deaths due to opioid overdoses and annual death rates that keep increasing (NIDA 2022). Consequently, it is necessary to revisit the classic marketing strategies to add nuances and exceptions about how they lead to responsible marketing outcomes, and when they result in marketing transgressions, which is the purpose of this paper.

This thesis essay is descriptive. First, I provide a contextual overview of the events of the opioid epidemic, particularly events related to marketing. I position the insights into the literature through examining marketing transgressions. I then present the classic marketing activities that were used by pharmaceutical firms that led to the opioid epidemic. I conclude with a framework for how marketing strategy decisions can lead to either marketing transgressions or responsible marketing actions.

This work has implications for the marketing discipline, future research, and teaching in business schools about the intentionality behind marketing strategy actions. The essay highlights the need for marketing researchers to expand the field of marketing transgressions as a complement to the recent focus on responsible marketing (de Ruyter et al. 2022), Better Marketing for a Better World (Chandy et al. 2021), and sustainability (Ekici, Genc, and Celik 2021; Gonzalez-Arcos et al. 2021; Sheth and Parvatiyar 2021).The findings from the essay also suggest that marketing educators need to add

nuance to their marketing education content, exposing students to the importance of intentionality behind classic marketing actions and their potential outcomes and effects on society.

Literature Review

Marketing Transgression Literature Review

While the literature has used a variety of terms to examine negative marketing and business actions including corporate illegality, wrongs in the marketplace, corporate wrongdoing, deceptive marketing or brand transgressions, I use the term "marketing transgressions" which I define as "marketing strategies that result in harm to society or the environment, whether intentionally or unintentionally." The effect of a marketing transgression on the firm relationship with the consumer and the effect of a marketing transgression on firm value and future firm strategic decisions have been examined. Additionally marketing transgressions have been studied from an ethical perspective.

Effect of the Marketing Transgression on the Firm Relationship with the Consumer

Consumer psychology research has examined how consumers react to corporate wrongdoing (Romani, Grappi, and Bagozzi 2013), and brand transgressions (Aaker, Fournier, and Brasel 2004) such as through boycotting (Klein, Smith, and John 2004) or other punitive actions. The literature focuses on the effect of a marketing transgression on the firm relationship with the consumer and the resulting behavior the consumer decides to engage in, for instance the decision to boycott the firm.

The extant literature is extensive and recent literature has worked to integrate them. Campbell and Winterich (2018) unify the literature under the topic of 'consumer psychology of marketplace morality' and clarify that marketplace morality is distinct

from morality in other contexts because it exists within an exchange relationship (relationship between firm and consumer). Khamitov, Grégoire, and Suri (2020) integrate the literature streams of brand transgressions, service failure and recovery, and product harm crisis to develop a unified discipline of 'negative events in marketing'. Their insights across the three themes of theoretical considerations, dynamic and longitudinal aspects, and method considerations are the cornerstones of their proposed new unified discipline. They focus on the effect of a significant negative event on the consumer-brand relationship, the "moment of truth", a term coined by Lafley and Charan (2008).

It should be noted that these integrated topics of 'marketplace morality' and 'negative events in marketing' have a consumer focus. They offer deep insights on the effect of marketing transgressions on customer actions and on customer relationships with the firm, but this essay is distinct from this literature because it focuses on firm strategy instead of on the consumer. Additionally, I do not address the effect of the marketing transgression on customer relationships, but rather I focus on a larger negative societal outcome, a public health crisis.

Effect of the Marketing Transgression on the Firm Value and Strategic Decisions

The strategic marketing literature examines negative marketing events (i.e. product recall) and their effect on firm value. These papers focus on the firm outcomes rather than on the ethicality of the decision making process, or the impact on the consumer relationships. Chen, Ganesan, and Liu (2009) examine the effect of strategic responses to recalls of faulty products (in this case the negative event has already occurred) and the resulting impact on firm value. They find that proactive strategies in the face of product recall have a more negative effect on firm value than passive

strategies. The characteristics of Food and Drug Administration (FDA) deceptive marketing violations are examined to evaluate the negative effect of regulatory exposure on firm value (Tipton, Bharadwaj, and Robertson 2009). It is found that the highly egregious deceptive marketing or deceptive marketing aimed at vulnerable populations has a greater negative effect on firm value. This stream of literature focuses on the impact on the firm once the marketing transgression has occurred. This essay is distinct because it focuses on how the transgression occurred.

Ethics of the Marketing Transgression

Significant research exists in the business ethics literature (Dacin et al. 2022), particularly related to the ethics of marketing (Schlegelmilch and Öberseder 2010). Marketing ethics research tends to examine the application of moral standards to marketing decisions from the perspective of the firm or the decision maker. Many efforts have been made to create models to aid decision makers in the face of business ethical dilemmas (Hunt and Vitell 2016; Laczniak and Murphy 1991) and to create frameworks for ethical analysis (Holley 1986; O'Boyle and Dawson 1992). Payne and Pressley (2013) review these models and frameworks with the intention to develop a code of marketing to guide marketing professionals' decisions. The ethics literature focuses on moral standards and the intent that precedes unethical business decisions or marketing transgressions. This essay is distinct from the ethics stream of literature because I examine the process of how a marketing transgression occurs rather than the moral standards that precede the decision to engage in a marketing transgression. This essay also does not examine the intent to engage in a marketing transgression, but rather how classic marketing strategies led to the transgression regardless of intent.

How Strategic Decisions Lead to Marketing Transgressions

There is a paucity of research examining how classic marketing strategies lead to negative societal outcomes. I adopt a marketing strategy lens to examine when, why, and how legitimate marketing strategies may lead to marketing transgressions. Existing literature has developed deep insights on the ethics of marketing transgression decisions and on the effect of negative events on customers and on the firm, but I extend this literature by examining how strategic firm decisions led to marketing transgressions.

Opioid Epidemic Literature Review

Due to the far-reaching nature of the opioid epidemic, there are a plethora of studies outside of the marketing discipline examining the epidemic. These studies examine the factors contributing to the opioid epidemic including the supply chain factors that fueled it (Skilton and Bernardes 2022) and a bioethical review of the effect of corporate influence on it (Marks 2020). They also study the effects of the epidemic on society including the effect on municipal finance (Cornaggia et al. 2022), and on student test scores (Cotti, Gordanier, and Ozturk 2020). Other studies examine the legalization of marijuana and the effect on opioid prescribing rates (Chihuri and Li 2019; Wen and Hockenberry 2018).

Despite pervasive popular press claims that marketing led to the opioid epidemic (Quinones and Hellegers 2015), there has been little research to examine the role of marketing in the public health crisis. There has been no research published in major marketing journals that focuses on the opioid epidemic. Gratz, Sarkees, and Fitzgerald (2021) study word choice by firms and media coverage in opioid lawsuits to show that firms who produced and manufactured opioids used denial speech and abstract language

more than those who did not. Two recent studies in consumer behavior mention the opioid epidemic in the implications section of the manuscripts. Hamby and Russell (2022) study the effect of ambivalence on approach behavior to risky products by youth and briefly mention opioids along with e-cigarettes as products whose consumption threatens well-being and as a possible avenue for applications of the findings in the paper. Zheng and Alba (2021) briefly discuss the opioid addiction public policy as an avenue for application of their findings on the effect of the lay understanding of the biological underpinnings of human behavior on policy implications. There remains a lack of research in the marketing discipline examining the marketing strategy decisions by pharmaceutical firms who sold opioids and their effect on societal welfare.

In research published outside of marketing discipline journals there is some work regarding the impact of marketing actions on the opioid epidemic, including an analysis in public health of the promotion and marketing of OxyContin (Van Zee 2009a), an empirical study in the medical field showing association between the marketing activity of industry payments made to physicians on prescribing of opioids and opioid overdose mortality (Hadland et al. 2019), and an empirical study in economics that shows how the introduction and marketing of OxyContin explains a substantial share of opioid overdose deaths (Alpert et al. 2022). Additional studies link physician payments to opioid prescriptions (Fleischman et al. 2019; Nguyen, Bradford, and Simon 2019).

While these studies examine empirical links between marketing activities and opioid prescriptions as well as overdose deaths, there is not a systematic examination of the marketing strategies and decisions that contributed to the opioid epidemic. My research examines the strategic marketing decisions that contributed to the opioid epidemic. The

marketing decisions that led to the epidemic were classic marketing actions, but in this case, they resulted in extreme negative societal outcomes.

Method

I use a single, exploratory case study approach (Dyer and Wilkins 1991; Maguire and Hardy 2009; Yin 2018). I conduct a deep case study of a single industry with multiple companies. I use this method for three reasons. First, case studies are useful in cases where a deep, interpretive, and holistic understanding is required (Maguire and Hardy 2009). As stated above, extant marketing literature does not offer insights about how marketing strategic actions lead to transgressions. Second, case studies should be used with clear, well-documented examples of constructs (Maguire and Hardy 2009). I selected the opioid epidemic and the opioid pharmaceutical industry because it is a well-documented example of a clear marketing transgression. With the multitude of lawsuits and court documents that have been made public surrounding the opioid epidemic, it is a unique opportunity to gain insight into the marketing strategy decisions of private firms. A case study is necessary because this level of access to private firm decision-making strategies is not available from other industries. Third, the goal of this descriptive essay is to "provide a rich description of the social scene, to describe the context in which events occur, and reveal […] the structure of social behavior" (Dyer and Wilkins 1991). Through description of the context in which marketing transgressions occur I develop insights about responsible and transgressive marketing actions.

My analysis relies on court documents and findings of fact that were made public from lawsuits in 2008-2022. I analyzed archival data of pharmaceutical company websites and advertisements related to opioids. I supplemented this primary data with

secondary data from popular press articles and books that have been written since 2014 when public awareness began to grow about the epidemic. This data collection coincided with researcher immersion in the topic since 2018 through data analysis of marketing activities, opioid distribution activities, and links to overdose deaths (see essay 3).

Background and Context

Timeline of the Opioid Epidemic

As the opioid epidemic has progressed, what was initially labeled as a medical breakthrough, led to rampant abuse and negative externalities, which were eventually addressed by activists, policy makers, and lawmakers. I identify three stages of the opioid epidemic and the events leading up to it: *Market Creation, Abuse Increase,* and *Widespread Awareness and Remediation*. These stages encompass the pharmaceutical industry strategic marketing actions, patient consumption patterns and subsequent abuse, and the policy actions and lawsuits surrounding the outcomes. These stages overlap with the continued increase in opioid overdose deaths demonstrated in Figure 2.1.

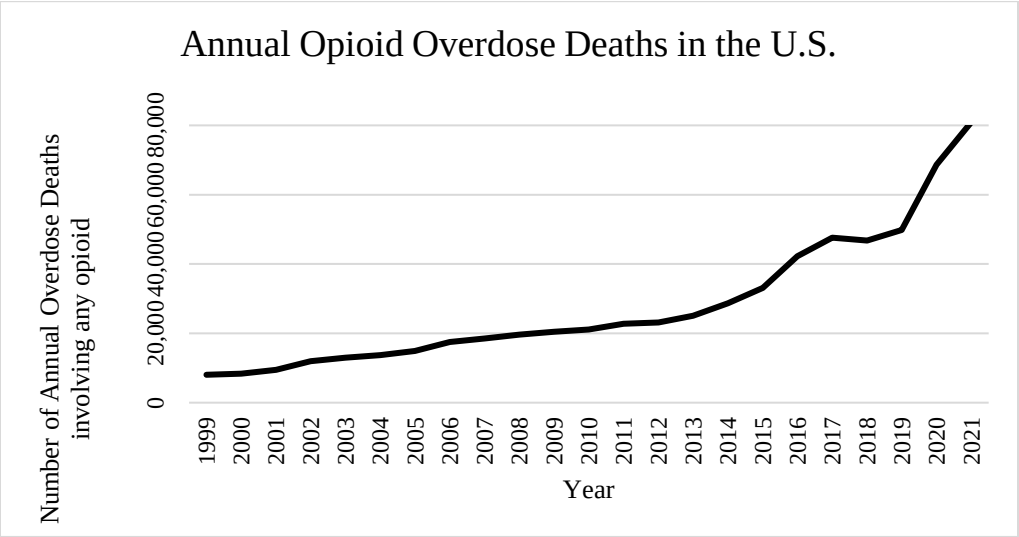

FIGURE 2.1: ANNUAL OPIOID OVERDOSE DEATHS 1999-2021[6]

The first stage of the opioid epidemic is *Market Creation*. This period lasted roughly from 1987, when the first controlled-release opioid, MS Contin, was approved for cancer pain treatment (FDA 2022), and extended through 2008, a year that Johnson and Johnson devoted to an unbranded marketing campaign the "Undertreatment of Pain"(Woodcock 2009). This stage encompassed the creation of a market for chronic pain treatment through reframing pain management, the effort to influence societal, medical, and regulatory perception that pain management was undertreated. It involved educating doctors about the number of patients who suffered from chronic pain and convincing them that opioids were a safe solution to pain management (Kolodny, David T Courtwright, et al. 2015).

Prior to this period, pain was something that was dealt with, and only treated in extreme cases at the end of life. Opioids were known by physicians to be addictive, and thus were not prescribed for patients for ailments such as chronic pain. Dr. Andrew

[6] Data Source for Figure 2.1: National Institute on Drug Abuse Overdose Death Rates

Kolodny, expert on the prescription opioid and heroin process described the prevalent beliefs among physicians prior to this period:

> "In the early '90s, the medical community understood that opioids should be prescribed cautiously for chronic pain. We knew these are essential medicines for end-of-life care, and essential medicines to be used short term for severe pain, for example, after major surgery. But we knew better than to use them aggressively for conditions like low back pain, chronic headache, fibromyalgia"(Harvard edX 2019).

Pharmaceutical firms used a variety of tactics to reframe pain management and persuade physicians to begin to treat pain. One campaign was called 'Pain as a 5th Vital Sign,' which encouraged doctors to begin to focus on treating pain for their patients, and called for improved pain care (Jones et al. 2018). During this period resources were poured into marketing campaigns, expansion of advertising spending and sales force, as well as other marketing activities. To assuage physician concerns about the addictive potential of opioids, the campaigns included assurances that the use of opioids for chronic pain would not result in addiction which was a claim that was not based on reliable scientific studies (Van Zee 2009a). As a result, treatment of chronic pain became commonplace, and opioid use expanded drastically.

I identify the second stage of the opioid epidemic as *Abuse Increase* from 2009-2016. Opioids have a large potential for abuse that was not completely stopped by the controlled-release formulas introduced in 2010. While opioid addiction and abuse occurred since the early days of the epidemic, this period saw the drastic increase of abuse, particularly in the substitution to synthetic opioids such as fentanyl in the face of abuse-deterrent reformulation of prescription opioids (NIDA 2021). By the end of this stage, the opioid overdose death toll had risen to more than 351,630 deaths, and the

annual number of opioid overdose deaths that year rose to 42,249 deaths (NIDA 2022), surpassing annual number of motor vehicle traffic fatalities, a leading cause of death in the United States, for the first time. This rate was so high that it was no longer possible to ignore the epidemic, propelling the nation into stage 3.

Stage 3, *Widespread Awareness and Remediation* began with the October 2017 declaration of the opioid epidemic as a national public health emergency (Hargan 2017). This declaration was the result of increasing awareness about the epidemic but marks the point at which the opioid epidemic became part of a national conversation. Widespread remediation efforts began to both prevent and treat the abuse of opioids across the nation. This involved a plethora of lawsuits to hold companies responsible for the role they played in the opioid epidemic whether through manufacturing, distribution, or marketing (Minhee 2023). A major purpose of these lawsuits was for states to recoup money from these companies to help fight the effects of the epidemic in communities. Some of the companies involved in the lawsuits are pharmacies: Walmart, CVS and Rite Aid, manufacturers: Johnson & Johnson, Purdue, Teva, Endo and Mallinckrodt, consultants: McKinsey & Company, and distributors: McKesson, AmerisourceBergen, and Cardinal Health (Minhee 2023). Funds secured from settlements were funneled into school and community based prevention programs, purchase of NARCAN for community agencies (drug used to counter opioid overdose), support for substance use disorder treatment, support of law enforcement agencies, as well as many other programs as determined by each state (Wisconsin Department of Health Services 2022). The three stages flow into each other and are not defined by strict time boundaries, but the years provide general periods to mark the changes over time. They are summarized in Table 2.1.

TABLE 2.1: TIMELINE OF THE OPIOID EPIDEMIC

Stage 1- Market Creation: 1987-2008	
1987	MS Contin (morphine sulfate) approved by FDA[7]
1990	Duragesic (fentanyl patch) approved by FDA[7]
1994	J&J creates new strain of Poppy that allows them to manufacture and supply opioids. For several years they supplied 60% of active ingredients in opioid manufacturing in the U.S.[8]
1995	Oxycontin (Oxycodone controlled release) approved by FDA[9]
1995	American Pain Society launches "pain as the fifth vital sign" campaign[9]
2000-2004	Overdose death reports from prescription drug products (opioids) began to increase rapidly[7]
1996-2002	Purdue Pharma funded more than 20,000 pain-related educational programs and campaigned to encourage long-term use of opioids for chronic non-cancer pain[10]
2002	Patient Package insert approved for opioids[7]
2003	FDA warning letter to Purdue for OxyContin misleading advertisements[7]
2007	Purdue pleads guilty to Misbranding[7]
2008	J&J devotes year to "Undertreatment of Pain" unbranded marketing campaign[11]
Stage 2- Opioid Abuse Increase: 2009-2016	
2009	FDA holds public and stakeholder meetings to discuss opioid risks and abuse[7]
2009	'A Difficult Balance- Pain Management, Drug Safety and the FDA' published in NEJM[12]
2010	New abuse deterrent formulation of OxyContin[7]
2013	Rise of synthetic opioids
2015	OxyContin approved for certain pediatric patients[7]
2017	59% of opioid-related deaths involved fentanyl compared to 14.3 percent in 2010[13]
Stage 3-Widespread Awareness and Remediation: 2017- Present	
2017	Opioid epidemic declared national public health emergency
2021	McKinsey settles for role in Opioid Epidemic [14]
2021	COVID-19 Pandemic coincides with increase in Opioid Overdose Deaths[15]
2022	On February 25, 2022, manufacturer Johnson & Johnson and the "big three" distributors McKesson, AmerisourceBergen, and Cardinal Health reach a $26 billion opioid settlement to resolve liabilities in over 3,000 opioid suits nationwide[16]

[7] (FDA 2022)

[8] ("After Resting Case, State Points to Critical Evidence that Shows Johnson & Johnson is Kingpin Behind State's Opioid Epidemic | Oklahoma Attorney General" 2023)

[9] (Jones et al. 2018)

[10] (Kolodny, David T. Courtwright, et al. 2015)

[11] (Woodcock 2009)

[12] (CMS 2022)

[13] (NIDA 2021)

[14] (McKinsey & Company 2021)

[15] (Ghose, Forati, and Mantsch 2022)

[16] (Minhee 2023)

Classic Marketing Strategies and Marketing Transgressions

This section of the thesis essay details the classic marketing strategies used by firms involved in the pharmaceutical industry related to opioids. I begin with an overview of the pharmaceutical industry and the existing marketing options and distribution channels. This is followed by a discussion of detailing and advertising that occurs towards the primary customer- the physician-and their unique role as a "learned intermediary" between the firm and the patient. I then discuss the classic marketing product-market growth strategies of product development, market development, and market penetration (Ansoff 1957) that were utilized by pharmaceutical firms and the established marketing strategies that were used in executing each growth strategy including, targeting, positioning, incentives, decoupling, and the influence of key stakeholders.

The pharmaceutical industry presents a unique context for examining marketing and distribution channels. Understanding the role of marketing in the opioid epidemic is dependent upon an understanding of the relationships between the main actors in the industry as summarized at a high level in Figure 2.2. The unique aspects of the industry are the role of physicians as the learned intermediary (physicians) and the role of payors (insurance companies). This essay focuses on the marketing channels and actions between the pharmaceutical firm, the physician and the patient, as outlined with a dotted box in Figure 2.2.

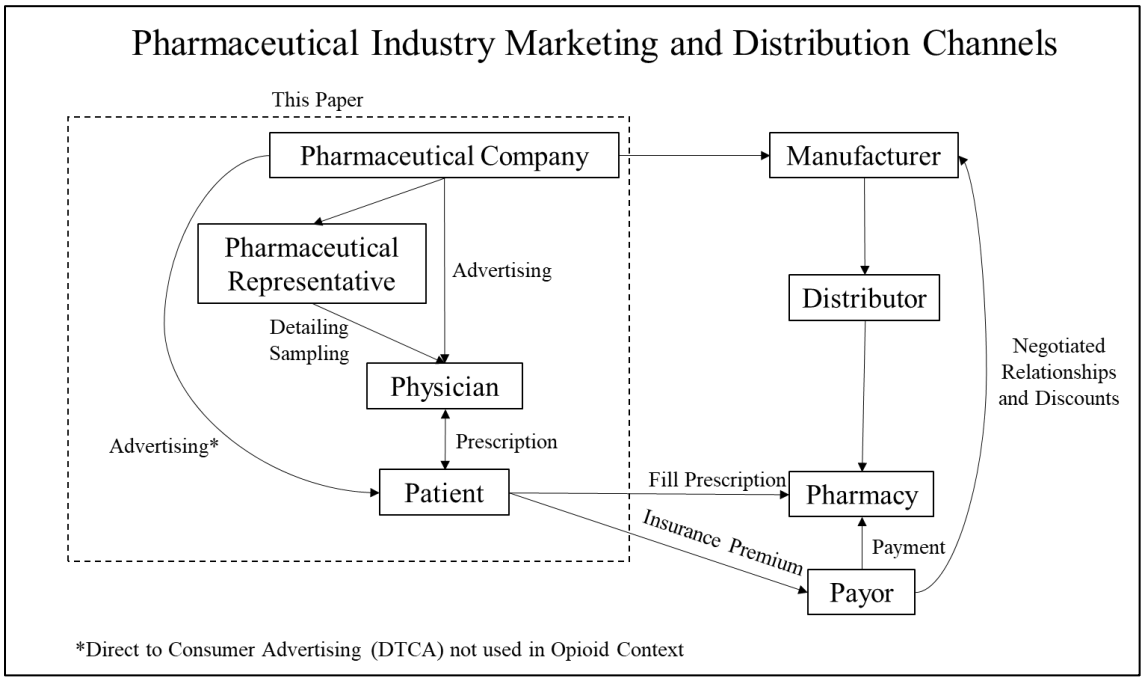

FIGURE 2.2. OVERVIEW OF MARKETING AND DISTRIBUTION CHANNELS IN THE PHARMACEUTICAL INDUSTRY

Detailing and Advertising to Learned Intermediaries

The pharmaceutical firm is responsible for the development of the drug, and the owner of the patent. They are also primarily responsible for the marketing that occurs which is directed at physicians through detailing and advertising. Physicians serve the role of a learned intermediary between the pharmaceutical company and the patient. In this essay, I use the term "learned intermediary" to refer to the unique position the physician holds in the decision making and consumption of prescription drugs. The term encompasses the trust that patients place in their physicians and the responsibility the physicians assume to evaluate all risks and make decisions in the best interests of patients' wellbeing.

"Learned intermediary" is primarily used as a legal doctrine to shift the responsibility of risk and patient warnings from the manufacturer to the prescribing physician (Thornton 2003) thus the physicians are responsible for warning their patients of the risks of the drug (Tipton, Bharadwaj, and Robertson 2009). The premise of the doctrine underscores the unique context of the role that physicians play in the decision-making and consumption process of pharmaceutical prescription drugs by the patient. As a learned intermediary, the physician holds the place between the manufacturer and the patient, and it is the responsibility of the physician to decide in the best interest of the patient for long term care. They must evaluate symptoms, patient history, risks of treatment or non-treatment, make a treatment decision, prescribe medication, and track the patient's recovery over time.

This context is distinctive from other marketing areas because the consumer (patient) is not the one who makes the purchase decision, and pharmaceutical companies do not advertise directly to the consumer for prescription opioids due to their classification as schedule II restricted drugs. Instead, pharmaceutical firms advertise to the physicians[17].

Pharmaceutical firms use the strategy of hiring pharmaceutical representatives to make individual visits to physicians to detail their drugs. Detailing has the primary purpose of educating physicians about a treatment (Wieringa et al. 2014). The sales representatives were the primary vehicle of marketing used to convince physicians to write prescriptions for their patients for opioids. Detailing at an individual physician level

[17] For less harmful prescription drugs, direct-to-consumer advertising is common and is used by companies to employ a "pull" marketing strategy by convincing patients to seek specific treatments from physicians.

by pharmaceutical sales representatives played a major role in the launch and early success of OxyContin and other opioid prescription drugs (GAO 2003). Pharmaceutical representatives also provided product samples to physicians as well as other leave-behinds when they visited physicians.

Pharmaceutical firms also advertise to physicians through advertisements placed in medical journals such as The Journal of the American Medical Association (JAMA) and The New England Journal of Medicine (NEJM) as well as through professional education. Professional education are programs that educate physicians on recent research or new therapies or treatments which takes place through continuing medical education programs (CME's) and other sponsored events. In this case, advertising activities by pharmaceutical companies serve a dual purpose to both inform physicians about a treatment or drug as well as persuade physicians to prescribe the drug (Wieringa et al. 2014).

Physicians believe they are uninfluenced by advertising and marketing efforts, but many studies show that their prescribing behavior changes in the face of marketing activities (Sah & Fugh Berman 2013). Additionally, the continued investment by pharmaceutical companies in advertising and detailing would suggest that companies find a return on investment from advertising to physicians. In 2016, pharmaceutical companies spent approximately $20 Billion on marketing to medical professionals, the majority of which was for prescription drugs (Schwartz & Woloshin 2016).

While the patient can make suggestions or requests to physicians and has the ultimate choice of compliance with the prescribed treatment, the physician makes the choice of what treatment to prescribe. Physicians serve the role of a trusted advisor, and it

is their responsibility to evaluate all information available to them. The Hippocratic oath all physicians take in medical school may be taken as proof that physicians are attempting to make decisions with the best interest of the patient in mind. Physicians pledge to act in a manner that is moral and accountable and to act in the best interests of patients (Hajar 2017). It could be assumed that physicians are fully informed experts with the best interests of the patient in mind. However the medical decision-making process has high levels of uncertainty and variation and a lack of available information (Sanford Schwartz 2017) which causes them to make the best decision with the information available at the time- which may be suboptimal in light of information that will become available later.

The decision-making process of the physician is important to evaluate in the context of situational, environmental, and other factors that influence the process. Physicians make a treatment decision by evaluating and synthesizing all the information available to them including their own medical training, expert advice from medical journals, medical faculty and key opinion leaders, regulatory restrictions from the FDA, Congress, or the DEA, input from key stakeholders such as pharmacists, insurance companies, and distributor availability.

Compounding the challenge of physicians making an informed decision in the best interest of the patient are a variety of environmental factors, particularly time pressure. Primary care physicians simply do not have enough time to provide the recommended care to patients (Porter et al. 2022). As a result, they may be rushed in their decision making and there is incentive to treat each patient as quickly as possible. Although initiatives such as team-based care have tried to remedy this issue, time

pressure influences the ability with which physicians are able to make the most informed decision (Porter et al. 2022).

Physicians, as the learned intermediary, were supposed to protect patients from the harm of opioids, but for a variety of reasons, they were persuaded to prescribe opioids in what are now known to be inappropriate situations. In the context of opioids, physicians would have never prescribed opioids for chronic pain in the early 1990's (Harvard edX 2019) but through classic marketing strategies and a campaign to reframe pain management, by the early 2000's physicians became convinced to prescribe opioids for chronic pain.

The role of physicians as learned intermediaries has contextual similarities to the role of financial advisors in the finance industry where advisors have a "fiduciary duty" to act in a manner that will benefit the beneficiary financially, and a "duty of care" to inform themselves of all information reasonably available to them prior to making a recommendation (Mulinari 2016) . In both the context of making decisions about taking prescription pharmaceuticals and the context of deciding which stocks to invest in their portfolio the patient/investor is vulnerable in the face of a complex decision. Patients/investors rely on trusted experts, physicians/financial advisors to make recommendations and in several cases to make treatment/investment decisions for them.

Product Development

The original strategic marketing decision related to opioids was Purdue Pharma's decision to expand their product portfolio of offerings by developing a new product, OxyContin, in 1997 (FDA 2022) . The firm's well-respected existing product, M.S. Contin, which was a morphine sulfate opioid for pain in cancer patients, was about to

lose its patent and face generic competition which would result in a loss of sales. Additionally, the cancer pain market was limited for growth potential because there is a finite number of cancer patients. As a result, the company sought to develop a new product, a classic marketing growth strategy (Ansoff 1957). Purdue Pharma developed a new product, a time-release opiate OxyContin (oxycodone).

In order to develop a new pharmaceutical product, extensive research and development is needed followed by eventual FDA approval as to the safety and efficacy of the drug. Unfortunately, the scientific evidence on which the safety of opioids for chronic pain was based was not reliable or significant (Van Zee 2009a). Additional product development occurred later in the life cycle of the product when the drug was reformulated to an abuse-deterrent formula (Cicero, Ellis, and Surratt 2012).

Market Development

The company also sought to develop a new market. Prior to the launch of OxyContin, there was almost no market for solutions to chronic pain (Harvard edX 2019). In order to grow, the firm reframed pain management to create a new market, chronic pain patients.

Innovation: Lack of Research and Development- Early Years

As the effort to reframe pain management was under way, proof was needed to back up the claims of non-addictive formulas and opioids. A key source of the claim that opioids were non-addictive arose from a one-paragraph Letter to the Editor from 1980. The entire text is restated below verbatim for reference of the length:

> "Recently, we examined our current files to determine the incidence of narcotic addiction in 39,946 hospitalized medical patients who were monitored consecutively. Although there were 11,882 patients who received at least one

> narcotic preparation, there were only four cases of reasonably well documented addiction in patients who had no history of addiction. The addiction was considered major in only one instance. The drugs implicated were meperidine in two patients, Percodan in one, and hydromorphone in one. We conclude that despite widespread use of narcotic drugs in hospitals, the development of addiction is rare in medical patients with no history of addiction (Porter and Jick 1980)."

This letter was not peer reviewed, and was evidence from patients interned in hospitals, not using opioids for daily chronic pain relief. This short letter to the editor was cited 439 times as misconstrued evidence that addiction was rare in patients treated with opioids. Many of these citations "grossly misinterpreted the conclusions of the letter" (Leung et al. 2017). Opioids were advertised with the slogan of addiction resulting in less than 1% of cases based on this article:

> "In the original Purdue OxyContin marketing video, a paid physician claimed the drug resulted in addiction in less than 1 percent of cases. Later he acknowledged that his statement wasn't based on any long-term studies. And that's just one of the litany of errors misstatements exaggerations and outright falsehoods."

The misrepresentation of the efficacy and addictive potential of opioids was proliferated throughout medical societies, detailing visits, and patient-physician interactions (Van Zee 2009a). The firm adopted a number of practices to reframe pain management actions as benevolent and improving patients' quality of life. This reframing of pain management was targeted towards pharmaceutical representatives, medical associations, and physicians and is described in the following section.

Influencing Key Stakeholders

Classic marketing strategies include influencing key stakeholders and the sources from which the target customer gets their information. Due to physicians' positions as learned intermediaries, pharmaceutical firms focused on persuading physicians to

prescribe opioids to their patients through advertising and detailing. In this context pharmaceutical firms influenced physicians through 3rd party websites, continuing medical education (CME) programs and conferences, and influencing peer physicians. These key stakeholders were imperative to the effort to successfully reframe pain management and change the way physicians treated pain.

Pharmaceutical companies influenced physicians through pain institute websites that were targeted at physicians. For example, they sponsored and maintained a website called Partners Against Pain which they used to combat the "outdated" attitude that opioids should not be used for chronic pain (Purdue Pharma 1998). Part of the launch plan for public relations of OxyContin, read in the video deposition of Richard Sackler stated:

> "In an effort to continue the publicity about the launch of OxyContin, approximately two to three months after the initial public relations campaign, another campaign would be launched focusing on the expansion of Purdue Frederick's Partners Against Pain Program developed to improve pain management knowledge among healthcare professionals and patients' caregivers."

The Partners Against Pain website was an early promotional tactic targeted toward physicians and caregivers to spread knowledge about pain management treatment. The Partners Against Pain website was designed for both physicians and patients, even encouraging patients to reach out to their healthcare providers to request opioid painkillers mentioned on the site. Richard Sackler describes this strategy:

> "Partners in Pain was principally designed to inform doctors about the proper use of our drugs, our medicine, and to encourage patients who may have had pain, sometimes for years, inadequately treated or not treated at all to present themselves to their physicians."

They touted the non-addictive nature of opioids and encouraged doctors to reconsider opioids as an under-utilized approach. A quote from the website from September 29, 2000:

> "Opioids: An under-utilized approach: Responsibly used, opioids can improve care for selected patients with back pain. But many people still have the outdated attitude that opioids are taboo in back pain because they "create" addicts. While opioids can be abused and may be habit forming, clinical experience shows that "addiction" to opioids legitimately used in the management of pain is very rare."

The website educated physicians about the importance of pain management for patients through effective storytelling and data of undertreated pain and patients (Purdue Pharma L.P. 2000). These sites also were used to assuage physician concerns about the addictive potential of opioids prescribed for chronic pain through the inclusion of definitions such as *pseudoaddiction*¸ which was a fake condition that was used to encourage physicians to ignore signs of addiction stating that patients were preoccupied with finding pain relief and not addicted (Purdue Pharma L.P. 2000).

By reframing physicians' caution towards opioids as barriers to humane patient treatment, these messages caused physicians to begin to consider opioids as a viable treatment for chronic pain. The message came not only from firms, but from medical associations as well. The Partners Against Pain website offered support to physicians to help them follow new Joint Commission on Accreditation of Healthcare Organizations (JCAHO) pain standards. They encouraged physicians to reach out to their sales representatives for more explanation on how to use the materials provided for JCAHO compliance (Purdue Pharma L.P. 2000).

Another method used to influence physicians was conferences for pain management. Between 1996 and 2001 Purdue conducted all-expenses-paid pain management and speaker-training conferences in resorts which more than 5000 physicians, pharmacists, and nurses attended in total (Van Zee 2009a). As Orlowski and Wateska (1992) showed, all-expenses-paid trips to sunbelt vacation sites for pharmaceutical symposiums were effective in increasing physician prescribing behavior for the associated drugs despite the fact that physicians believed they were uninfluenced.

Additionally, physicians were required to complete continuing medical education credits (CME) to maintain medical licenses in certain states or credentials at certain hospitals. These are educational activities that help physicians maintain, develop or increase skills, professional performance or relationships of physicians (NIH 2017). For example, Purdue Pharma funded more than 20,000 pain-related educational programs from 1996-2002. Many of them provided CME for attendees (GAO 2003).

One of the keys to the spread of the reframing of pain management was that the message came from all sides. Andrew Kolodny described how doctor's received information about pain management from many sources which caused them to reconsider their beliefs that opioids should not be used for chronic pain:

> "In educational programs that were sponsored by the drug company--20,000 educational programs in the first six years of the release of OxyContin--doctors began to hear that the risk of addiction had been overblown, that we've been allowing patients to suffer needlessly, that we can be much more compassionate if we prescribe opioids more liberally. And we didn't just hear this in educational programs that were sponsored by drug companies. We heard these messages from our national societies, from our hospitals, from our state medical boards. So from every direction, primary care doctors begin hearing that if you're an enlightened physician and a concerned, compassionate physician, you'll be different from those stingy puritanical doctors of the past that were allowing patients to suffer needlessly"(Harvard edX 2019).

The leveraging of the medical associations legitimized and validated the messages. Doctors that were skeptical initially, became more open to prescribing opioids as the medical association legitimized the communication. Thus, many sources were working together to educate doctors on the shift in pain management.

Research and Development

A component of institutional theory is strain theory which Greve, Palmer, and Pozner (2010) cite as an antecedent to organizational misconduct. Resource strain leads companies to search for resources in unethical areas, in this case, a lack of an innovation pipeline led to the need to expand into new markets through market development. It also may have led to increased deceptive marketing. Tipton and Bharadwaj (2010) posit that research and development resources can be replaced with marketing resources in deceptive marketing cases involving lack of innovation pipelines. Purdue Pharma and its employees experienced great success in the early years of OxyContin- by 2001, OxyContin accounted for 90% of the entire company's sales and exceeded $1 Billion (GAO 2003). However, the pipeline of products after OxyContin, were not comparable. The company reformulated OxyContin to be abuse deterrent in 2010 (FDA 2022) but did not have any highly successful products in the pipeline. Subsequently, the lack of successful new products from research and development led to increased marketing efforts and lobbying. Moreover, the lack of new products in the R&D pipeline, limited product development as a growth strategy and the firm turned to market penetration- selling more existing products to existing customers.

Market Penetration

After the initial product and market development efforts, Purdue sought to gain new patients in the existing chronic pain management market through an alternative strategy of market penetration. They hired more sales representatives- increasing their marketing efforts to reach more physicians to generate more prescriptions within existing markets (Sackler 2015). These hiring increases were combined with incentives, targeting strategies, and titration messages which served to increase market penetration.

Salesforce Promotional Incentives

As a part of an aggressive marketing campaign for opioids for chronic pain, pharmaceutical firms drastically increased their sales force and offered them escalating commissions that incentivized sales of higher dosages. Commission levels were higher for promoting smaller numbers of prescriptions of larger dosages rather than larger numbers of prescriptions of lower dosage. Due to the bonus structure, the pharmaceutical representatives were under constant pressure to sell increasingly higher doses to physicians. The sales representatives were rewarded for promoting higher and higher doses to physicians. A sales representative on CafePharma described the bonus structure:

> "Bonuses were not paid on the number of prescriptions increased in your territory (as is the case in 90%+ of other pharma companies) rather Purdue reps bonuses were paid on dollar volume increase. Therefore if you got 10 docs to write 1 script for 80 mg you received approximately 8 x the bonus than if you got 10 docs to write 1 script for 10 mg. Reason being that 80 mg was approximately 8x the cost of the 10 mg. Ergo the pressure to sell higher and higher doses."

Sales representatives were under pressure to sell higher dosages of opioids and incentivized monetarily. Because of these escalating sales commissions, they would be likely to have tailored their detailing messages to persuade physicians to not only

prescribe opioids, but also to prescribe higher dosages to individual patients, known as titration.

Titration

Titration is the increase of a dosage of medicine to better treat the patient with minimal intended side effects. Sales representatives shared messages that encouraged doctors to titrate, or increase, the strength of dosages to existing patients. OxyContin was offered in a variety of increments of dosages to enable this possibility (CDC Centers for Disease Control and Prevention 2020). Doctors were persuaded to increase dosages for patients in response to breakthrough pain. Unfortunately, increased dosage for patients meant that they were developing a tolerance for the opioids. In response to a growing tolerance to opioids, physicians were encouraged by pharmaceutical representatives, conferences, and Partners Against Pain website to increase the dosage, essentially fueling a patient's addiction. On the Partners Against Pain website in January 1999, it stated:

> "Fact: Unlike other analgesics, such as NSAIDs, there is no "ceiling effect" for the analgesia provided by morphine. As cancer pain increases or tolerance develops, the morphine dose can usually be titrated upwards to treat the increased pain."

Increased strength of dosages was harmful to patients because the risk of an overdose death from opioids is directly related to the dosage received (Armstrong and Ernsthausen 2019). While increased dosages should have been a cause for concern, they were a mark of success for pharmaceutical representatives.

Targeting

One of the main strategies employed to sell OxyContin was through targeting physicians to increase the effectiveness of detailing efforts by pharmaceutical

representatives. The targeting strategy included targeting higher prescribers, targeting physicians susceptible to prescribing opioids, and targeting physicians with a high number of repeat patients. Market penetration practices of increasing sales to existing customers resulted in repeated sales visits to physicians who were high prescribers and physicians who had a high number of continuing patients.

Sales representatives were responsible for developing lists of physicians who were most susceptible to their efforts. In the deposition of Richard Sackler, CEO of Purdue Pharma, a statement is read that said:

> "Each Purdue sales representative had a specific sales territory and is responsible for developing a list of 105-140 physicians who already prescribe opioids or who are candidates for prescribing opioids."

The unredacted complaint also suggests that McKinsey Inc's consultants examined if sales representatives were targeting prescribers likely to increase opioid use:

> "Mortimer Sackler asked for more detail on what was being done to increase sales. Staff told the Sackler's that McKinsey (Inc) would analyze whether sales reps were targeting the prescribers who were most susceptible to increasing opioid use."

Effective targeting of susceptible physicians would lead to larger number of prescriptions being prescribed. The unredacted complaint filed in the state of Massachusetts discusses the advice McKinsey gave to help Purdue increase the sale of opioids:

> "Staff told the Sackler's that McKinsey would also study techniques for keeping patients on opioids longer, including the need for sales reps "to make a lot of calls on physicians with a high number of continuing patients."

Patients who frequently returned for chronic pain treatment were perfect candidates for opioids in the eyes of Purdue Pharma. If doctors could be persuaded to put

the patients on their products, then it would be a long-term market, especially considering the addictive nature of the drug which was only realized later.

Lobbying

Another component that contributed to market penetration was lobbying. Pharmaceutical firms who sold opioids lobbied the government significantly to influence policies regarding opioids. Drug companies' political lobbying spending for opioids was more than eight times the gun lobbying amount for the same period. The opioid industry contributed to campaigns of over 7000 candidates for state-level offices, and employed more than 1000 lobbyists who worked in all 50 state capitals (Mulvilhill et al. 2016). Lobbying the government for policies favorable to the use and sale of opioids ensured that opioids would continue to be sold at current or even increasing rates- thus supporting market penetration.

Drug companies also lobbied the Drug Enforcement Administration (DEA). Drug companies lobbied to reduce the power the DEA had to suspend operations of drug companies that broke the law (Higham et al. 2019). By eliminating the perceived threat to market penetration of DEA regulations on opioid sales, particularly restrictions on high volumes of sales, drug companies ensured that their profits would not diminish and that market penetration was possible.

Decoupling

The decoupling literature is a branch of institutional theory. It suggests that firms often decouple formal policies from regular organizational procedures and practices in order to respond to institutional pressures. Decoupling usually arises when organizational responses to regulative, normative, or cultural-cognitive pressures conflict with business

performance goals (Meyer and Rowan 1977). A critical component of Purdue's marketing plan was to target physicians who were the highest prescribers for Opioids (Van Zee 2009a). At the same time sales representatives were also required to report physicians who were prescribing opioids in suspiciously high amounts- often known as pill mills.

Pill mills were pain clinics which followed a business model of serving people with pain who came to their offices for treatment. They prescribed opioids in copious amounts, consistently treating patients with opioids (Quinones and Hellegers 2015). Not all doctors had good intentions for prescribing opioids. Pill mills were doctors who prescribed copious amounts of opioids without appropriately evaluating the needs of their patients. In Akron, Ohio a gynecologist prescribed hundreds of thousands of painkillers to patients (Hoffman, Thomas, and Hakim 2019), a classic example of a pill mill. Pill mill doctors helped to spread the reach of the opioid crisis, making opioids available to addicts and others with the potential to abuse the drug. Pill mills would have been considered high volume customers. Classic marketing strategies include targeting high prescribers and incentives that are aligned with performance goals (high volumes of sales). In the opioid industry, these classic marketing strategies of targeting and incentives were in direct conflict with the ethical dilemma of supplying pill mills and illegal high prescribers. Through decoupling, pharmaceutical companies responded to institutional pressure to report high prescribers but did so in a way that resembled the "fox guarding the hen house."

Pharmaceutical representatives were often aware of illegally high prescribing activity. A representative discussed his knowledge of an over-prescriber on CafePharma:

> "He was the biggest writer of OxyContin in the state of New Jersey. He was also one of the biggest writers in the country. He was protected immensely by the company. I should know because I called on him."

It was the responsibility of pharmaceutical representatives and managers to turn in doctors suspected of illegally high prescribing, however one representative scoffed at the plan:

> "Purdue created the scourge that is OxyContin abuse. When they introduced their program to turn in ""pill mill docs"" so that you wouldn't have to call on these *scumbuckets* what do you really think the response was??!!??? No one turned any docs in managers never saw the fact that needle-marked strung-out druggies lined up out the door of these ""pill mills"" because the managers and reps made SOOOO much money (unbelievable amounts) for calling on what deemed to be doctors ""doing the right thing"" and treating pain appropriately."

Targeting higher prescribers, as described previously, allowed for meeting sales targets, and the responsibility of reporting one's largest clients is directly in conflict with self-preservation instincts for employees who want to advance in the company and make more money. These strategies, while classic strategies that fall under the marketing discipline, were not undertaken in a responsible manner, and therefore compiled to lead to negative societal outcomes.

Discussion

This section begins with a brief update of the current status of the opioid epidemic in order to emphasize the egregiousness of the outcome and concludes by summarizing the pitfalls of the classic marketing activities used by firms that resulted in marketing transgressions. I present a framework for marketing strategic decision making and the corresponding actions which can result in responsible marketing or marketing transgressions.

Current Status of the Opioid Epidemic

Restriction of Prescriptions

In response to the opioid epidemic, the CDC issued guidelines for restricted prescribing practices for opioids in 2016. The guidelines were adopted in states across the country. Prescription Drug Monitoring Programs (PDMP) are statewide electronic databases that track prescriptions of controlled substances and uses algorithms to help physicians determine which patients might be an overdose risk (CDC 2022). Although PDMP programs have been used since the 1930's, a more recent wave of electronic PDMP programs were implemented across the country starting in the late 1990's. Implementation of PDMP programs from 2000-2010 was found to be associated with a reduction in the prescribing rate for opioids (Bao et al. 2016), however (Ozturk et al. 2021) did not find an effect of PDMP implementation on the rate of prescribing for patients with long-term disabilities.

The Physician Payments Sunshine Act (PPSA), part of the Affordable Care Act required medical product manufacturers to report payments or value transfers to physicians or teaching hospitals beginning in August 2013. It reports this information in a publicly available database (Richardson 2014). This data availability led to the publication of many studies associating value transfer to physicians to their opioid prescribing behavior (Hadland et al. 2019; Hollander et al. 2020; Nguyen, Bradford, and Simon 2019).

While the adoption of prescription restrictions limited the opioid painkiller use, there have been concerns raised about patients who actually need opioids being unable to access prescriptions. There are recent efforts to ease some of the restrictions on

prescribing opioids by the CDC (Vestel 2022). Opioid prescribing and pain treatment is still a controversial and complex issue facing the nation.

Destigmatization of Addiction

Marketing actions contributed to the scale of the opioid epidemic, but marketing actions by individuals, nonprofits, and government offices led to public awareness of the crisis and the eventual recognition of the harm of opioids and the silent epidemic facing the nation. There was very little public awareness about opioid addiction in the first decade of the 2000's. Although people had begun to die from opioid overdoses, their families stayed quiet from shame (Quinones and Hellegers 2015), or were ignored by doctors, regulators and politicians (McGreal 2017). As a result, only a few government workers were fighting the opioid epidemic. Eventually, families began to step forward to share their experiences including the Schooner family and the 'Sharing without Shame' Facebook group of mothers with children addicted to opioids (Quinones and Hellegers 2015) and FedUp! an umbrella group that petitioned for change in Washington (McGreal 2017).

A 2014 survey showed that the public held negative attitudes toward persons with drug addiction due to societal ambivalence about whether substance abuse was a medical problem or a personal failing to overcome (Barry et al. 2014). The high profile death of actor Seymour Hoffman in 2014 focused national public attention on the opioid epidemic, particularly the substitution to heroin (Achenbach 2014). In 2017 the opioid epidemic was declared a national public health emergency- at this point it is safe to say that the public became aware of the opioid epidemic.

Attitudes began to change towards addiction- it went from being considered a crime, to more commonly accepted as a disease. It is a common practice to reduce stigma in the effort to drive change surrounding barriers to healthcare and public health improvements. Past examples include national campaigns for stigma reduction for HIV/AIDS, sexually transmitted diseases, and mental health challenges (Atkins, Legreid Dopp, and Boone Temaner 2020). By 2020, the American Medical Association had an opioid task force that prioritized the removal of stigma related to opioid addiction ("End the Epidemic" 2020). There has been significant progress made towards changing the language of addiction, especially with the transition to "substance use disorder" instead of "substance abuse" which recognizes the medical and health issue instead of categorizing it as a moral failing (Feldscher 2022).

Increasing Opioid Overdose Deaths

Deaths due to opioid overdoses appeared to plateau from 2017-2019 following the declaration of the opioid epidemic as a national public health crisis, however, in 2020 drug overdose deaths, including those from opioid overdoses spiked again, coinciding with the COVID-19 pandemic lockdown (Tanz et al. 2022). The United States life expectancy has decreased in recent years (while other international nations increased life expectancy), and opioid overdose deaths are cited as a strong contributing cause (Harper, Riddell, and King 2021). The majority of these overdose deaths are due to illicit opioid drugs such as fentanyl (Vestel 2022). Further interventions to stem the overdose deaths due to opioids are needed.

Company Changes

Many of the companies who marketed opioids and were named in the litigation have undergone structural changes including mergers or acquisitions, shifting focus from pain medication to other drug development areas, or have sold their opioid products business to reduce their participation in pain management (Uppal and Anderson 2021).

Lawsuit Settlements and Release of Remediation Funds

Many of the nationwide opioid overdose related lawsuits facing pharmaceutical companies were settled in recent years. CVS, Walgreens and Walmart settled for $13.8 billion (Pierson 2022). Johnson & Johnson and Big 3 distributors McKesson, Cardinal Health, and Amerisource Bergan settled for $26 billion (NAAG 2022). Johnson & Johnson no longer sells prescription pain products, and although they will contribute $5 billion to the opioid case settlement, they admit no wrongdoing. Purdue Pharma declared bankruptcy, and settled for $6 billion (Knauth and Hals 2022). The money from many of these lawsuits will be distributed over the next two decades to the states, and each state has their own plan for how to use the funds to help attempt to assuage the effects of the epidemic (Pattani 2022). The opioid epidemic continues to challenge the United States healthcare systems, emergency response, and social support systems, and the solution is not going to be a quick fix.

Framework for Egregious vs. Responsible Marketing

The purpose of this essay was to discuss classic strategic marketing decisions in the context of how they contributed to the opioid epidemic to demonstrate how classic marketing activities- when not conducted in a responsible manner, can lead to marketing transgressions.

Table 2.2 below summarizes classic marketing decisions. These are overarching decisions that the pharmaceutical opioid firms faced in their efforts to diversify and create a market for opioid chronic pain relief. The framework is divided by actions that firms can take regarding each marketing strategy decision that will propel them towards responsible marketing outcomes, egregious outcomes, or outcomes that maintain the status quo.

Marketing strategy decisions propel companies forward. They have the potential to substantially change the direction of the company. Choices of how to act on strategic decisions influence company outcomes. While the actions in each column do not guarantee that there will be egregious or responsible outcomes if followed, multiple marketing strategic decisions undertaken in a column are more likely to result in the corresponding outcomes. A single action in a category under column 4 of Table 2.2 by pharmaceutical opioid firms most likely would not have resulted in the rampant public health crisis facing the nation today- but repeated strategic marketing decisions under that column culminated in the extremely negative societal outcome. Table 2.2 includes references to specific examples of each transgressive action as related to the opioid epidemic.

Similarly, responsible marketing actions individually may not result in an outcome which is beneficial to society, customers, or employees- but repeated responsible marketing actions in the face of strategic decisions are more likely to lead to responsible outcomes. Classic marketing strategies are tools, it is how firms choose to use the tools that determines the impact on society. Firms must intentionally work towards responsible marketing.

TABLE 2.2: FRAMEWORK FOR MARKETING TRANSGRESSIONS VS. RESPONSIBLE MARKETING

Decision	**Actions for Desired Outcomes**		
Marketing Strategy Decisions	**Outcome: Marketing Transgression**	**Outcome: Maintain Status Quo**	**Outcome: Responsible Marketing**
1. Is Ethical Decision Making a Priority?	Leverage public relations to obfuscate or portray alternative reality. (Opioid Example: Lobbying)	Create Programs and Policies without teeth. Make an effort to create a few reports of ethical activities.	Make responsible business practices a business priority. Co-create measurable goals to achieve ethical outcomes.
2. Crafting Marketing Messages	Engage in deceptive marketing- making intentionally false claims that are not backed by science or have the purpose to mislead customers. (Opioid Example: reframing pain management)	Craft claims that are true but may not be completely forthcoming.	Foster a culture that considers all stakeholders in an ethical manner and communicates transparently with them all.
3. Interactions with Regulators and Sources of Accountability	Lobby Regulators to look the other way. (Opioid Example: decoupling, fox guarding henhouse)	Trust leaders will do what they can, trust existing regulators and processes.	Get Leaders on Board with regulatory requirements. Work with independent regulators
4. Research and Development (Key in Pharmaceutical Research)	Rely on insufficient studies, pressure researchers through funding or lobbying. (Opioid Example: Lack of strong scientific research)	Set research standards and ethical requirements without measurable outcomes.	Set high standards of research and hire ethical employees to conduct the research. Independent 3rd part review.
5. Sales Incentives	Incentive Structure Rewards unethical activity. (Opioid Example: Incentives tied to increased dosages of harmful product)	Hire/promote managers who meet sales targets and bring in revenue.	Align incentives, initiatives, and policies to encourage employee and leader responsible behavior.

6. Targeting	Target vulnerable consumers or clients who are using products unethically. (Opioid Example: Targeting High Prescribers)	Target consumers who will bring in the most profit.	Intentionally target consumers who have a legitimate need for the product and create mutual value.
7. What to do when a Marketing Transgression is Exposed	Ignore it, lobby regulators to look the other way, and engage in a public campaign to shift blame. (Opioid Example: Lobbying)	Make vague or deflective public statements. Promise to address issues without clear action plans, and avoid making changes that expose challenges or cost firm money	Acknowledge role in the mistake. Create actionable steps with accountability measures to correct course.

Insights and Conclusions

This essay used the opioid epidemic as a case study to illustrate negative societal outcomes which can occur from classic marketing strategy decisions. The framework above offers insights into marketing actions that, when made repeatedly, can result in marketing transgressions. This case study and resulting framework adds important nuances to the marketing strategy discipline's research and education and shows that there is an important element of intentionality behind strategic decisions and actions made. This research is generalizable to other negative societal outcomes that occur in marketing such as the recent e-cigarettes marketed to teens, or past events such as the Volkswagen emissions scandal or Big Tobacco lawsuits. It is important to note that even if the firm's strategic decisions do not contain malice or ethical lapses, classic marketing strategies can still cause harms to society and the environment.

This research has important implications for the classroom. It is not enough to teach marketing strategies as tools that students can employ in their future careers

without adding context about the intentionality of their actions. This is a call to teach students not only the strategic tools for marketing, but the intentionality behind the actions that leads to responsible marketing outcomes. Strategic marketing outcomes, without intentionality, at best maintain the status quo, and at worst, could unintentionally result in egregious outcomes.

There have been some tools created to use in the classroom to help students focus on sustainable or ethical societal outcomes including the Citizen Consumer, Company Manager, and Company Leader Environmental Oaths from Texas A&M University which call on students in their roles as consumers, and future roles as managers and leaders to 'do no harm to the environment whenever and wherever avoidable' (Varadarajan 2020). I propose to explore extending this sustainable and ethical teaching in the classroom to include case studies of ethical and unethical company actions with opportunities for students to see how the same tools can result in positive or negative societal outcomes depending on intentionality.

Future Research

There are many avenues for future research. Marketing transgressions is an understudied area of research. There have been many recent calls for responsible research in marketing (de Ruyter et al. 2022), Better Marketing for a Better World (Chandy et al. 2021), as well as a growing interest in sustainability (Ekici, Genc, and Celik 2021; Gonzalez-Arcos et al. 2021; Sheth and Parvatiyar 2021). However, responsible marketing cannot be fully understood without the corresponding study of unethical firms. Understanding firms who engage in egregious marketing is necessary to complement the research in responsible marketing. Firms whose actions result in egregious societal

outcomes often use the same marketing strategy tools as firms with ethical societal outcomes, so research is needed to determine the nuances of intentionality between these firms.

Future avenues of research may include case studies of firms who turned themselves around- ones who found they were headed towards egregious outcomes and made a cultural or strategic shift. Conceptual examinations of marketing transgressions could be complemented and strengthened by empirical studies that link specific marketing strategies to negative societal outcomes. The following essay links marketing activities to poor decision making by doctors in the form of inappropriate prescriptions and the subsequent negative societal outcome of opioid overdose deaths.

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CHAPTER 4

ESSAY 3: THE DARK SIDE OF MARKETING: AN EXAMINATION OF THE OPIOID EPIDEMIC[18]

[18] Ramey, R. and S. Bharadwaj. To be submitted to the *Journal of Marketing*.

Abstract

From 1999-2020, more than 550,000 people died from a drug overdose involving opioids. The number only continues to climb with almost 70,000 deaths due to opioid overdoses in 2020, a sharp increase from approximately 50,000 deaths in 2019 (NCHStats 2021; NIH 2021). The deceptive promotion of opioids by pharmaceutical companies is cited as a major cause of the Opioid Epidemic and many firms are facing lawsuits for their role in the public health crisis (ABA 2019). Despite this, there has been little systematic academic research examining the role of marketing in the Opioid Epidemic. Drawing on proprietary marketing strategy documents, interview depositions of key firm leaders, and data from pharmaceutical representative online forums, this study tests a conceptual framework to examine the role of advertising and salesforce detailing on the number of inappropriate opioid prescriptions and overdose related patient deaths. I also examine the role of targeting and responsible advertising campaigns as moderators. I use a novel national level panel dataset that integrates (1) CDC Multiple Mortality files, (2) medical journal advertisements, and (3) lawsuit disclosures data on sales rep ("detailing") visits and opioid distribution. I find that advertising and detailing led to an increase in the number of inappropriate prescriptions. I also find that responsible prescribing reminders helped mitigate this effect. Finally, I find support for a positive link between inappropriate prescriptions and opioid overdose deaths. I present implications for marketing strategy and public policy.

Keywords

Opioid Epidemic, Pharmaceutical Marketing, Deceptive Marketing, Theory Building from Cases, Dark Side of Marketing.

Introduction

Over 550,000 deaths have been attributed to opioid overdoses over the period 1999-2020, with 70,000 deaths in 2020, an increase from 50,000 in the previous year (NCHStats 2021; NIH 2021). Deceptive marketing activities through sales rep detailing (calls on physicians) and advertising of opioids are viewed as key factors implicated in the Opioid Epidemic (Kolodny 2021). Moreover, state attorney generals have filed class action lawsuits against these firms for their role in the public health crisis (ABA 2019). The opioid epidemic has received significant media coverage with over 16.3M news stories appearing on a web search as well as TV documentaries (e.g., Understanding the Opioid Epidemic on PBS) and shows (e.g., Dopesick on Hulu) dedicated to the issue given its significant impact on societal well-being. Despite this, there has been a lack of systematic marketing academic research examining the role of marketing in the Opioid Epidemic.

The extant empirical literature on pharmaceutical marketing draws on data from a variety of drug categories and therapies. This prior research has addressed several aspects of marketing in the pharmaceutical industry including the effect of (1) detailing (Gönül, Carter, and Petrova 2001; Kappe and Stremersch 2016; Shapiro 2018), (2) direct to consumer advertising (Liu and Gupta 2014; Vakratsas and Kolsarici 2014; Zaitsu et. al 2018), (3) spillover effects of advertising (Wosinska 2005) and (4) sampling (Dong, Manchanda, and Chintagunta 2014; Venkataraman and Stremersch 2007) on prescriptions and sales. However, little research has examined the role of these marketing actions on dysfunctional outcomes. An exception, Tipton, Bharadwaj and Robertson (2009) examine the effect of egregious pharmaceutical claims on stock market response.

However, the literature has not addressed the appropriateness of prescriptions or how inappropriate prescribing, or mis-prescribing, may lead to negative societal outcomes. The lack of research on the role of marketing in dysfunctional societal outcomes is perhaps attributable to difficulties in accessing data. The Opioid Epidemic is a situation apt to investigate harmful prescribing and the negative societal impact of pharmaceutical marketing. I examine the following research questions: (1) What are the effects of marketing activities, i.e., advertising and detailing, on the number of inappropriate prescriptions? (2) What is the effect of marketing related moderators, namely, physician targeting, and responsible advertising in moderating the relationship between marketing actions and behaviors and inappropriate prescriptions? (3) What is the effect of inappropriate prescriptions on negative societal outcomes, namely opioid overdose deaths?

To develop a conceptual model and hypotheses, I draw on the research in marketing, and qualitative analysis of data from proprietary firm marketing strategy documents, interview depositions of key leaders in the pharmaceutical firms and data from pharmaceutical sales representatives online chat forums. To test the hypotheses, I integrate data from multiple sources to develop a unique data set and present results from analyses conducted at the national and a single state level.

The results show that the marketing activities of pharmaceutical representative detailing and medical journal advertising are positively and significantly related to the quantity of inappropriate prescriptions written by physicians. The number of inappropriate prescriptions, in turn, is positively and significantly associated with increasing opioid related deaths. I find that responsible prescribing reminders

significantly mitigate the effects of detailing and advertising on inappropriate prescription quantity. Additionally, targeting high prescribing doctors increases the positive effect of detailing on number of inappropriate prescriptions written and filled.

The study contributes to the discipline in three main ways. First, I add to research on marketing activities in the pharmaceutical industry by examining an under-researched outcome, overdose deaths. The qualitative research identifies the novel mechanisms of *pseudoaddiction* and *titration*, in addition to addiction, leading to overdose related deaths. The research brings into sharp focus that legitimate marketing promotional activities, when misused, have significant societal negative externalities.

Second, in contrast to existing pharmaceutical literature, I extend the focus to marketing transgressions, a previously unexplored aspect of legitimate marketing actions. My research draws on multiple non-traditional data sources to identify two mechanisms- *legitimation,* and *deceptive marketing*- that undergird the effects of the information and persuasion aspects of advertising and detailing to convince physicians to prescribe greater amounts and increase the strength of prescriptions (Appendix A), which were often inappropriate decisions. I extend the concept of legitimacy and legitimation to actions that lead to negative outcomes (Pfeffer and Salancik 1978; Humphreys 2010). I add to the deceptive marketing research in the pharmaceutical industry by studying inappropriate prescriptions- an unintended consequence of the effect of marketing strategies on sales. Thus, I extend the deceptive marketing literature that is focused on advertising to consumers (see Tipton, Bharadwaj and Robertson 2009) to marketing promotions to learned intermediaries whose expertise is expected to serve as a shield against such deception.

Third, I explore two factors that mitigate or enable the relationship between marketing activities and prescription behaviors. In contrast to recent research on the effects of anti-smoking advertising for vice products such as cigarettes (Wang, Lewis and Singh 2021), this essay finds that responsible prescription reminders do mitigate the effect of advertising opioids on inappropriate prescriptions. My work adds a nuance to the counter-marketing literature by suggesting that the target of the advertising matters and leads to asymmetric outcomes. While marketing has always viewed targeting as a strategy to enable better returns on marketing activities (e.g., Montoya, Netzer and Jedidi 2010; Narayanan and Manchanda 2009), the negative consequences of the decision are underexplored. This study is among the first to draw out this potential danger from targeting. Thus, this essay offers concrete guidance regarding mitigation of marketing promotion on inappropriate prescribing by identifying responsible prescribing reminders as an instrument of alleviation.

The rest of the essay is structured as follows: I first present a representative literature review followed by a description of the research setting, the Opioid Epidemic. I then provide the theory development process and hypotheses developed from the qualitative research. Next, I present my empirical strategy to test the theoretical model using a panel dataset. I conclude with a discussion of the findings, the limitations, and directions for future research.

Representative Literature

A summary of the relevant existing research in pharmaceutical marketing is presented in Table 3.1. To a large extent, the research examines the effectiveness of

marketing instruments and not the appropriateness of the prescriptions that result from the marketing activities. (Brax et al. 2017) review 20 articles that study the association between physician interaction with pharmaceutical companies and prescribing practices. They find that physician prescribing patterns and prescribing quality are influenced by these interactions. Their measures of prescribing quality include the quality of the drug prescribed based on global indicators such as whether controlled trials for efficacy exist and adherence to prescribing guidelines.

Spurling et al. (2010) provide a review of articles that examine the relationship between physician exposure to pharmaceutical information and the quality, quantity, and cost of prescribing by those physicians. They discuss ten research studies that use quality as an outcome, but the quality measured is whether the drug is needed and effective, not whether the prescription is harmful. Avorn and Solomon (2000) address the inappropriate prescribing of antibiotics. They do not test the negative outcome, but they make the case for why over-prescribing of antibiotics could lead to negative externalities including resistant organism prevalence. Shapiro (2018) examines the extent to which off-label prescriptions are caused by detailing. Off-label is prescribing a drug for a use other than that which the FDA approves. The author refrains from evaluating the quality or appropriateness of off-label prescribing, and only briefly mentions the possibility of "potentially undesirable" off-label prescription. The existing research stops short of a true examination of negative externalities caused by poor prescribing quality. This may be due to data availability or conflicts of interest. Pharmaceutical research has focused on areas where data is available through partnerships, limiting the ability of the researcher to choose the drug class. Additionally, it appears that it is challenging to make negative

claims about prescribing habits for a company's drug when they allow a researcher to use their data, potentially resulting in an aversion to examine negative externalities.

Closer to this study in examining marketing transgression, Tipton, Bharadwaj and Robertson (2009) examine the effects of exposure of advertising claims by pharmaceutical brands that misstate efficacy or hide risk information or overclaim efficacy superiority on the stock market reaction. However, their study does not directly examine the effect of marketing actions on patients. This research addresses the issue by examining a firm who promoted and produced opioids during the Opioid Epidemic. The status of opioids as a schedule II-controlled substance offers an opportune situation to examine these important aspects and allows me to study the effect of detailing and advertising on prescriptions and overdose deaths.

It is well documented that consumers do not always make the most optimal decisions (Kahneman and Tversky 1979) especially when faced with marketing. In this essay I examine the effect of marketing activities on suboptimal decision making by physicians. I examine the effect of marketing activities on inappropriate prescribing, the amount of pills that were prescribed above what would have been considered an appropriate amount for the reasonable medical needs of the number of patients the physician sees. I also examine the effect of this suboptimal decision on negative societal outcomes, Opioid Overdose Deaths.

TABLE 3.1 REPRESENTATIVE LITERATURE REVIEW

Representative Papers in Marketing of Pharmaceuticals	**Drug**	**Schedule II Drug**	**Prescriptions/ Sales**	**Detailing Effect on Prescription Quality**	**Societal Implications**
Avorn and Solomon (2000)	Antibiotics	No	✓	Inappropriate Prescribing of antibiotics	Resistant Organism Prevalence
Gönül et al. (2001)	Scott-Levin Dataset	No	✓	Not addressed	None
Manchanda, Rossi and Chintagunta (2004)	Not Disclosed	No	✓	Not addressed	None
Mizik and Jacobson (2004)	Not Disclosed	No	✓	Not addressed	None
Venkataraman and Stremersch (2007)	Not Disclosed	No	✓	Not addressed	None
Spurling et al. (2010)	Review Article	No	✓	Lower Prescribing Quality (guideline adherence, appropriateness)	None
Kappe and Stremersch (2016)	Statins	No	✓	Not addressed	None
Brax et al. (2017)	Review Article	No	✓	Lower Prescribing Quality (guideline adherence, drug quality)	None
Shapiro (2018)	Seroquel-Antipsychotic	No	✓	Off-label prescriptions	"Potentially Undesirable" Off-Label Prescriptions
This Study (2020)	Opioids	Yes	✓	Inappropriate Prescriptions	Opioid Overdose Deaths

Research Setting

The current Opioid Epidemic is not the only epidemic due to opioids that the United States has faced. There have been multiple epidemics related to opioids in

different forms over the past centuries (Harvard edX 2019). The first opioid epidemic arose during the 1800's after the creation of morphine. Patients, especially soldiers, who were overexposed to morphine prescriptions, became addicted and opioid overdose deaths rose by the end of the century. At this time, heroin tablets were introduced to the market as a safer alternative to morphine. Heroin was quickly abused nonmedically in urban centers and eventually the Federal Government began to regulate the sale and prescription of narcotics. The next opioid epidemic arose in the second half of the 20th century surrounding injection heroin (Harvard edX 2019). The current Opioid Epidemic, the subject of this research, began in the last few years of the millennium with the creating and marketing of opioids for chronic pain.

In the 1990's physicians were aware of the addictive nature of opioids due to the history of epidemics of opioids. They prescribed opioids for end-of-life care but exercised great caution in prescribing them for chronic conditions such as low back pain or fibromyalgia (Harvard edX 2019). OxyContin, patented in 1995, was the first opioid marketed for chronic, non-cancer-related pain. The slow-release properties of the formulation were touted as lower potential for abuse and the products were aggressively marketed to physicians through conferences, advertising, detailing, promotional offers and advertising (Van Zee 2009). Several other pharmaceutical companies quickly developed and promoted their own opioids for chronic pain. During this period, physicians progressed from being extremely cautious prescribing opioids to liberally prescribing them for a variety of ailments. Thus, the subsequent overexposure of patients to opioids began. Figure 3.1 presents a timeline of the Opioid Epidemic superimposed on

the rates of opioid overdose deaths. This research examines the role of marketing in that progression.

Theory and Hypotheses

Theory Development Approach

Yin (1994) states that cases should be chosen because they are extreme examples, unusually revelatory, or where there exists an opportunity for unusual research access. This case offers an extreme example of marketing misconduct that serves as an optimal opportunity for case-based research. In addition, several states have filed a multitude of lawsuits against pharmaceutical companies, which has made public the data that allows unparalleled insight into this privately held focal firm.

This situation offers an extreme circumstance to explore a significant phenomenon, making a single case study appropriate (Eisenhardt and Graebner 2007). The theory building from cases method is appropriate because the theory emerges through iterative cycling between case data, emerging theory, and extant literature (Eisenhardt and Graebner 2007). I build the theoretical constructs from a case study of a prominent opioid firm in the extreme context of a marketing transgression, the opioid epidemic. I follow the research guidelines of Eisenhardt (1989) and Narayandas and Rangan (2004).

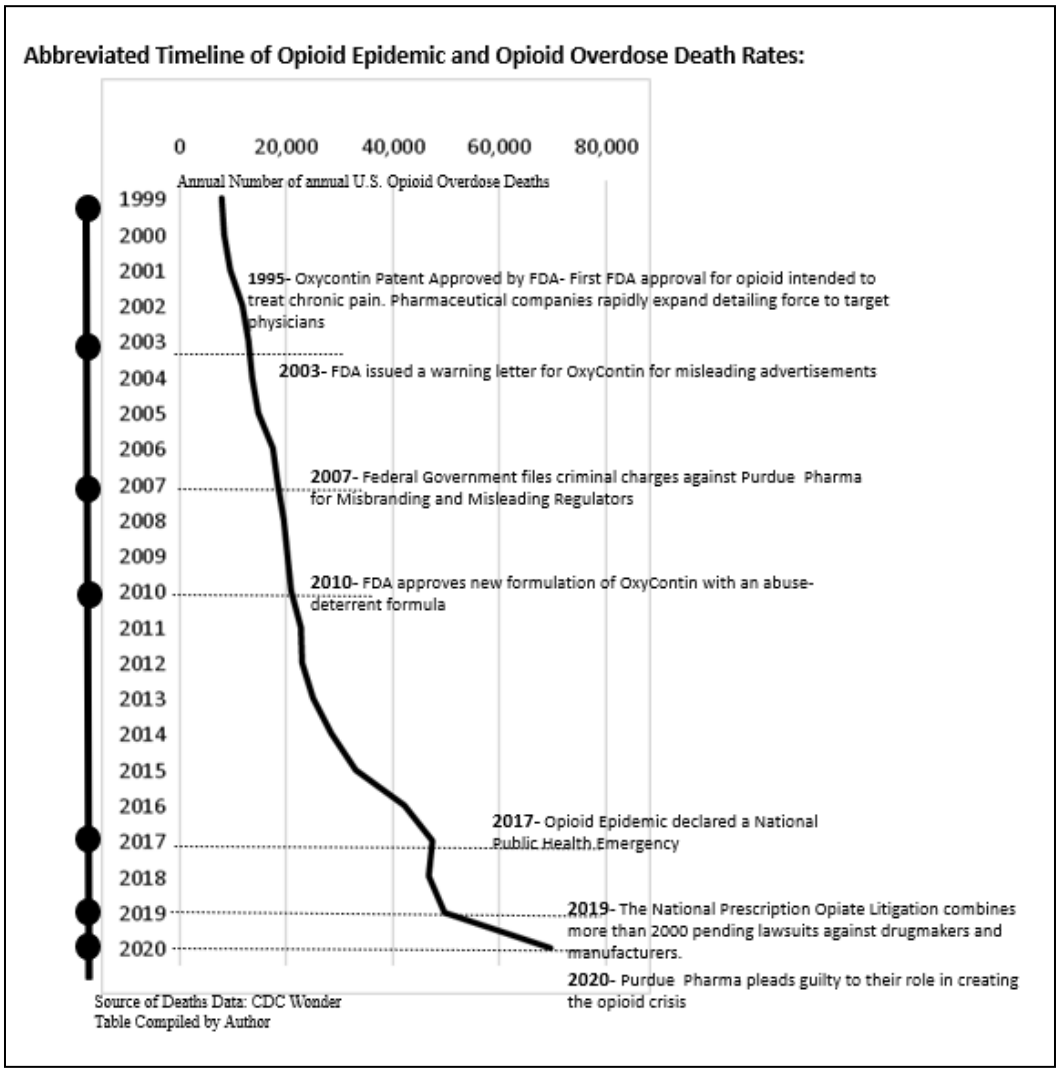

FIGURE 3.1. TIMELINE OF OPIOID EPIDEMIC AND OVERDOSE DEATH RATES

Data collection included gathering and reviewing court documents and their associated exhibits, scraping chat forum comments, reviewing internet archives of promotional websites, and collecting popular press articles. I began by reviewing court documents and evidence made public in recent lawsuits against the focal opioid firm. These included partially redacted complaints, video depositions, statements of agreed upon facts, detailing records, and corporate strategy documents. Then, I combed through a chat forum of comments from pharmaceutical representatives that promoted opioids to

extract key strategies, concepts and insights that influenced the pharmaceutical sales rep's experience at the company and on detailing visits. The extracted insights were then integrated into nodes through open coding and further condensed into major themes through axial coding (Strauss and Corbin 1998) using NVivo software. Next, I used the Wayback Machine to track and analyze changes in promotional messages on pharmaceutical company websites because advertisements and warnings about safety related to opioids changed throughout the last two decades as understanding about risk evolved. Throughout these steps, I examined popular press articles related to the Opioid Epidemic as supplemental material. Qualitative data analysis occurred until I reached theoretical model saturation (Gebhardt, Carpenter, and Sherry 2006). Table 3.2 is a summary of qualitative data sources.

TABLE 3.2. SUMMARY OF QUALITATIVE SOURCES

Qualitative Sources of Data	Data Provided
Court Documents	Insight into the scope of focal firm marketing practices and strategies. Analyzed unredacted complaints, deposition videos, agreed statement of facts.
Glassdoor.com	Insights into the work environment experienced by Pharmaceutical Sales Reps at Focal Firm.
Focal Firm Pain Management Website Internet Archive	Main source of pain management advocation by focal firm to physicians and patient caregivers. Internet archive of the website from 1998-2016.
CafePharma Message Board	Message board of pharmaceutical sales representatives discussing their experiences at focal firm from 2010-2019. Analyzed 22,655 comments from 1,614 threads.
Opioid Crisis Patient Interviews (Harvard edX)	Patient experience with addiction, getting prescriptions from doctors, and chronic pain.
Popular Press Articles	Additional insights into the public conversation surrounding the Opioid Epidemic. New York Times, Washington Post, The New Yorker, The Lancet, ProPublica.

The qualitative analysis revealed that marketing activities, through the mechanisms of *legitimation* and *deceptive marketing* positively affected the number of inappropriate prescriptions written for opioids by ameliorating the risk perceived by

physicians and persuading them to prescribe the drug. I also find that this increase in inappropriate prescribing leads to prescription opioid overdose deaths through the *titration* actions of physicians, physician belief in *pseudoaddiction*, and the *addiction* among the users, which leads to the pursuit of increased dosages eventually resulting in overdose death.

Furthermore, based on qualitative research, I introduce *responsible prescribing reminders* and *high prescriber targeting* as moderators of the relationship between marketing activities and inappropriate prescriptions. Here, I examine if reminding physicians to prescribe responsibly attenuates the positive effect of advertising on inappropriate prescriptions and whether the use of *high prescriber targeting* strategies increased the productivity of detailing. I present a conceptual model in Figure 3.2.

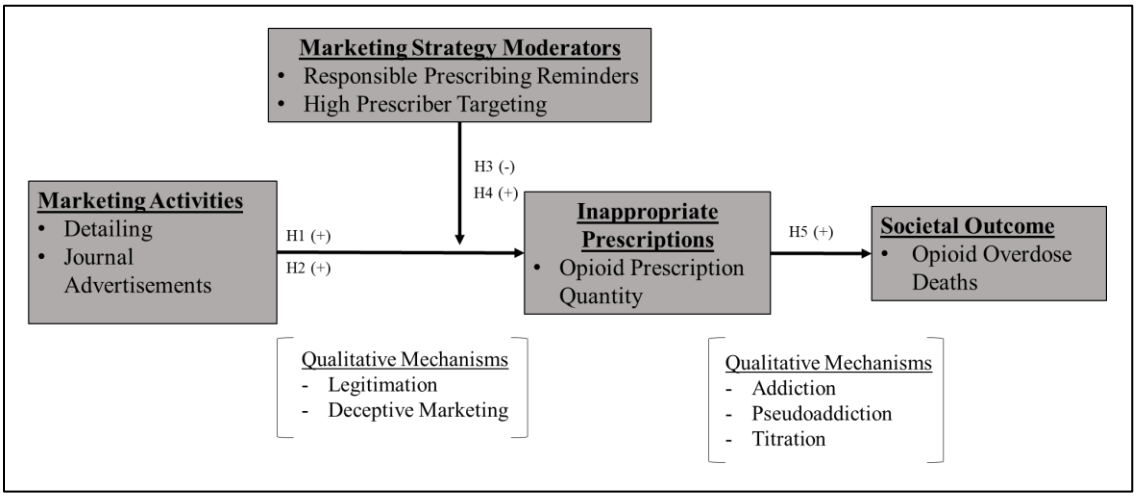

FIGURE 3.2. CONCEPTUAL MODEL

Effect of Advertising on Prescriptions

While direct to consumer (DTC) is utilized in the pharmaceutical industry, it is illegal in the opioid category as it is a restricted drug with potential for abuse. Consequently, I focus on advertising in medical journals aimed at doctors. Physicians play the role of a

"learned intermediary" between pharmaceutical companies and patients (Giliberti 2003) and it is their responsibility to mitigate the risk that medical solutions may pose to patients. The extant marketing literature in the pharmaceutical industry contexts points to information (transparency, better decisions), and persuasion (habit rather than choice) as the mechanisms through which advertising influences prescription behavior by physicians (Wieringa et al. 2014).

Physicians are trained to make decisions in the best interests of patients, and the assumption that prescriptions written by doctors are appropriate is pervasive in the existing literature. However, my manuscript deviates from the literature in this regard. my dependent variable of interest is *inappropriate prescriptions*, and there are additional mechanisms I identified through which advertising influences inappropriate prescribing behavior by physicians.

The qualitative research helped identified *deceptive marketing* in advertising claims as an additional mechanism through which the risk perceived by physicians towards prescribing opioids was mitigated. *Deceptive Marketing* refers to misleading statements about the efficacy of the drug or the omission of risk information in advertisements that are produced by the pharmaceutical firm or printed on the product packaging (Tipton, Bharadwaj and Robertson 2009). Industry reports find that in a large number of pharmaceutical firms, marketing spending has exceeded R&D spending[19]. Firms are motivated to spend on advertising to maximize the returns to their R&D output and with declining R&D investment pay-offs in terms of innovation, advertising has become more

[19] Institute for Health & Socio-Economic Policy. The R&D smokescreen: the prioritization of marketing & sales in the pharmaceutical industry: IHSP; 2016.

critical (Tipton, Bharadwaj, and Robertson 2009). In some instances, the advertising involves deceptive marketing claims. Tipton, Bharadwaj and Robertson (2009) point to use of deceptive marketing claims and its repeated use by established pharmaceutical firms despite their exposure and punishment. They argue that the pharmaceutical firms follow the practice as the pay-offs from deceptive advertising is greater than the penalties paid by these firms. Moreover, pharmaceutical firms may also benefit from the fact that the DDMAC division of the FDA has limited resources to monitor the veracity of the advertising claims, especially in an environment of increasing advertising spending[20] (Tipton, Bharadwaj and Robertson 2009).

In the case of the focal firm and their Brandname[21] drug, the deceptive marketing tactic of omitted risk led to widespread misuse. It was initially advertised with the slogan of addiction resulting in less than 1% of cases. As one of the salespeople on the CafePharma forum stated:

> "In the original (focal firm) marketing video, a paid physician claimed the drug resulted in addiction in less than 1 percent of cases. Later he acknowledged that his statement was not based on any long-term studies. And that's just one of the litany of errors, misstatements, exaggerations, and outright falsehoods" (Pharmaceutical Representative in CafePharma, an online chat group for pharma sales representatives).

The misrepresentation of the addictive potential of opioids was proliferated throughout promotional material. This message helped assuage concerns that the physicians, as the learned intermediaries, had about the risks of addiction to patients consuming opioids. With the erroneous perception conveyed through medical journal

[20] https://www.ahip.org/news/articles/new-study-in-the-midst-of-covid-19-crisis-7-out-of-10-big-pharma-companies-spent-more-on-sales-and-marketing-than-r-d
[21] I use the term Brandname to refer to the drug from the focal firm.

advertising that opioids prescribed for chronic pain were low-risk, physicians would be more likely to be persuaded to prescribe them more often and in larger dosages to patients. These prescriptions would be above the appropriate level of prescribing that physicians should make to their patients, and therefore would be inappropriate.

Formally,

H1: The greater the advertising in medical journals, the greater the number of inappropriate prescriptions likely to be prescribed by the physician.

Effect of Detailing on Prescriptions

Detailing is the second instrument used in the pharmaceutical industry to influence physician prescription behavior. In line with extant research on pharmaceutical detailing, pharmaceutical representatives use their initial interactions with physicians to inform and educate the physician about the drug. Later in the life cycle of the drug, after the information is disseminated, detailing develops a more persuasive function as constant interaction between the sales representative and the physician creates a relationship and builds a stock of positive physician prescription behavior (Manchanda & Honka, 2005). The focal firm followed a strategy of selling their branded opioid through the use of detailing visits to individual physicians. As the CEO of the focal firm stated in a video deposition:

"The salespeople were the principal agents of getting the word out (CEO of Focal Firm 2015)."

Following the detailing emphasis, the focal firm greatly increased its salesforce to support the launch of the focal firm's branded opioid offering, more than doubling it in 5 years (Deposition of the CEO of Focal Firm 2015). Detailing at an individual physician level by pharmaceutical sales representatives played a major role in the launch and early

success of the Brandname drug and it was a strategy quickly emulated by other pharmaceutical companies entering the opioid industry. Moreover, a key component of the detailing strategy was to increase the number of sales calls made to physicians.

The drastic expansion of the sales force allowed more primary care doctors to be reached, increasing the awareness of opioid use for chronic pain. Subsequently, the focal firm continued to increase the number of sales calls, though they did this through increasing the quota of physician calls per representative instead of hiring more. The detailing efforts by pharmaceutical representatives exposed the physicians to information about opioids and persuaded them to alleviate their patients' pain by prescribing the Brandname opioid drug.

The qualitative case study research helped identify *deceptive marketing* and *legitimation* as additional mechanisms through which detailing affects physician prescription behavior. Pharmaceutical sales representatives have been shown to misrepresent facts in detailing activities (Mizik and Jacobson 2004). There was a false claim of low addiction likelihood and less potential for abuse promoted in advertisements for opioids. This claim misrepresented the risk of addiction by citing studies that showed low addiction out of context and failing to cite studies that showed higher levels of addiction in relevant contexts (Van Zee 2009b).

The false claim was perpetuated by sales representatives on their detailing visits and resulted in a persuasive effect. Deceptive marketing claims in detailing reinforced and ameliorated the perceived risk of opioids by the learned intermediary (physician) and makes them more likely to be persuaded to prescribe opioids to patients because they

believe them to be less harmful. As a pharmaceutical sales representative posted on the online chat group, CafePharma,

> "We promoted (Brandname Drug) as "less potential for abuse." That is the quote we were instructed to say. It was even in the package insert with "data on file". When the FDA asked for that data, we did not have it. ..."Delayed absorption as delivered by (Brandname Drug) is believed to reduce the abuse liability of the drug" - or something along those lines was what was in the original pitch."

This deceptive marketing false claim of "less potential for abuse" perpetuated by pharmaceutical representatives assuaged the worries physicians had about addiction risks and made them feel more comfortable and justified in prescribing opioids for chronic pain, thus increasing inappropriate prescriptions.

Detailing affected increased inappropriate prescriptions through *legitimation* as well. Legitimation is the process of gaining sociopolitical and cognitive recognition (Humphreys 2010). It can occur through endorsement by organizations or regulations, or through development of cultural assumptions that an organization is appropriate within a shared system of norms and values (Rao 1994). In the context of this essay, using opioids for chronic pain presented an ideological challenge (Press et al. 2014) to existing prescribing norms of physicians. Opioids were rarely prescribed for conditions other than end-of-life due to concerns over addiction (Harvard edX 2019), until pharmaceutical firms reframed pain management by changing the medical, societal, and regulatory perceptions of the need for pain management and the use of opioids to do so. The process of reframing pain management and convincing doctors to prescribe opioids was through the *legitimation* of the use of opioids for pain management. Andrew Kolodny (2012), a physician, described how doctors' received information about pain management with opioids from many sources:

> “Doctors began to hear that the risk of addiction had been overblown, that we've been allowing patients to suffer needlessly, that we can be much more compassionate if we prescribe opioids more liberally. And we didn't just hear this in educational programs that were sponsored by drug companies. We heard these messages from our national societies, from our hospitals, from our state medical boards.”

The leveraging of the support from medical associations and third-party sources by pharmaceutical representatives in their detailing pitches and communication with physicians increased the credibility of the messages they spread about pain management with opioids. As a sales representative noted,

> “The "unbiased" third-party recommendations for treating pain by the APM and the AAPM etc. we're just that unbiased. In reality (the focal firm) virtually told both of these pain societies what to write in their recommendations for treating pain and the Product Data Brochure was a real hoot (wonder who they paid off to be able to market with that piece of crap) ...statements like ""delayed absorption as provided by (Brandname drug) may reduce the abuse liability of a drug".

The American Pain Society first suggested the idea of pain as a 5th vital sign in 1995, and in the years following this recommendation, pain began to be evaluated consistently at clinical encounters with patients and it raised physician awareness of pain and pain management (Morone and Weiner 2013). Pharmaceutical representatives leveraged this awareness and external validation to convince physicians to continue to monitor pain and prescribe opioids as a solution. The homepage of the pain management website of the focal firm stated the website’s mission was to, “Provide the best possible care for people in pain. Too often, pain remains inadequately treated in the US” (Focal Firm Pain Management Website 1998).

Doctors who were initially skeptical about prescribing opioids due to the risks involved became more open to prescribing them as they were exposed to detailing messages by representatives leveraging the legitimation of their product by third-party

sources. Manchanda and Honka (2005) suggest the consistent interaction between detailers and physicians builds a stock of goodwill which is based on social and cultural norms which translate into positive prescribing habits. The doctors' greater openness to opioids would have allowed them to be persuaded into prescribing more opioid prescriptions to their patients. Thus, the use of *deceptive marketing* to mitigate risk concerns and the leveraging of third-party *legitimation* of pain management led to positive effect of detailing on the number of inappropriate prescriptions. Formally,

> H2: The greater the detailing, the greater the number of inappropriate prescriptions likely to be prescribed by physicians.

Marketing Strategy Moderators

The qualitative research enabled me to uncover two factors, namely *responsibility ads* and *high prescriber targeting,* that moderate the relationship between marketing activities and inappropriate prescription practices of physicians. *Responsible prescribing reminders* refers to advertisements that reminded physicians of the addictive nature of opioids, or their responsibility to prescribe appropriately. High prescriber targeting refers to the strategy of focusing greater detailing time and effort towards physicians who had a prior history of writing a larger number of prescriptions relative to other physicians. A court document deposition of the CEO stated:

> "In the United States from the inception of the launch of (Brandname drug), we focused our salesmen's attention to physicians who were, based on their history, physicians whose practice and their practice was to use—write a lot of prescriptions for opioids. We didn't go to people who didn't write them, we went to people who did" (Focal Firm CEO 2015).

Effect of Responsible Prescribing Reminders on Opioid Overdoses

With only a short window of time available to evaluate, diagnose, and treat each patient, physicians sometimes struggle to appropriately prescribe opioids despite their best intentions. Their environments of too many patients, pain reframing, and misinformation limit physicians' attention. A reminder of responsible prescribing may reduce a doctor's tendency for mis-prescribing opioids. Despite early claims of less than 1% of chronic pain patients using opioids becoming addicted, later in the life cycle of opioids, awareness about the addictive nature of opioids spread and pharmaceutical companies made efforts to encourage responsible prescribing by physicians. The firms introduced responsible prescription ads either in an effort to highlight solutions to the problem or were motivated to do so to minimize their perceived contribution to the abuse. For example, Alpharma Pharmaceuticals published an advertisement in a medical journal in the first week of July 2008 stating, "Because you never know where your Rx ends up." The advertisement encouraged responsible prescribing and advertised new reformulation technology to prevent abuse (Alpharma 2008). The marketing activities of detailing and medical journal advertising traditionally persuade physicians to prescribe greater quantities of opioids through *deceptive marketing messages*. In contrast, this *responsible prescribing reminder* in the form of an advertisement may have made the risks of opioid abuse and their role as a "learned intermediary" more salient to physicians and caused them to be more mindful and prescribe more cautiously. This cautiousness would mitigate the positive effect of advertising on opioid prescriptions. In the face of *responsible prescribing reminders*, physicians are likely to prescribe opioids only to those who truly require the medication and compel them to search for alternative

remedies for other patients instead of prescribing opioids to everyone, in effect decreasing inappropriate prescriptions.

Therefore,

> H3: As the number of advertisements urging doctors to prescribe opioids responsibly increases, it will attenuate the positive effect of advertising on inappropriate prescription quantity.

Effect of High Prescriber Targeting on Opioid Prescriptions

Data from the lawsuit filings revealed that implementing the physician targeting strategies increased the positive effect of detailing on prescriptions. Early in the product life cycle of their Brandname drug, the focal firm expanded their salesforce to increase detailing. Later in the product life cycle, they explored other methods to increase their market share. According to the un-redacted complaint filed in a Commonwealth of Massachusetts lawsuit, the focal firm hired a management consulting company to study how to get doctors to prescribe more of the brand name drug (Commonwealth of Massachusetts 2019). The consultants examined if sales representatives were targeting prescribers likely to increase opioid use:

> "(CEO of focal firm) asked for more detail on what was being done to increase sales. Staff told the CEO that (management company) would analyze whether sales reps were targeting the prescribers who were most susceptible to increasing opioid use" (Commonwealth of Massachusetts 2019).

The consulting company advised the focal firm to follow several strategies including incentivizing sales representatives to target physicians with higher propensity to prescribe opioids. From a statement made by the CEO it appears that the focal firm implemented the suggestions to target higher prescribers by requiring sales representatives to develop lists of physicians who were most susceptible to their efforts:

> "Each Focal Firm sales representative had specific sales territory and is responsible for developing a list of 105-140 physicians who already prescribe opioids or who are candidates for prescribing opioids" (CEO of Focal Firm 2015).

Effective targeting of high prescriber physicians by pharmaceutical representatives could increase the effectiveness of each detailing visit and lead to larger number of prescriptions because time and effort of detailing visits could be focused on higher prescribers rather than diluted by focusing on low prescribers. As extant pharmaceutical marketing research observes, targeting physicians with a higher propensity to prescribe with detailing efforts yields higher prescriptions (Dong, Li, and Xie 2009; Montoya Netzer, and Jedidi 2010). By focusing efforts on high prescribers who are already predisposed to prescribe higher amounts, detailing would be even more likely to lead to persuasion, thus increasing the positive effect of detailing on inappropriate prescriptions.

H4: Targeting higher prescribers would increase the positive effect of detailing on inappropriate opioid prescriptions.

Linking Prescriptions to Overdose and Deaths

I expect that the mechanism of *addiction* links inappropriate opioid prescriptions to prescription opioid overdose deaths. Products are considered addictive if past consumption raises marginal utility of current consumption (Tuchman 2019). Opioids can interact with opioid receptors in the brain and have analgesic and sedative effects (WHO 2020). Consumption of opioids can cause euphoria, motivating their adoption for non-medical reasons. Their repeated non-medical use, and misuse, can lead to opioid dependence. As the World Health Organization factsheet says:

> "The characteristic feature of addiction is a strong internal drive to use opioids, which manifests itself by impaired ability to regulate use, increasing priority given to use over other activities and persistence of use despite harm or negative consequences. Due to their pharmacological effects, opioids can cause difficulties with breathing, and opioid overdose can lead to death" (WHO, 2020).

The increased availability of Brandname drug in the United States was associated with higher rates of substance abuse, and by 2004, Brandname drug had become the most prevalently abused opioid (Van Zee 2009). The addictive nature of opioids (despite marketing claims to the contrary) led to opioid dependence and substance abuse by patients. A recovering addict described opioid addiction and the effect it has on people:

> "But opiate addiction is such that it causes people to be dishonest. And people are so desperate for the medication that they'll flat-out lie to you to get it. And they're very convincing because they convince themselves. Because they think they do need it." (Recovering opioid addict 2019).

Addiction can lead to consumption beyond prescribed limits which can culminate in opioid overdose, which, without emergency treatment leads to overdose deaths[22]. I do not have patient level data to track opioid use over time by individual patients that might indicate addiction, but I rely on *addiction* as a mechanism due to qualitative insights.

This negative consequence occurs through both the demand and the supply side of the physician-patient relationship through the misguided belief in the *pseudoaddiction* of opioid dependent patients and the subsequent treatment using *titration* strategies. The definition of *pseudoaddiction* was promoted on the focal firm's website,

> "...Individuals who have severe, unrelieved pain may become intensely focused on finding relief for their pain. Sometimes such patients may appear to observers to be preoccupied with obtaining opioids, but the preoccupation is with finding relief of pain, rather than using opioids per se. This phenomenon has been termed

[22] I do not have patient level data to track opioid use over time by individual patients that might indicate addiction, but I rely on addiction as a mechanism due to qualitative insights.

> 'pseudoaddiction' in the pain literature..."(American Society of Addiction Medicine 1997).

Thus, *pseudoaddiction* refers to the false claim by pharmaceutical companies that patients who appeared to be addicted to opioids are, not in fact, addicted. Because there is no objective proof that *pseudoaddiction* is a true diagnosis, it is quite possible that the patients were suffering from both pain and opioid dependence (Greene and Chambers 2015). It is expected that physicians, as a learned intermediary, should have recognized the signs of opioid dependence and addiction in patients; however, the pharmaceutical industry diverted concerns of opioid abuse through arguing for the presence of *pseudoaddiction.* Sales representatives were also instructed to educate physicians about the concept. Physicians who were misled by the concept of *pseudoaddiction* are likely to have ignored signs of addiction in their patients and continued supplying them with opioid medication for their continuing pain (inappropriate prescribing), essentially fueling their addiction and increasing the likelihood that prescriptions would lead to opioid overdoses.

To exacerbate matters, physicians were encouraged by pharmaceutical company advertising, conferences, and pharmaceutical sales representatives to *titrate* dosages in response to signs of opioid dependence, inadvertently fueling a patient's addiction. *Titration* is defined as the increase of a dosage of medicine to better treat the patient with minimal side effects. On the Focal Firm website in January 1999, it stated:

> "Fact: Unlike other analgesics, such as NSAIDs, there is no "ceiling effect" for the analgesia provided by morphine. As cancer pain increases or tolerance develops, the morphine dose can usually be titrated upwards to treat the increased pain." (Focal Firm, 1999).

Physicians titrated, or increased, the dosage of patients who showed signs of developing tolerance to opioids. Pharmaceutical companies who utilized *titration*-focused messages encouraged doctors to increase opioid dosages rather than promoting responsible prescribing. The force of demand, through patient opioid *addiction*, and the force of supply, through physician acceptance of *pseudoaddiction* and *titration* likely led to a positive effect of inappropriate prescriptions on opioid overdose deaths which evident in *the number of prescriptions* of the prescriptions. Formally,

> H5: The greater the number of inappropriate prescriptions for opioids, the greater the number of *prescription opioid overdose deaths*.

Data

I faced two significant challenges in collecting data about the marketing practices of the focal firm as well as the general pharmaceutical industry. First, the focal firm was a private firm and thus has fewer disclosure requirements. Second the Opioid Epidemic has made pharmaceutical firms and database providers wary of making data related to these products available to researchers. In fact, one established market research firm with data available in this context refused to make data available for this reason. Consequently, this study uses a variety of creative sources to gain empirical insight of the marketing practices of firms involved in the Opioid Epidemic. The dataset was constructed by merging national prescription distribution records with firm level advertising and detailing data. I then merged this data with the CDC mortality records which provides data of opioid related deaths.

The panel dataset covers the marketing activities of the focal pharmaceutical firm from 2006-2014. This period covers the rapid growth and expansion of the sale of opioids

and an increase in the deaths due to opioid overdose as shown in Figure 3.3. 2006 is also the year that the Opioid Crisis is considered to have matured (Skilton and Bernardes 2022).

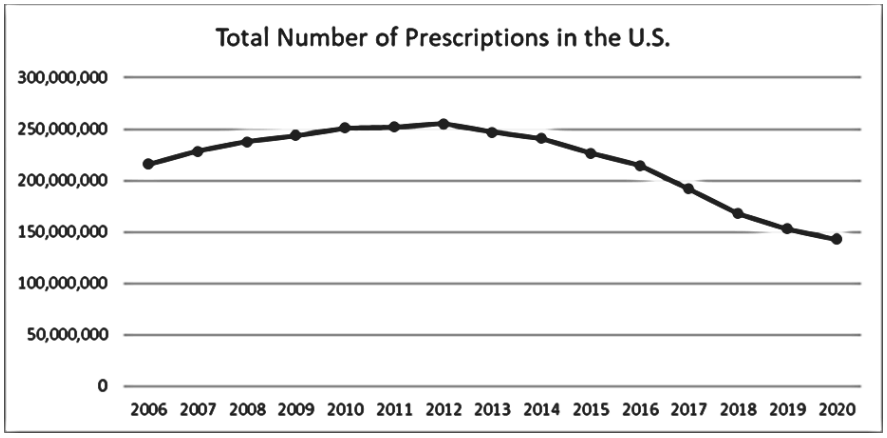

FIGURE 3.3: NUMBER OF PRESCRIPTIONS IN THE US[23]

Dataset Distinctions

I use two datasets in this study. The primary dataset captures the advertising and detailing activities in the United States from 2006-2014. This national level panel dataset is at a monthly county level. The granularity of this dataset is constrained by the CDC Mortality Data being available only at a monthly county level. In the primary dataset, advertising is available for all the counties in the United States[24]. Opioid detailing data is not available from any database. I rely on an exhibit from court records from the lawsuit filing by the state of Massachusetts for the data. Consequently, detailing records are available only for the single focal firm and the single state of Massachusetts for the period, May 2007-December 2012. Detailing is reported as the total number of detailing

[23] Data Source: cdc.gov/drugoverdose, Figure created by Author.
[24] The advertising varies over time but not across the cross-sectional units (counties).

visits made by the focal firm sales representatives to physicians in a county. As a result, a second, limited dataset is used to test the detailing hypotheses.

Dependent Variables

Prescription quantity was sourced from the ARCOS database which was released by DEA and Washington Post in July 2019 (The Washington Post 2019). This is a record of all pills shipped to all pharmacies in the United States by date. I aggregate this to a county month level. I do not have access to physician-level prescribing data. The quantity of total opioid pills shipped to pharmacies in the county is a proxy for the *quantity of opioid prescriptions* written and filled by doctors for opioid pills in that county per month. I assume that pharmacies ordered pills to meet the demands of prescriptions written by doctors and the pills are distributed only to patients upon receipt of a prescription. Further, I also assume that prescriptions are written, filled, and consumed within the county. As I describe later, I winsorize the data to remove sales by outlets that sell large quantities (i.e., pill-mills) and thus are likely involved in sales to out of county patients. The panel structure of the data ensures that counties are compared to themselves over time, thus removing concerns about population effects. This is elaborated further in the discussion about controls.

Inappropriate Prescription Quantity is the number of pills that were prescribed above what would have been considered an appropriate amount for the population of the county. Skilton and Bernardes (2022) make the claim that 1062 total dosage units per 100 people would be a safe supply of opioids based on Dahlhamer et al. (2018). This number is calculated based on an aggregated measure of recommended safe supply treatment levels for three groups of patients: severe chronic pain patients with legitimate demand

for annual prescriptions, non-severe chronic pain patients with short-term prescriptions of a week or two, and acute pain patients with prescription periods of a few days such as after surgery. This is equivalent to 30 prescriptions per 100 population per year, with an average of 35.4 dosage units per prescription. I calculate inappropriate prescriptions as the total number of pills prescribed in the county minus the safe supply for the county (1062 pills per 100 of the population).

Prescriptions are winsorized to account for outliers in counties that may have pill mills (locations that illegally prescribed opioids in extremely high quantities to almost any patient that walked through the door). Pill mills were run by physicians who prescribed copiously regardless of detailing or advertising activities. These prescriptions can almost all be considered inappropriate, but theoretically they have no link to marketing activities and are thus excluded from the model.

Opioid overdose deaths. The number of monthly deaths due to opioid overdoses per county were retrieved from the CDC Restricted Use Multiple Mortality Files. I used the restricted use files instead of the publicly available mortality files because the public records are censored at the lower limit of 10 deaths per county per month to address privacy concerns. Most counties have less than 10 deaths per county per month, so I formally requested the restricted use files to have a record of every overdose death per county, not censored at 10 [25]. Drug overdose deaths were identified using the underlying cause of death codes reported as Contributing Causes of Death by the CDC[26]. A death

[25] National Health Statistics. [2006-2012 Detailed Mortality- All Counties] (2006-2012), as compiled from data provided by the 57 vital statistics jurisdictions through the Vital Statistics Cooperative Program.

[26] X40-X44 (unintentional), Y10-Y14 (undetermined), and X60-X64(suicide), X85 (homicide). Then the contributing cause of death codes: T400- Poisoning by Opium is a Contributing Cause of Death, T401-Poisoning by Heroin is a Contributing Cause of Death, T402- Poisoning by Other opioids is a Contributing Cause of Death, T403 signifies Poisoning by Methadone is a Contributing Cause

may be attributed to multiple causes. *Prescription Opioid Overdose Deaths* [27] is calculated as the sum of deaths where one of the contributing causes of death is due to a prescription opioid overdose. The CDC Multiple Mortality files are anonymized, so I am unable to link the deaths to specific people.

Independent Variables

Adstock (advertising spending in medical journals). The three most prominent journals in the medical field are the New England Journal of Medicine (NEJM), The Lancet, and the Journal of American Medical Association (JAMA). The number of opioid advertisements were collected manually from copies of the*se journals* for the period 2007-2012[28] . The advertising spending was recorded as the number of covers, inserts, and full pages (weighted by cost paid for by the firm advertising an opioid). The weekly totals were aggregated to the monthly level. To account for the cumulative effect of marketing activities over time, I calculated an adstock measure (see also Bayer et al. 2020). Following Danaher, Bonfrer, and Dhar (2008), I calculate the *adstock* value of advertising using Equation (1).

$$(1) \quad Adstock_{it} = \psi \, Adstock_{t-1} + (1 - \psi) \, advertising \; spending_{it}$$

Where *adstock* is the advertising stock at time *t* and ψ is a smoothing parameter bounded between 0 and 1. I use a smoothing parameter of .68 found by a gridsearch following the practice in Dinner, Heerde, and Neslin (2014) and Bayer et al. (2020). The parameter is similar to the parameter of 0.6 found in Bayer et al. (2020).

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of Death, T404 signifies Poisoning by Other synthetic narcotics is a Contributing Cause of Death, and T406- Poisoning by Other and Unspecified Narcotics.

[27] *Prescription Opioid Overdose Deaths* include the contributing cause of deaths codes T402-T403

[28] I also examined The Lancet, another top ranked medical journal and found no opioid advertisements for the period.

In equation (1) the coefficient of *adstock* is the long term advertising elasticity and $(1-\psi)$*adstock* is the short-term advertising elasticity (Dinner, Heerde, and Neslin 2014).

Detailing stock (detailing). The total number of detailing visits made by the focal firm sales representatives to physicians in a county are collected from an exhibit provided as evidence from a court case. The dataset has a record of every visit made by a pharmaceutical representative of the focal firm to any physician in the Commonwealth of Massachusetts from May 2007-December 2012[29]. I aggregate the data at the county and monthly level to merge with the other datasets. Although I only have detailing at a firm level, competitors quickly emulated the focal firm by expanding their detailing forces alongside the focal firm. Detailing benefits also compound over time, so I calculate the *detailing stock* using the geometric decay method from Gönül et al. (2001) and Shapiro (2018) with equation (2). I use a limit of 6 months following Datta and Dave (2017) who cite that advertising effects fully depreciate within 6 months to one year. I use a geometric decay parameter of 0.9 found by a gridsearch. This is comparable to the detailing carryover parameter for detailing of .86 found in Narayanan, Desiraju, and Chintagunta (2004), and consistent with decay rates from the literature cited in Datta and Dave (2017).

$$(2) \quad Detailingstock_{it} = \sum_{\tau=0}^{6} \delta^{(t-\tau)}\ Detailing_{t-\tau}$$

[29] Exhibit 1 of the Court Documents

Marketing Strategy Moderators

High prescriber targeting. High prescriber targeting is the strategy of directing detailing visits towards physicians who already prescribe large amounts of opioids. I use a binary variable indicating the year the focal firm implemented a recommendation from the consulting firm (Commonwealth of Massachusetts 2019). I assume that other firms followed suit in adopting this approach. This assumption is necessary because the outcome variable of *inappropriate prescriptions* is measured at an industry level which means I cannot directly link the high prescriber targeting strategy of a focal firm to the amount of inappropriate prescriptions written for the opioid produced by that firm. January 2010 and after was coded as 1 and the prior period was coded as 0. I discuss the limitations to this measure later.

Responsible prescribing reminder. Responsible prescribing reminders were reminders to physicians about the risks of opioids intended to make them more carefully consider liberal opioid prescribing practices. I used a binary indicator measured by the presence of at least one advertisement encouraging responsible prescribing during the month in at least one of the JAMA or NEJM weekly issues. Table 3.3 summarizes the variables along with their sources and descriptions.

TABLE 3.3. VARIABLE DESCRIPTIONS

Variable	Source	Description
Inappropriate Prescription Quantity	ARCOS Database DEA	Number of opioid pills (dosage units) shipped to pharmacies in the county above what would be considered a 'safe supply' based on population. Proxy for inappropriate filled prescriptions
Prescription Opioid Overdose Deaths (T402-T403)	CDC Multiple Mortality Files	Total opioid overdose deaths involving prescription opioids defined by CDC (sum T402-T403)
Detailing Visits (Detailing Stock)	Court Documents, Exhibit 1	# Of monthly visits by Focal Firm representatives to each county, cumulative
Advertising Spending (Adstock)	JAMA, NEJM Medical Journals	Weighted # of ad pages for Opioids in B2B health journals, cumulative
Responsible Prescribing Reminder	JAMA, NEJM Medical Journals	Presence of an advertisement for responsible prescribing in the health journal issues for the month
High Prescriber Targeting	Court Documents	Binary indicator of when the high prescribing targeting went into effect (January 2010)
Prescription Drug Monitoring Program (PDMP)	PDMP Training and Technical Assistance Center	Binary indicator of whether a PDMP was operational in the state during that year
Producer Price Index	U.S. Bureau of Labor Statistics	Average change over time in selling prices for Chemicals and Allied Products- Analgesics, prescription, not seasonally adjusted. Used as an instrument for Advertising
Number of Focal Firm Corporate Employees	Internet Archives of Focal Firm "About" Page	Total number of employees employed by Focal Firm. Used as an instrument for detailing
Advertisement Pictures	JAMA, NEJM Medical Journals	Use of pictures in the opioid advertisements (used as control)
Advertisement Transparency	JAMA, NEJM Medical Journals	Portion of the opioid advertisement made up of warnings (used as control)

Controls

I include time and county fixed effects in the panel data structure. I control for aspects of the advertisement content including *advertisement transparency*, and *advertisement pictures.* These variables were created by hand coding the advertisements in the medical journals. *Advertisement Transparency* is the proportion of the main page of the

advertisement that is taken up by pharmaceutical warnings, and *advertisement pictures* is an indication of whether the advertisement used pictures on the main page of the advertisement.

Prescription Drug Monitoring Programs (PDMP) are state initiatives to track patient's controlled substance prescriptions. During the period of analysis, several states instituted PDMP programs. I control for this using a binary indicator of whether the state in which the county resides had a PDMP program at the month of the observation.

I used time and county fixed effects in models that account for the panel data structure. These fixed effects control for endogenous factors that would vary by either county or time that could drive prescription behaviors. These fixed effects control for regional characteristics, events specific to the region, as well as patient and physician characteristics because prescriptions aggregated to a county level would vary by county. While I could have utilized county level demographics, they are available only at an annual level, whereas the time and county fixed effects were at a monthly level, so they provided more variation than these additional variables.

Analysis Strategy

Descriptive Statistics

The average number of detailing visits by focal firm representatives to physicians per month per county in MA was approximately 132 visits, although they could reach up to as many as 654 visits in a single month in a county. The number of opioid pills shipped to U.S. counties to fill prescriptions per month averaged 2,807,414 pills per county. The

inappropriate prescriptions pills sent to each county per month averaged 2,717,074 pills. The average number of prescription opioid overdose deaths per county per month was 1.40 deaths. Descriptive statistics of the key variables are in Table 3.4.

TABLE 3.4. DESCRIPTIVE STATISTICS

	MA County levels datasets		U.S. County Level Dataset	
	Mean	**St. Dev**	**Mean**	**St. Dev**
Detailing Visits	132.856	122.3976	N/A	N/A
Monthly Prescription Opioid Overdose Deaths by county (T402-T403)	1.40	1.52	0.38	1.30
Inappropriate Prescription Quantity	720547.8	546147	2717074.00	7155621.00
Population	46299.4	399503.6	102095.00	318158.00
Prescription Quantity Total	1135878	839739	2807414.00	7404498.00
MME Total	14600000	10300000	31600000	88900000
Advertising Spending Total	6.637	6.058	7.53	3.52
Observations	882	882	248840 (advertising)	322,067 (prescriptions and deaths)

Addressing Endogeneity of Advertising and Detailing

Advertising and detailing decisions are strategic choices by the firm and hence are endogenous with the outcome variable of prescriptions due to potential reverse causality and potential omitted variables. A firm's advertising and detailing will affect prescriptions, but a firm's prescription sales will affect future advertising and detailing spending. This would be endogeneity from reverse causality. Additionally, there are omitted variables in the model due to data access including spending by pharmaceutical companies on physicians for activities outside of detailing such as conferences. I use two approaches to address endogeneity: Instruments, and Gaussian Copula.

Instruments

I follow Narayanan et al., (2004) and use Producer Price Index (PPI) to instrument for advertising expenditures, and the Number of Employees to instrument for detailing expenditures. PPI is the average change over time in selling prices for commodities or services and is available from the Bureau of Labor Statistics. I used the series for Chemicals and Allied Products- Analgesics, Prescriptions, not seasonally adjusted which captures the prices for bulk analgesic drugs, including opioids. Instruments must fulfill two requirements, that they are theoretically relevant and exogenous (Stock and Watson 2018). PPI is a relevant instrument because it is correlated with prices because it reflects a component of the costs faced by marketers of opioids, and it is exogenous (uncorrelated with errors) because it is a supply side variable that would be unaffected by demand shocks for the number of inappropriate prescriptions written.

As an instrument for detailing, I compiled the total number of employees employed by the focal firm over time following Narayanan et al. 2004. I use the internet archives of the focal firm "About" Page, formerly "Who We Are- FAQ's Page." The employee totals on the site were updated only at intervals, so the assumption was made that the number of employees per month is the same as for the closest months. This is consistent with the literature- employee totals are only available in annual reports at a yearly level. The number of employees is relevant because it reflects increases in detailing staff which would be indicative of higher detailing visits and it is exogenous the number of employees at pharmaceutical firms would not be expected to directly impact demand for inappropriate prescriptions except through detailing impacts.

The instruments are strong and exogenous statistically for *PPI* and *focal firm employees*. Endogeneity instrument tests for the STATA command -xtivreg2- are significant for all models showing the instruments are exogenous. The Cragg-Donald Wald F-statistics that exceed the Stock-Yogo Critical values of 10% (7.03 for MA state level models and 16.38 for national level models as Reported in Table 3.5) showing the instruments are relevant.

Gaussian Copula

Another approach to addressing endogeneity is through using a Gaussian copula function. This is an instrumental variable-free estimation method which does not seek to identify the source of endogeneity like instrumental variable methods, but rather approximates a joint distribution of the endogenous regressor and error using a copula function (Haschka 2022). I follow the Haschka (2022) panel data generalization method. Results are reported in the tables as an additional column.

Panel Regression Fixed Effects Models

I use panel fixed effects models to test the hypotheses with the base equation shown in equation (3). I log the dependent and independent variables so the coefficients can be interpreted as elasticities. To test the moderation effects of responsible prescribing reminders on the positive relationship between adstock and focal firm prescriptions, I included an interaction effect between *adstock* and *responsible prescribing reminders* and between *high prescriber targeting* and detailing shown in equation (4).

$$
\begin{aligned}
&(3)\ \log(Y_{it}) \\
&= \beta_0 + \beta_{1it}(Adstock) + \beta_{2it} log(Responsible\ Prescribing\ Reminder) \\
&+ \beta_{3it}\big(log(Adstock)X(Responsible\ Prescribing\ Reminder)\big) + \beta_{4it}(High\ Prescriber\ Targeting) \\
&+ \beta_{5it} log(Detailing\ Stock) + \beta_{6it}\big(log(Detailing\ Stock)\big)X(High\ Prescriber\ Targeting)\big) \\
&+ \beta_{7it}(PDMP) + \beta_{8it} log(Advertisement\ Characteristics) + \gamma_{it}(county\ fixed\ effects) + \varepsilon
\end{aligned}
$$

Where $\boldsymbol{Y_{it}}$ is the *inappropriate prescription quantity* in the county (*i*) at time t, and ε is random error. I first analyzed the data with both a panel fixed effects and random effects models. The Hausman Test that the two estimators are not different was rejected (p= .000) indicating the preferred use of a fixed effects model (Kennedy 2008). The results of the panel fixed effects models are presented in Table 3.5. They are conducted at national levels, except for models that include detailing.

The results of *adstock models* should be interpreted as long-term advertising elasticities (Danaher, Bonfrer, and Dhar 2008). As shown in Table 3.5 Model B, as the adstock of *advertising spending* increases by 1%, the *inappropriate prescription quantity* at the county level increases by 1.149% (β=1.149, p<0.01) supporting H1. Next, as shown in Model E, as the number of detailing visits increases by 1%, the *inappropriate opioid prescriptions* for a county increases by approximately 0.4099% (β=0.886, p<0.01) in support of H2. For Robustness, using the Gaussian copula as an instrument finds that, the coefficient for the copula term was insignificant for detailing, so I do not treat detailing as an endogenous variable in that model. Testing H3 (see Model 1), the interaction effect of *responsible prescribing reminders* and *adstock* is significant and negative (β= -0.95, p<.01), which supports the expectation that *responsible prescribing reminders* attenuates the positive effect of *advertisements* on *inappropriate prescriptions*.

TABLE 3.5. MODELS FOR H1-H4 INAPPROPRIATE PRESCRIPTIONS

	Model A: Panel FE DV: Inappropriate Prescription Quantity Data: National county level	**Model B: Panel FE DV: Inappropriate Prescription Quantity (Instrumented) Data: National County level**	**Model C: Panel FE DV: Inappropriate Prescription Quantity (Gaussian) Data: National County level**	**Model D: Panel FE DV: Inappropriate Prescription Quantity Data: MA county level**	**Model E: Panel FE DV: Inappropriate Prescription Quantity (Instrumented) Data: MA County level**	**Model F: Panel FE DV: Inappropriate Prescription Quantity (Gaussian) Data: MA County level**
Log (Detailstock)				0.00694	0.4099***	0.0074509
				(0.0083)	(0.10558)	(0.010242)
Log (Adstock)	0.107***	1.149***	0.026***	0.0051	-0.19165***	0.0831***
	(0.0113)	(0.01473)	(0.0043)	(0.0101423)	(0.004)	(0.025034)
Ad Transparency	-0.0322***	-0.3509***	-0.0355***	0.0431***	0.1433***	0.0475878***
	(0.0014)	(0.006)	(0.0015)	(0.0119)	(0.0433)	(0.0107)
Ad Pictures	-0.0049***	-0.3853***	-0.01765	-0.0087	0.0498	0.00745
	(0.00156)	(0.0065)	(0.00178)	(0.13026)	(0.0325)	(0.01024)
Responsible Prescribing	0.094***	1.7165***	0.1917***	0.2468***	0.67467***	0.15719
	(0.112683)	(0.0261)	(0.1323)	(0.0787)	(0.09463)	(0.099135)
PDMP	0.16227***	-0.0583	0.1577***			
	(0.00688)	(0.00598)	(0.0029)			
Responsible Prescribing X Log (Adstock)	-0.0884***	-0.9500***	-0.13605***	-0.1052***	-0.2151**	-0.5910
	(0.0049)	(0.01326)	(0.00597)	(0.038)	(0.09463)	(0.0505)
Targeting				-0.325	0.52189***	-0.0326
				(0.02779)	(0.1568)	(0.03334)
Targeting X Log (Detailstock)				0.23225***	-0.0398**	0.0237***
				(0.0043)	(0.0201)	(0.0051022)
Gaussian Copula Term for Adstock			0.04427***			-0.056491***
			(0.00211)			(0.0168)
Constant	13.307***		13.478 ***	12.747***	10.64***	12.604***
	(0.0061)		(0.0087)	(0.0468)	(0.8135)	(0.084068)
Time Fixed Effects	Included	Included	Included	Included	Included	Included
County/State Fixed Effects	Included	Included	Included	Included	Included	Included
Observations	201323	201323	201323	868	868	868
Number of cities/counties/states	2973 counties in the US	2973 counties in the US	2973 counties in the US	14 counties in MA	14 counties in MA	14 counties in MA
Cragg-Donald Wald F Statistic		12000			9.810	
Stock-Yogo Critical Value (10%)		16.38			7.03	
Bootstrap (Gaussian)			100			200
Endogeneity of Instrument Test		p=0.000			p=0.000	

Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

In H4, I predicted a positive moderating effect, of *high prescriber targeting* strategy on the relationship between *focal firm detailing visits* and *focal firm prescriptions.* I tested the hypothesis with the MA county data set because detailing data is only available for the state of MA. The results provide mixed support for H4 with the interaction term in Model E as (β=-0.0398, $p<0.05$) and (β=0.0237, $p<0.01$) in Model F for the Gaussian copula method of instrumentation model as above, I treat detailing as not endogenous in this model.

Analysis of Overdose Deaths as Dependent Variable

The second stage of the study is to examine the effects of prescriptions on overdose deaths due to opioids. To mitigate the skewness in the data and to capture the coefficients as elasticities, I take the logs of the variables. This estimation takes place with the national data at the aggregated level of the county because it is the most granular level of mortality statistics available.

To model prescriptions as an independent variable, it is necessary to include a time lag because it takes time for the prescriptions to develop into an addiction and eventually lead to an overdose. A triangular window of weights makes sense theoretically because there is an average amount of time it takes for an addiction to develop (See Appendix C for further explanation). Following Hadland et al. (2019), I use 12 months, and time values before and after this time are weighted at a decreasing rate.

To test H5, I examined the effect of inappropriate weighted prescription quantity on Prescription Opioid Overdose Deaths using equation (5).

$$(5) \quad \boldsymbol{Log}\,(\boldsymbol{Y_{ijt}}) = \boldsymbol{\beta_0} + \boldsymbol{\beta_{1it}}\boldsymbol{log}(\boldsymbol{Weighted\ Inappropriate\ Prescription\ Quantity}) + \boldsymbol{\gamma_{it}}(\boldsymbol{county\ fixed\ effects}) + \boldsymbol{\varepsilon}$$

Where $\boldsymbol{Y_{it}}$ is the number of *prescription opioid overdose deaths* in the county at time t, and ε is random error. The results for this panel fixed effects model are reported in Table 3.6.

TABLE 3.6. ANALYSIS FOR H5- Inappropriate Prescriptions

	Model G: Panel FE DV: Prescription Opioid Overdose Deaths Data: National County Level	**Model H: Panel FE DV: Prescription Opioid Overdose Deaths Data: National County Level (Gaussian Copula)**
Log (Weighted Lag Inappropriate Presc. Quantity)	0.034***	0.0172
	(0.0056)	(0.034)
Gaussian Copula Term		0.0262
		(0.0543)
Constant	-0.2774	-0.047
	(0.0779)	(0.463)
Time Fixed Effects	Included	Included
County Fixed Effects	Included	Included
Observations	176608	1776608
Bootstrap Replications		100

Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

The results of Model D, *inappropriate prescription quantity* (β=0.034, p<.01), provide support for H5 that the *inappropriate prescription quantity* will be positively associated with prescription opioid overdose deaths. The Gaussian copula term is insignificant which means that the Gaussian copula correction for endogeneity is not necessary for this model.

Supplementary Mediation Analysis

I tested for the likelihood that the positive effect of marketing activities on opioid overdose deaths is fully mediated by the number of prescriptions and prescription strength. Marketing activities could not have led directly to opioid overdose deaths

because the marketing activities were directed at physicians and not at the patients. An opioid addiction tied to marketing activities would only have occurred through an initial prescription from a physician. I used the MA county level data to conduct the mediation tests as this data set contains both advertising and detailing data. The relationship between the marketing activities (*detailing* and *advertising)* and *prescription opioid overdose deaths* is not significant at the MA county level. This suggests that any relationship between *marketing activities* and *opioid overdose deaths* is fully mediated through prescriptions.

Robustness Analysis

For robustness, I analyzed H1-H4 main effects at the focal firm level using the alternative dependent variable of *prescription strength* as reported in Table A1 in Appendix A. Next, for H1 I applied an alternative corner solution Tobit model (See Appendix B), and the results remain consistent. Finally, I analyzed the H5 model with alternative lags and the results remain consistent (See Appendix C).

Discussion

Despite widespread interest in the media, there has not been a systematic academic examination in marketing of its role in the opioid epidemic. The motivation for this research is to investigate the link between marketing activities, inappropriate prescriptions, and opioid overdose deaths. I drew on a variety of novel data sources to develop the conceptual model that provides the theoretical rational for the impact of marketing advertising and detailing actions on opioid prescription quantity and strength and its subsequent impact on opioid overdose deaths. The qualitative research helped identify factors that moderate the relationships between marketing activities and

inappropriate prescriptions. I then tested this model by integrating multiple data sources at both a single state and a national level. The empirical analyses provide compelling evidence that medical journal advertising and detailing led to an increase in the quantity of inappropriate prescriptions prescribed by physicians. I find that responsible prescribing reminders helped mitigate this effect. I find mixed results for the strategy of targeting physicians increasing the positive effect of detailing on inappropriate opioid prescriptions. The results, consistent with the hypothesis, also find support for the link between prescriptions and overdose deaths.

Theoretical and Managerial Implications

While the broader literature on marketing transgressions has examined issues such as product recall, and advertising claims, the marketing literature in the context of pharmaceutical products has largely focused on the impact of marketing activities on prescription quantity and has neglected to examine prescribing appropriateness. Nor has the literature examined the societal implications of mis- or over-prescribing by physicians. By linking pharmaceutical marketing literature to societal outcomes, this work responds to the call by the American Marketing Association and the *Journal of Marketing* for scholars to examine the social impact of marketing as reflected in the recent special journal issue on "Marketing for a Better World."

This research extends the marketing literature by examining the effects of advertising and detailing on the dysfunctional societal consequences of inappropriate prescribing behavior of physicians. Opioids, as a controlled substance, offer the ideal situation to examine how marketing activities can lead to harmful prescribing practices and create negative societal consequences. I present new theoretical mechanisms from qualitative

research that can explain how harmful prescribing can occur. Moreover, I add to the limited literature on deception in pharmaceutical marketing that has only examined the implications for investors to implications for customers. In doing so, I introduce deceptive marketing and reframing of pain as potential theoretical mechanisms. The study findings suggest that deceptive marketing activities even overcome the expert's (the learned intermediary) scientific skepticism for unsupported claims. I add to the literature on marketing's role in mitigation by examining socially responsible advertising reminders as a possible mechanism to make salient the prescribing responsibility of the learned intermediaries. The research also meets the requirements of timely and topical relevance as documented by Jedidi et al. (2021). The opioid is widely discussed in the media and has significant societal implications.

This work offers insights to managers and policy makers. The study provides support for the use of socially responsible advertising in mitigating the marketing activities enabled pressures faced by physicians to inappropriately prescribe drugs that are prone to abuse. Second, while targeting has been seen as effective strategy to improve the effectiveness and returns of marketing investment, prior research has largely ignored its downsides. My research suggests that targeting could lead to negative societal outcomes. Managers and policy makers need to be cognizant of the unintended consequences of well-meaning strategic changes to products.

In the face of increased limitations and oversight on opioid prescribing, the focal firm expanded extensively internationally under a different name using marketing strategies they were condemned for in the U.S. (Ryan, Girion, and Glover 2016). Researching the opioid epidemic in order to learn from the mistakes made in the U.S. and

prevent them other places is imperative in order to avert the next global public health crisis.

Limitations and Directions for Future Research

First, the primary limitation is data access as the pharmaceutical companies are private. Second, I am limited by the detailing dataset being restricted to a single state and firm, which limits the generalizability of the results regarding detailing. Third, I did not have access to prescription data at a physician level, so I was unable to link physician level prescribing behavior directly to detailing visits or overdose deaths. The advertising data variation was limited to time and cross- sectionally state or county level variation was constant.

The Opioid Epidemic offers a unique opportunity for insight into a public health crisis fomented by harmful marketing practices. By examining the events empirically and qualitatively, one can learn from past mistakes and educate the next generation of business leaders on how to avoid similar problems. Future research could extend the analysis to other case studies of marketing activities and decisions that led to negative societal outcomes. This problem is not only historical. There are several contemporary events of marketing linked to negative societal outcomes including Juul electronic cigarettes deceptively marketed to adolescents and J&J's baby powder laced with asbestos. An examination of these cases could determine the similarities and differences between them and the Opioid Epidemic. Future research could use experimental methods to test several of the novel mechanisms identified in this study. This would provide greater opportunities for mitigation of the negative outcomes of marketing activities.

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APPENDIX A:

Prescription Strength Alternative DV- Main Effects for Focal Firm

Additional Analysis was conducted at the focal firm versus industry level. This analysis does not account for inappropriate prescriptions because I do not have the data to determine how many prescriptions of the focal firm were prescribed inappropriately, but the dependent variable in this model is prescription strength compared with the main manuscript dependent variable of inappropriate prescription quantity. It is important to examine prescription strength in addition to quantity because the risk of an overdose death is directly related to the dosage a person receives (Armstrong and Ernsthausen 2019).

Prescription strength is measured in MME (morphine milligram equivalents) of total strength (morphine volume) of pills shipped to the county each month. MME was calculated as the number of pills ordered multiplied by the volume per pill (mg) and the milligram morphine equivalent of each opioid. For example, 1 mg of OxyContin, a prominent opioid brand, is equivalent to 1.5 milligrams of morphine, while 1mg of the generic opioid hydrocodone is equivalent to 1mg of morphine. The CDC uses MME as a gauge of overdose potential for patients (CDC Centers for Disease Control and Prevention 2020). For example, the focal firm sent approximately 3.3% of the opioid pills delivered to each county but approximately 18% of the MME.

Controls

I controlled for competitor advertising and sales with the variables of *industry adstock,* the *industry prescription quantity,* and the *industry prescription strength*

(MME). *Industry adstock,* a proxy for competitor advertising spending is calculated as the total number of advertising pages utilized by all competitors in the industry to advertise opioids. *Industry prescription quantity*, and the *industry prescription strength (MME)* are calculated using the ARCOS DEA database as the total number of opioid pills shipped to pharmacies by competitors in the industry per county per month, and the total MME of opioids shipped to pharmacies by all competitors in the industry per county per month. These measures exclude the focal firm (because focal firm prescriptions are captured by the variable *focal firm prescription strength)* but include generics. *Industry prescription quantity* and *industry prescription strength* are representative of competitor sales in the industry.

TABLE A1: ADDITIONAL VARIABLES TABLE

Variable	Source	Description
Focal Firm Prescription Strength	ARCOS Database DEA	Morphine Milligram Equivalents shipped to pharmacies in the county (# pills *dosage strength *MME equivalent)
Industry Prescription Strength	ARCOS Database DEA	Morphine Milligram Equivalents shipped to pharmacies in the county (# pills *dosage strength *MME equivalent)
Prescription Opioid Overdose Deaths (T402-T403)	CDC Multiple Mortality Files	Total opioid overdose deaths involving prescription opioids defined by CDC (sum T402-T403)
Detailing Visits (Detailing Stock)	Court Documents, Exhibit 1	# Of monthly visits by Focal Firm representatives to each county, cumulative
Focal Firm Advertising Spending (Adstock)	JAMA, NEJM Medical Journals	Weighted # of ad pages for Focal Firm Opioids in B2B health journals, cumulative
Industry Advertising Spending (Adstock)	JAMA, NEJM Medical Journals	Weighted # of ad pages for Opioids in B2B health journals not including Focal Firm, cumulative
Responsible Prescribing Reminder	JAMA, NEJM Medical Journals	Presence of an advertisement for responsible prescribing in the health journal issues for the month
High Prescriber Targeting	Court Documents	Binary indicator of when the high prescribing targeting went into effect (January 2010)
Prescription Drug Monitoring Program (PDMP)	PDMP Training and Technical Assistance Center	Binary indicator of whether a PDMP was operational in the state during that year

Producer Price Index	U.S. Bureau of Labor Statistics	Average change over time in selling prices for Chemicals and Allied Products- Analgesics, prescription, not seasonally adjusted. Used as an instrument for Advertising
Number of Focal Firm Corporate Employees	Internet Archives of Focal Firm "About" Page	Total number of employees employed by Focal Firm. Used as an instrument for detailing
Advertisement Pictures	JAMA, NEJM Medical Journals	Use of pictures in the opioid advertisements (used as control)
Advertisement Transparency	JAMA, NEJM Medical Journals	Portion of the opioid advertisement made up of warnings (used as control)

Hypotheses for Prescription Strength

The hypotheses for the models using the DV of prescription strength are variations of the hypotheses above:

H1b: The greater the advertising in medical journals, the greater the strength of prescriptions likely to be prescribed by the physician.
H2b: The greater the detailing the greater the increase in the strength of prescriptions likely to be prescribed by physicians.

H3b: As the number of advertisements urging doctors to prescribe opioids responsibly increases, it will attenuate the positive effect of advertising on prescription strength.

H4b: Targeting higher prescribers would increase the positive effect of detailing on opioid prescription strength.

H5b: The greater the prescription strength for opioids, the greater the number of *prescription opioid overdose deaths*.

Panel Regression Fixed Effects Models

I use panel fixed effects models to test the hypotheses with the base equation shown in equation (3). I log the dependent and independent variables so the coefficients can be interpreted as elasticities.

$$(3) \quad log(Y_{it}) = \beta_0 + \beta_{1it} log(\textbf{Focal Firm Detailing Visits}) + \beta_{2it} log(\textbf{Focal Firm Advertising Spending}) + \beta_{3it} log(\textbf{Industry Advertising Spending}) + \beta_{4it} log(\textbf{Industry Prescription Quantity}) + \gamma_{it}(\textbf{city fixed effects}) + \varepsilon$$

Where $\boldsymbol{Y_{it}}$ is *Focal Firm Opioid Prescriptions Strength* measured as the total MME of pills shipped to the county by the focal firm at time t, and ε is random error.

To test the moderation effects of responsible prescribing reminders on the positive relationship between adstock and Focal Firm Prescription strength, I included an interaction effect between *adstock* and *responsible prescribing reminders* and between *high prescriber targeting* and detailing shown in Equation (4).

$$
\begin{aligned}
(4) \quad & \log(Y_{it}) \\
& = \beta_0 + \beta_{1it}(\textit{Focal Firm Adstock}) + \beta_{2it}\log(\textit{Responsible Prescribing Reminder}) \\
& + \beta_{3it}\big(\log(\textit{Focal Firm Adstock})X(\textit{Responsible Prescribing Reminder})\big) + \beta_{4it}(\textit{High Prescriber Targeting}) \\
& + \beta_{5it}\log(\textit{Focal Firm detailing stock}) \\
& + \beta_{6it}\big(\log(\textit{Focal Firm Detailing Visits})X(\textit{High Prescriber Targeting})\big) \\
& + \beta_{7it}\log(\textit{Industry Prescription Quantity}) + \beta_{8it}\log(\textit{Industry Adstock}) \\
& + \gamma_{it}(\textit{city/state/county fixed effects}) + \varepsilon
\end{aligned}
$$

Where $\boldsymbol{Y_{it}}$ is the *Focal Firm Prescription Strength (MME)* in the county (*i*) at time t, and ε is random error. I first analyzed the data with both a panel fixed effects and random effects models.

The Hausman Test that the two estimators are not different was rejected (p= .000) indicating the preferred use of a fixed effects model (Kennedy 2008). The results of the panel fixed effects models are presented in Table A1. They are conducted at a county national level which is a larger sample size than the single state level data thus providing more accurate models, with the caveat that the models at the do not include detailing due to data availability only at a single state level.

The results of *adstock models* should be interpreted as long-term advertising elasticities (Danaher, Bonfrer, and Dhar 2008). As shown in Table A2 Model 1, as the *Focal Firm Advertising Spending* increases by 1%, the Focal Firm Opioid Strength increases by 1.0711% (β=1.0711, p<0.01). Next, as the number of detailing visits

increases by 1%, the *Focal Firm Opioid Prescription strength* for a county increases by approximately .7836% (β=0.7836, p<0.01) in support of H2b.

Next, I conducted the panel effects model with the second DV of *Prescription Strength*. As shown in Table A2 Model 2, as the number of detailing visits increases by 1%, the *strength of pills* prescribed in a county increases by 0.849% (β=0.849, p<0.01) in support of H2b.

Testing H3b (see Model 1), the interaction effect of *responsible prescribing reminders* and *Focal Firm Adstock* is in support of the hypothesis (β=-0.8002, p<.01), which supports the expectation that *responsible prescribing reminders* attenuate the positive effect of *advertisements* on *prescription strength*. The exception is Model 2 which is in the opposite direction. Interpretation of this coefficient (β=0.356, p<.01) would suggest that the responsible prescribing reminders served simply as reminders to prescribe opioids. If physicians thought they already were prescribing opioids responsibly, then they may have simply interpreted the advertisements as reminders to prescribe opioids to patients.

In H4b, I predicted a positive moderating effect, of *high prescriber targeting* strategy on the relationship between *Focal Firm detailing visits* and *Focal Firm prescriptions.* I tested the hypothesis with Equation (4) conducted with the MA county data set because detailing data is only available for the state of MA. The results support H4 with the interaction term (β=0.03289, p<0.10) for the prescription strength model.

TABLE A2. MODELS FOR H1B-H4B

	Model 1: Panel FE DV: Focal Firm Prescription Strength Data: MA county level Base Model	**Model 2: Panel FE DV: Focal Firm Prescription Strength Data: MA county level Instruments**	**Model 3: Panel FE DV: Focal Firm Prescription Strength Data: MA county level Copula**	**Model 5: Panel FE DV: Focal Firm Prescription Strength Data: National County level Base Model**	**Model 5: Panel FE DV: Focal Firm Prescription Strength Data: National County level Instruments**	**Model 6: Panel FE DV: Focal Firm Prescription Strength Data: National County level Copula**
Log (Detailstock)	0.0001091***	0.7838559***	0.0000849***			
	(0.0000285)	(0.151487)	(0.000)			
Log (Focal firm Adstock)	0.099176**	0.1313733*	0.7953***	1.05191***	1.0711***	1.768***
	(0.0227358)	(0.073)	(0.0729)	(0.0087426)	(0.0144)	(0.322)
Log (Industry Adstock)	0.0488628**	-0.2915157***	0.0187	-0.432***	-0.433***	-0.2823***
	(0.0202)	(0.0698)	(0.0190)	(0.0108)	(0.0116)	(0.0632)
Log (Industry Prescription Strength)	0.2282895***	-0.55281***	0.173892*	0.5012227***	0.479***	0.5985***
	(0.0202)	(0.19575)	(0.0963)	(0.0236)	(0.041)	(0.0584)
Ad Transparency	0.0142	0.05957	0.0824***	-0.0270**	-0.0379***	0.0331*
	(0.0209)	(0.552149)	(0.02187)	(0.0114)	(0.01198)	(0.0187)
Ad Pictures	-0.0511064	0.1418998**	0.0329	0.0695***	0.0700***	0.1929***
	(0.0209)	(0.0642)	(0.02249)	(0.01418)	(0.0148)	(0.0405)
Responsible Prescribing X Log (Focal Firm Adstock)	-0.7721**	0.356039***	-0.6593***	-0.79411***	-0.80015***	-1.006***
	(0.2217)	(0.06009)	(0.0244)	(0.0151)	(0.1355)	(0.1352)
Targeting X Log (Focal Firm Detailstock)	0.0001028***	0.0328866***	0.0001124***			
	(0.000285)	(0.0118156)	(0.000)			
Constant	10.60***	18.72321***	10.475***	4.242***	4.539***	1.877***
	(1.189)	(2.844)	(1.493)	(0.366)	(1.345)	(1.310)
Copula Term Detailstock			Insignificant, so ran model without it			Insignificant, so ran model without it
Copula Term Adstock			-0.395***			-0.729**
			(0.0374)			(0.2959)
Time Fixed Effects	Included	Included	Included	Included	Included	Included
County/State Fixed Effects	Included	Included	Included	Included	Included	Included
Observations	868	868	868	201323	201323	201306
Number of cities/counties/states	14 counties in MA	14 counties in MA	14 counties in MA	2973 counties in the US	2973 counties in the US	2973 counties in the US
Cragg-Donald Wald F Statistic		17.302			9173	
Stock-Yogo Critical Value (10%)		7.03			19.93	
Endogeneity of Instrument Test		p=0.000			p=0.000	

Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

For the full model to test H5, I examined the effect of weighted prescription quantity on Prescription Opioid Overdose Deaths using equation (5) and the effect of weighted prescription strength on Prescription Opioid Overdose Deaths using equation (6).

$$(6) \quad \boldsymbol{Log}\,(\boldsymbol{Y_{ijt}}) = \boldsymbol{\beta_0} + \boldsymbol{\beta_{1it}}\boldsymbol{log}(\boldsymbol{Weighted\ Focal\ Firm\ Prescriptions\ Strength}) + \boldsymbol{\beta_{2it}}\boldsymbol{log}(\boldsymbol{Weighted\ Industry\ \ Prescription\ Strength}) + \boldsymbol{\gamma_{it}}(\boldsymbol{county\ fixed\ effects}) + \boldsymbol{\varepsilon}$$

Where $\boldsymbol{Y_{it}}$ is the number of *prescription opioid overdose deaths* in the county at time t, and ε is random error. The results for this panel fixed effects model are reported in Table A3.

TABLE A3. ANALYSIS FOR H5

	Panel FE DV: Prescription Opioid Overdose Deaths Data: National County Level
Log (Weighted Lag Focal Firm Presc. Strength)	0.003* (0.001)
Log (Weighted Lag Industry Presc. Strength)	0.042*** (0.004)
Log (Detailstock)	
Log (Focal firm Adstock)	
Log (Industry Adstock)	
Constant	-0.054*** (0.022)
Time Fixed Effects	Included
County Fixed Effects	Included
Hausman	p=0.000
Observations	252,824
Number of cities/counties/states	3005

Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

APPENDIX B:

Tobit Model- Alternative Method for H1

The data violates the assumptions of the Ordinary Least Squares model because the value that the dependent variable can take is limited at the lower end to zero as prescriptions cannot take a negative value. At the city level several cities have zero prescriptions as a minimum value for Focal Firm Opioid Prescriptions during a month. This makes it into a limited Dependent Variable (DV) and therefore it requires a corner solution model. Corner solution outcomes are common when y has a continuous distribution over positive values but a corner at zero or another value (P(y=0)>0) (Wooldridge 2010). One model that is appropriate for a Corner Solution is the Tobit Model (Baum, 2006). The lower limit is set at zero. I use the Panel Tobit Model command in STATA -xttobit- to account for the panel data structure. This model is expressed with two equations in terms of a latent variable:

$$(3)\ (Y_{ijt})^{*} = \beta_0 + \beta_{1it}(\textbf{Detailing Stock}) + \beta_{2it}(\textbf{Focal Firm Adstock}) + \beta_{3it}(\textbf{Industry Adstock}) + \beta_{4it}(\textbf{Industry Prescription Quantity}) + \gamma_{it}(\textbf{city fixed effects}) + \varepsilon$$

$$(4) Y_{ijt} = \begin{cases} 0 & \text{if } Y_i^{*} \leq 0 \\ Y_i^{*} & \text{if } Y_i^{*} > 0 \end{cases}$$

Where Y_{ijt} is Focal Firm Prescription Quantity measured as the number of pills shipped to the county (*i)* by the focal firm at time (t), (*j*) is the choice a physician has to prescribe zero pills or a positive number of pills, and ε is random error.

The results of the model should be interpreted by the sign and significance of the coefficient, but the values cannot be directly interpreted from a Tobit Model. The results for the Tobit model are reported in Table B2 at the MA county level. Hypothesis (H1) predicted that an increase in *advertising* for opioids in medical journals led to an increase

in the *prescription quantity* prescribed for those opioids. The hypothesis is supported (β=632.95, p=0.008). (H2a) predicted that an increase in *detailing* would lead to an increase in the number of *prescriptions* which also is supported in the model (β=11.02, p=0.000).

TABLE B2. PANEL TOBIT RESULTS

	Tobit RE DV: Focal Firm Prescription Quantity Data: MA county level
Log (Detailstock)	11.021***
	(1.415)
Log (Focal Firm Adstock)	632.95***
	(239.018)
Log (Industry Adstock)	457.347**
	(226.378)
Log (Industry Prescription Quantity)	0.049***
	(0.002)
Consumer Search	23.083**
	(9.005)
Constant	-11972.41**
	(4683.703)
Observations	868
Number of cities/counties/states	14

APPENDIX C

Prescription Weighted Lags and Alternative

To theoretically model prescriptions as an independent variable, it is necessary to include a time lag because it takes time for the prescriptions to develop into an addiction and eventually lead to an overdose. It does not make sense theoretically that an overdose in the current time period would be caused by a prescription in the current time period. Advertising models of lagged independent variables such as Koyck Lags (Kennedy 2008) or Adstock (Danaher, Bonfrer, and Dhar 2008) seem theoretically inappropriate because an average time must exist for an addiction to develop and for prescriptions to result in opioid overdose. It does not make sense that Koyck Lags (weighted lagged values declining geometrically) would be appropriate. I believe a triangular window of weights makes more sense theoretically. In other words, there is an average amount of time it takes for an addiction to develop (I use one year), and time values before and after this time are weighted at a decreasing rate. See Figure C1 for an illustration.

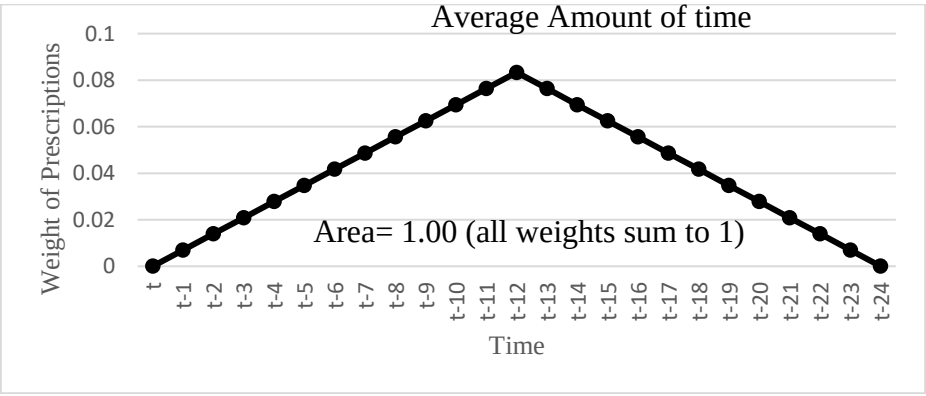

FIGURE C1. TRIANGULAR WINDOW OF WEIGHTED LAGS FOR PRESCRIPTIONS

Prior medical research in opioids used a 12-month lag (see Hadland et. al 2019) for lag time from prescriptions to opioid overdose death, however the dataset was annual and limited to three years of available data, so other lags were not empirically possible. Further research is needed about the average time for an opioid to develop into an addiction, but for this manuscript I assume that 12 months is the average time it takes for a patient to progress from a first prescription to an overdose death. I also experimented with using lags of 6 months, 12 months, 18 months, and 24 months but those results are not shown here due to space limitations.

Kennedy (2008) describes a limitation of Koyck lags that the "lagged explanatory variables continually decline- they cannot first rise then decline, a pattern thought by many to be *a priori* attractive (pg. 208)." This triangular lag seems *a priori* appropriate based on theoretical insights developed in my qualitative research. I also run the model with a 12-month lag (Hadland et al. 2019) for robustness. See Table C1.

I calculate a weighted value for prescriptions using equation (6) and I calculated *Weighted Industry Prescription Quantity*, *weighted Focal Firm Prescription Strength* and *Weighted Industry Prescription Strength* in the same manner.

$$(6)\ \boldsymbol{Weighted\ Focal\ Firm\ Prescription\ Quantity_{it}}$$

$$= \left(\frac{1}{144}\right) * (\boldsymbol{PQ})_{t-1} + \left(\frac{2}{144}\right) * (\boldsymbol{PQ})_{t-2} + \left(\frac{3}{144}\right) * (\boldsymbol{PQ})_{t-3} + \left(\frac{4}{144}\right) * (\boldsymbol{PQ})_{t-4} + \left(\frac{5}{144}\right) * (\boldsymbol{PQ})_{t-5}$$
$$+ \left(\frac{6}{144}\right) * (\boldsymbol{PQ})_{t-6} + \left(\frac{7}{144}\right) * (\boldsymbol{PQ})_{t-7} + \left(\frac{8}{144}\right) * (\boldsymbol{PQ})_{t-8} + \left(\frac{9}{144}\right) * (\boldsymbol{PQ})_{t-9} + \left(\frac{10}{144}\right) * (\boldsymbol{PQ})_{t-10}$$
$$+ \left(\frac{11}{144}\right) * (\boldsymbol{PQ})_{t-11} + \left(\frac{12}{144}\right) * (\boldsymbol{PQ})_{t-12} + \left(\frac{11}{144}\right) * (\boldsymbol{PQ})_{t-13} + \left(\frac{10}{144}\right) * (\boldsymbol{PQ})_{t-14} + \left(\frac{9}{144}\right) * (\boldsymbol{PQ})_{t-15}$$
$$+ \left(\frac{8}{144}\right) * (\boldsymbol{PQ})_{t-16} + \left(\frac{7}{144}\right) * (\boldsymbol{PQ})_{t-17} + \left(\frac{6}{144}\right) * (\boldsymbol{PQ})_{t-18} + \left(\frac{5}{144}\right) * (\boldsymbol{PQ})_{t-19} + \left(\frac{4}{144}\right) * (\boldsymbol{PQ})_{t-20}$$
$$+ \left(\frac{3}{144}\right) * (\boldsymbol{PQ})_{t-21} + \left(\frac{2}{144}\right) * (\boldsymbol{PQ})_{t-22} + \left(\frac{1}{144}\right) * (\boldsymbol{PQ})_{t-23}$$

Where (*i)* is the firm at time *(t)* and PQ= Focal Firm Prescription Quantity divided by population of the county.

As an alternative to weighted lags for prescription quantity and quality, I also run the model with a 12-month lag (Hadland et al. 2019) for robustness. The results for H3 still hold.

TABLE C1: 12 MONTH LAG ALTERNATIVE

	Panel FE DV: Opioid Prescription Deaths Data: National County	Panel FE DV: Opioid Prescription Deaths Data: National County
Log (12 mo. Lag Focal Firm Presc. Quantity)	0.024***	
	(0.003)	
Log (12 mo. Lag Industry Presc. Quantity)	0.023***	
	(0.003)	
Log (12 mo. Lag Focal Firm Presc. Strength)		0.002
		(0.0007)
Log (12 mo. Lag Industry Presc. Strength)		0.028***
		(0.003)
Constant	0.099***	0.026***
	(0.012)	(0.014)
Hausman	p=0.000	p=0.000
Observations	255,837	255,837
Number of cities/counties/states	3009	3009

Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

APPENDIX D

Additional Analysis of Reformulation and Heroin Substitution

Effect of Reformulation on Prescription Opioid Overdoses

For additional analysis, I explore the role of product reformulation as another mitigating solution to limiting the dangers of opioid overdoses due to heroin. While it was effective in reducing opioid overdose deaths, it had the unintended consequence of encouraging the drug users to switch to alternatives such as heroin. I find that the consequent consumption of unregulated heroin led to significant increases in heroin-related deaths.

Despite slow-release properties advertised by the focal firm to prevent addiction and abuse of their prescription product, common methods of abuse for the Brandname drug involved crushing or dissolving the pills to circumvent the slow-release properties. In the face of growing litigation regarding the abuse potential of opioids used for chronic pain, pharmaceutical companies engaged in product development and reformulated the drug with a new abuse-deterrent formula. The FDA determined that the products had abuse-deterrent properties and officially approved a new drug with Abuse Deterrent Formula of the Brandname drug (manufactured by the focal firm) in 2010 (FDA 2020). Abuse deterrent formulas defend against common methods of abuse and prevent addicts from being able to abuse prescription drugs. Thus, while a patient might become addicted to greater dosages of opioid prescribed by their physician, they could no longer manipulate the pill to get a greater high and unintentionally succumb to an overdose. Thus, reformulation attenuated the positive effect of prescriptions on prescription opioid

overdose deaths by making it less likely that addiction could result in overdose from opioid pills.

> H6: *Reformulation* of the drug attenuated the positive effect of prescriptions on *prescription opioid overdose deaths*.

Effect of Reformulation on Heroin Opioid Overdoses

When prescription opioid pills became too expensive or difficult to find, many prescription opioid addicts began substituting with heroin (Quinones and Hellegers 2015). Reformulation made abuse of prescription opioids more challenging, so some addicts searched for substitutes, and many switched to heroin, an illegal narcotic with unregulated composition that depends on the source. (Cicero, Ellis, and Surratt 2012). The reformulation of prescription opioid pills to an abuse-deterrent formula increased the positive effect of prescriptions on heroin overdoses because it forced addicts to substitute to a stronger illegal opioid, heroin, causing them to overdose from heroin rather than prescription opioids.

> H7a: As the number of prescriptions for an opioid increases, the number of *heroin opioid overdose deaths* will decrease (main effect).
> H7b: *Reformulation* attenuated the negative effect of increased prescriptions on *heroin overdose deaths.*
> A conceptual model is presented in Figure D1.

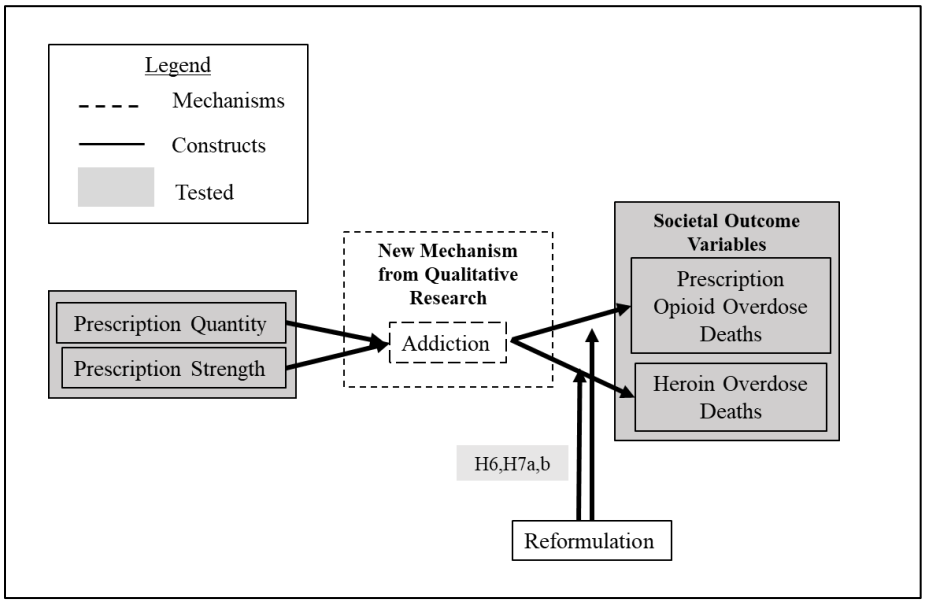

FIGURE D1. CONCEPTUAL MODEL OF REFORMULATION AND OVERDOSE DEATHS

The focal firm received FDA approval for their reformulation of the Brandname drug to prevent abuse and it first became available in August 2010. *Reformulation* is operationalized as a binary indicator of whether the observation is before (coded as 0) or after the month of August 2010 (coded as 1).

In H6 and H7 I examine the effect of *Prescription Strength* on *Heroin Opioid Overdose Deaths* (T401). I use a panel fixed effects model as shown in Equation (8).

$$(8) \quad log(Y_{it}) = \beta_0 + \beta_{1it}(Reformulation) + \beta_{2it} log(Weighted\ Purdue\ Opioid\ Prescription\ Quantity) + \beta_{3it}\big(log(Weighted\ Purdue\ Opioid\ Prescription\ Quantity)X(Reformulation)\big) + \beta_{4it}(Weighted\ Industry\ Prescription\ Quantity) + \gamma_{it}(county\ fixed\ effects) + \varepsilon$$

Where $\boldsymbol{Y_{it}}$ is the number of *Prescription Opioid Overdose Deaths (T402-T403)* for H6 and *heroin opioid overdose deaths (T401)* for H7 in the county (*i*) at time t, and ε is random error. The results are displayed in Table D1 Models D6-D9. The data is at a national county level.

H6 predicted that reformulation would attenuate the positive effect of *prescriptions* on *prescription opioid overdose deaths (T402-T403)*. H6 is supported neither by Table D1 Model D6 for the coefficient of *Prescription quantity* interacted with *reformulation* (β=0.030, p=0.000), nor in Model D7 for the coefficient of *Prescription strength* interacted with *reformulation,* where the coefficient is (β=0.011, p=0.000). However, reformulation itself had a negative and significant effect on prescription opioid overdose deaths in both models (β=-0.13, p=0.000; β=0.034, p=0.000).

H7a predicted the main effect that as the *Focal Firm Prescription Quantity* increased, the number of Heroin Overdose deaths would decrease. Hypothesis H7a is supported by the coefficient for *Focal Firm Prescription Quantity* in Model D8, (β= -0.066, p=0.000), and for the dependent variable of *Prescription Strength* in Model D9, H6a is also supported (β= -0.023, p=0.000). This suggests that an increase in prescriptions did not lead to an increase in Heroin overdose deaths.

H7b suggested that reformulation attenuated the negative effect of *prescriptions* on *heroin overdose deaths.* This hypothesis is supported by the results in Table D1, Model D8 and Model D9. The coefficient of *Reformulation* interacted with *Weighted Lag of Focal Firm Prescription Quantity* is (β=0.045, p=0.000) and the coefficient of *Reformulation* crossed with *Weighted Lag of Focal Firm Prescription Strength* in Model D9 is (β=0.013, p=0.000) provide support for H7b. They suggest that reformulation attenuated the negative effect of increased prescriptions on heroin overdoses meaning that reformulation could have led to substitution to heroin instead of prescription opioids resulting in greater overdoses.

TABLE D1. ANALYSIS OF H6 AND H7

	Model D6: Panel FE DV: Opioid Prescription Deaths Data: National County	Model D7: Panel FE DV: Opioid Prescription Deaths Data: National County	Model D8: Panel FE DV: Heroin Overdose Deaths Data: National County	Model D9: Panel FE DV: Heroin Overdose Deaths Data: National County
Log (Weighted Lag Focal Firm Presc. Quantity)	0.015***		-0.066***	
	(0.005)		(0.003)	
Log (Weighted Lag Industry Presc. Quantity)	0.025***		-0.003	
	(0.006)		(0.004)	
Log (Weighted Lag Focal Firm Presc. Strength)		0.0001		-0.023***
		(0.001)		(0.001)
Log (Weighted Lag Industry Presc. Strength)		0.038***		0.023***
		(0.004)		(0.003)
Reformulation	-0.013***	-0.034***	0.028***	0.005**
	(0.003)	(0.004)	(0.002)	(0.003)
Reformulation X Log (Focal Firm Prescription Quantity)	0.030***		0.045***	
	(0.004)		(0.003)	
Reformulation X Log (Focal Firm Prescription Strength)		0.011***		0.013***
		(0.001)		(0.001)
Constant	0.094***	0.022	0.086***	-0.006
	(0.017)	(0.022)	(0.011)	(0.013)
Hausman	p=0.000	p=0.000	p=0.000	p=0.000
Observations	252,824	252,824	252,824	252,824
Number of cities/counties/states	3005	3005	3005	3005

Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

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CHAPTER 5

CONCLUSION

The corporate world has shown an increased awareness of and concern for the impact of business actions on society, the environment, and on employees over the past decades. This is evidenced by initiatives such as the triple bottom line (TBL), corporate social responsibility (CSR), B-Corps (benefit corporations), ESG investing (environment, social and governance), and DEI (diversity, equity, and inclusion) initiatives. The marketing discipline has mirrored this shift by an increased interest in sustainability, responsible marketing, and marketing for a better world. There have been several calls to study topics that matter to society. My dissertation responds to this call by examining the societal implications of marketing.

This dissertation examined the societal implications of marketing strategy through an applied field study discussing how marketing can improve the world, as well as studying the other side of the coin- the dark side of marketing. Essay 1 was a multi-year field study that showed marketing strategy could positively impact society. An identity-based motivation intervention was used to increase financial access for women in emerging markets. Essays 2 and 3 examined the dark side of marketing through the case study of the opioid epidemic. They exposed how classic marketing strategy could result in marketing transgressions, and empirically linked marketing activities to inappropriate prescribing practices and opioid overdose deaths.

Others can build on this research by studying a variety of research avenues related to responsible marketing and marketing transgressions. The process of how and why marketing transgressions occur remains under-studied as mentioned in essay 2. Future research can begin to draw generalizations about marketing transgressions in other industries and events. More research is needed on the mechanisms of how and why marketing transgressions occur, as well as teasing out the nuances of just how and when classic marketing strategies result in transgressions. There are also many opportunities to examine how marketing interventions can be used to improve societal well-being. Empirical research that examines societal outcomes in addition to firm outcomes is needed, as well as lab studies that focus on consumer well-being. Researchers can pursue opportunities for field studies that work with communities to develop projects that promote positive societal impact while providing opportunities to propel the discipline of marketing further through theoretical contributions. This dissertation contributes to the advancement of the study of the societal implications of marketing and provides a strong foundation for future research.