Prospective Marketing Meta-Analysis and a
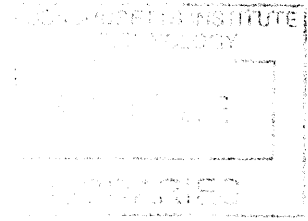# Novel Web-based Media-Mix Modeling Experiment

by

Ryan Ko

S.B. Computer Science, M.I.T., 2011

Submitted to the Department of Electrical Engineering and Computer Science

in Partial Fulfillment of the Requirements for the Degree of

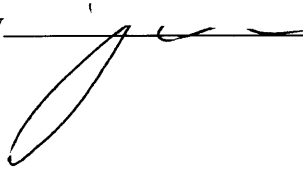Master of Engineering in Electrical Engineering and Computer Science

at the

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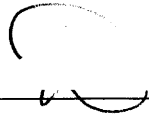Master of Engineering in Electrical Engineering and Computer Science

ABSTRACT

Prospective meta-analysis, pioneered in the biomedical field, is the meta-analysis of multiple studies conducted using similar protocols and under similar conditions. To eliminate bias, the inclusion of individual studies in the meta-analysis is agnostic of the findings of the individual experiment. In this thesis, I adapt prospective meta-analysis for use in the field of marketing science. Specifically, I design and create a database for prospective marketing meta-analysis that encourages and facilitates international collaboration and scale-up of marketing science studies and use this platform as the basis for a novel web-based media-mix modeling experiment that aims to model the relative effects of a variety of media.

I detail the design and implementation of this web-based media-mix modeling experiment, which introduces the use of a browser extension to modify the media experience for test subjects based on their responses to pre-survey questions. I present preliminary results from a 50-user trial run of the system and analyze improvements and next steps, both for the current experiment and scale-up for future studies to include in the meta-analysis.

Thesis Supervisor: Glen L. Urban
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ACKNOWLEDGMENTS

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1. INTRODUCTION AND BACKGROUND

This section offers introductory definitions of key concepts that may be unfamiliar to the reader with a technical background and describes the research context and background for the work detailed within.

1.1 Marketing science

Fundamentally speaking, Marketing Science is the study of marketing, defined by the American Marketing Association as *"the activity, set of institutions, and processes for creating, communicating, delivering, and exchanging offerings that have value for customers, clients, partners and society at large."* Marketing Science is therefore the study of such businesses and their markets. This can involve studying the market itself, the businesses, or the relationships between them. [1]

Marketing Science is a rigorous discipline that adheres to high rigors of statistical analysis. In it, the phenomena studied are as natural as microorganisms or planetary bodies; the phenomena are the businesses and customers themselves. Data is often readily available and easily collected. Metrics are clear and measurable. The challenges often lie in rigorous, methodical design and analysis of properly-run experiments to extract meaningful results and conclusions.

1.2 Trust-based marketing

Trust-based marketing, a phrase pioneered by Professor Glen Urban, refers to marketing which is not targeted with the goal of immediately converting users or selling products or services [2]. Instead, the focus is to build the eponymous trust with the consumer, to take the role not of a salesman or supplier but instead of an expert advocate providing a valuable relationship between the business and customer. This trust leads to a stronger relationship and thus more interaction (and presumably, more sales).

There is nothing novel about trust itself. It has been around as long as business transactions themselves. For example, customers with deep pockets are often handled by personal shoppers or personal bankers. The best salespeople often cast themselves

as experts and advocates looking out for consumers' best interests. However, such personalized attention is expensive in both time and resources. It is not scalable to large customer bases.

Much of Professor Urban's recent work has been with regards to trust-based marketing on the Internet [3]. He explores whether successful offline trust concepts such as expert advice and community interactions can port successfully to Internet-based marketing. Early efforts include establishing expert communities online, and more recent work has shifted towards mobile and web-based applications designed to advise and counsel consumers. For example, a Flash-based web game that allows users to design their dream car was developed and deployed to study the effects of discovery, social sharing, and customizability of the app on consumers. In a similar study, a mobile app that helps users move from one home to another was created to study how consumers using the app changed their perceptions of the sponsoring company. [4]

1.3 Information acceleration

One common method of studying the effect of various multimedia stimuli on consumers is Information Acceleration [5]. The idea, which seems somewhat obvious at the time of writing of this thesis, utilizes computer technology to facilitate marketing research. The use of a computer allows for simulated and morphed media to be displayed to test subjects. Prior to Information Acceleration, studies conducted offline simply could not reach as many users or were very costly. With Information Acceleration, studies could be conducted across the Internet with a few clicks of a mouse. Information Acceleration has been used successfully across many facets of marketing research to project the success of new products, identify customer attitudes towards current ones, or validate various forms of advertisement. Simply put, Information Acceleration has drastically accelerated the pace and scale of marketing research.

1.4 Prospective meta-analysis

Prospective meta-analysis, pioneered in the biomedical disciplines, is a concept by which many individual experiments, conducted using similar protocols under similar

conditions, perhaps at various geographical locations, are merged and studied as one (hence, the "meta-" prefix). [6] At first glance, this is fraught with bias, as it seems that studies are used after the fact, and data is hand-selected. However, "prospective" meta-analysis aims to avoid such biases by only including studies that agree to certain protocols and procedures and inclusion in the meta-analysis before the results are determined.

Prospective meta-analysis has become popular in the biomedical field for many reasons. For one, it is one way of allowing for replicable experiments. Instead of one researcher recruiting an unwieldy large sample, ten researchers can recruit more manageable samples across the country and merge their experiments. Second, prospective meta-analysis leads to increased collaboration and research standards across institutions and research groups. Third, the increased size of resulting data sets leads to greater statistical significance and reduces random sampling bias.

As Information Acceleration and similar marketing methodologies made it significantly easier and faster to run marketing experiments and collect data, this thesis discusses the possibilities of using such prospective meta-analysis in marketing science.

1.5 Chevrolet

Chevrolet is an American car brand owned and produced by General Motors. In 2011, Chevrolet sold 4.76 million vehicles worldwide, including 1.77 million in the United States, resulting in a U.S. market share of 36.9%. [7] Chevrolet's current USA vehicular offerings include eight car models, four crossover and sport-utility vehicles, and four trucks and vans. The company is very active in advertising, with its parent company GM spending an estimated $4.2 billion in advertising in 2011. [8]

GM and Chevrolet have collaborated with and sponsored research at the MIT Center for Digital Business and specifically Professor Urban. Recent research studied the efficacy of a trust-based marketing web app, and examined the "Gen Y" segment and its response to trust-based marketing. [4]

1.6 Media-mix modeling

There are many different ways for companies to advertise to consumers, from low-technological solutions such as direct mail or word-of-mouth to advanced location-based mobile advertisements. Active, top-tier companies often invest in many different marketing opportunities across multiple channels. For instance, Chevrolet spends on advertising across multiple on-line and off-line properties, like Super Bowl advertisements, Facebook presence, banner advertisements on common web properties like Yahoo.com or Msn.com, and YouTube.

In fact, these channels are increasingly interwoven. Billboards alongside highways include Twitter hashtags and Facebook URLs for interested customers to peruse. Instead of pointing directly to a product website, online advertisements point to YouTube videos or press releases.

The ultimate goal of Media-Mix Modeling is to determine how to best allocate resources across this varied and diverse "mix" of multimedia to maximize return on investment. This can be quantified and measured in many ways, of which the simplest is simply revenue to the advertiser. However, this can be somewhat difficult to measure or estimate, so intermediate measures are used. A popular set of measures, commonly referred to as "funnel measures," describes the path a consumer takes from the initial discovery of a product through its purchase. Aspects of this funnel include Brand Awareness, Consideration, Trust, and Probability of Purchase.

Whereas once an advertiser may have been limited to advertising via newspaper and radio, advertisers are now faced with an expansive portfolio of options. Chevrolet is no stranger to this allocation challenge. The rest of this thesis details an initial attempt at combining the various methodologies introduced in this introductory section to generate insight into this interesting problem.

2. OVERVIEW

2.1 Summary of thesis content

This section contains a high-level view of the work presented in this thesis. It is split into two levels of abstraction: first, the meta- level, which contains information regarding Prospective Marketing Meta-Analysis, and secondly, the individual study used to bootstrap PMMA: a market research experiment sponsored by Chevrolet that studies media-mix modeling; specifically, with regards to traditional media (TV, banner ads) versus newer, quickly-evolving media (Facebook, YouTube, etc.).

Chapter 3 details PMMA: Prospective Marketing Meta-Analysis, which adapts the biomedical methodology of prospective meta-analysis for use with marketing research.

Chapter 4 describes the Chevrolet New/Traditional Media-Mix Modeling experiment, the first marketing study to be included in PMMA. The goal of this research is to study the relative effects of various marketing channels on consumer funnel measures. The technical implementation and experimental protocols are presented and explained in this section.

Chapter 5 shows preliminary results from a small trial run of the media-mix modeling experiment with sample size n=50. This execution is intended as a feasibility test for the systems and protocols described in Chapter 4.

Chapter 6 analyzes the results from the preliminary study, conducts a technical evaluation of the systems and protocols, and discusses concerns and challenges. A thorough treatment of improvements and iterations necessary for the systems and protocols is presented and discussed with the goal of improving for a large scale (n=13,000) deployment.

Chapter 7 discusses next steps for the Chevrolet experiment and PMMA in general. This includes the full USA experiment, an international scale-up, and work further out, which includes in-depth looks at individual media, studying the interaction of combinations of media, and extensions to other types of products, such as consumer packaged goods.

Chapter 8 draws conclusions about the current work and ramifications for relevant stakeholders.

2.2 Motivation and research objectives

The primary motivation behind the PMMA methodology is to build upon the success of information acceleration in contributing to the proliferation of market research experiments. By enabling multiple similar studies done with a unified protocol, research efforts can scale massively across many different axes: geographic location, product category, and stimuli, to name a few. These benefits have been proven in the biomedical field; this research effort hopes to bring that success to marketing research.

This work, is intended as a first effort. The primary objective is to establish a credible, methodologically solid PMMA effort that is scalable and generate meaningful meta-analyses. This requires both a database design that is flexible enough to hold information from various scale-up experiments, some which may not have even been determined yet, and an implementation that fosters research sharing and collaboration to make it easy for researchers to run PMMA experiments and integrate their data.

The motivations for the specific first experiment on new vs. traditional media advertising are two-fold. First, this is a legitimate business concern for advertisers large and small. While advertising executions on any given individual media stimulus are well-understood, and traditional media-mix modeling is understood, very little research has been done on the entire media combination and advertising portfolio that advertisers face. Chevrolet has a complex real-world business challenge that is well-suited for a PMMA study because it features a variety of media and international scale-up opportunities. This is the second reason.

Thus, the objective for this experiment is to serve as a proof-of concept: a representative study that demonstrates the functional, scalable benefits of PMMA methodology, all while studying a real-world domain of marketing that has not been studied before.

3. PMMA

This section describes PMMA, an effort at adapting prospective meta-analysis for use in marketing.

3.1 Motivation

Given the success of prospective meta-analysis in biomedicine, the Marketing Special Interest Group of the Center for Digital Business decided to adapt the method for use in marketing research. With the accelerated advancement of marketing science due to improvements such as Information Acceleration, there is now a proliferation of marketing studies and data. Prospective meta-analysis provides many benefits for biomedical researchers, and if transferred successfully, marketing scientists could enjoy the same advantages.

Achieving an adequate sample size for statistical significance would be facilitated, as researchers can aggregate sample from across many smaller experiments. A related effect is that sampling bias would be minimized with the increased diversity from the many smaller experiments. Furthermore, with a PMMA data set, many new relationships and complexities can be studied with currently existing data without the need to run a new field experiment.

3.2 Database: Information architecture

The distinguishing factor between a well-designed prospective meta-analysis and merely a collection of disjoint marketing studies is the pre-agreed protocol that is used for the studies. The studies need not be exactly the same, or they would just be replicas of each other. Instead, they should differ on a subset of the independent variables.

From an abstraction standpoint, if every independent variable were the same, then the experiments would simply be replicas. If every independent variable were different, then the experiments would have nothing in common and there would be nothing to meta-analyze. It is finding the "sweet spot" in the middle of this spectrum that leads to successful meta-analyses where the individual experiments are different enough to

be able to extract non-trivial generalizations of information without compromising the fidelity and depth of the results and conclusions. This is a classic "breadth vs. depth" problem.

3.2.1 Objects

The goal of this design phase is to objectively design an information architecture: a structured way to hold the data from different experiments with the goal of making it easy and efficient to later meta-analyze. The desired outcome is a database schema that is capable of handling information both for the current Chevrolet New/Traditional Media-Mix modeling experiment, but also any extensions of that experiment, or any different experiments that the research group wishes to include in PMMA. The requirements for this database schema then, are that it must be flexible enough to handle a currently unknown number and variety of related experiments, but rigid enough so that there is some structure unifying the different experiments in order to have relations and common fields to meta-analyze.

The first step I took was to account for all of the structure and nature of the data. I listed all of the different entities in this domain with their respective definitions. This is displayed in Table 3.1.

3.2.2 Object models

With the objects in hand, the next step was to arrange them into logical relations. Figure 3-1 displays an object model of the PMMA domain. The two significant features of Figure 3-1 are the relations between the objects, as well as the multiplicities of these relations. These two features can very often uniquely determine how to place the objects displayed into a relational database schema.

The object modeling notation used is the same set of constructs used in MIT software engineering courses 6.005 and 6.170 [9]. It is a very simple object model, and because of how lightweight it is, there are advantages and disadvantages both. Relations are best described linearly, which makes tuples and sets difficult but not impossible. For the purposes of this set of objects, I opted for ease of use and flexibility over 100% logically accurate and efficient relationships.

Table 3.1: PMMA data entities defined

PMMA	Prospective Marketing Meta Analysis. Database that contains information regarding many similar market research experiments, conducted with pre-determined protocol and stimuli
Study	A single execution of a market research experiment. Examples include Professor Urban's prior work, and other examples from Section 1. Introduction.
User	A participant in a study. Studies have many users. The number of users is usually determined based on a minimum number to achieve statistical significance.
Stimulus	A type of media, or other set of exposures presented to a user during a study. Examples include a specially-designed mobile app, or a website with ads customized for the user, etc. Studies can have one or more stimuli. Not all users see all sets of stimuli. For example, one common experimental method, the Full Factorial experiment, establishes 2^n cells for an experiment with n stimuli, each cell with a unique combination of stimuli displayed. Within each cell, the order of stimuli shown is often randomized.
Clickstream	Logged measurements of how a user interacts with a stimulus. For example, if the stimulus is an exposure to a website with a specially inserted advertisement, the clickstream might log the user's mouse clicks, scrolls, and whether the user hovered on the inserted advertisement.
Pre/Post Surveys	Surveys are administered to users before and after stimuli exposure. Surveys usually collect basic biographical information, background information to baseline the user, and test marketing funnel measures (see Section 1 for a refresher). For examples, questions on a survey could be designed to assess the brand awareness of a consumer to a certain brand, like Geico Insurance. Survey questions usually adhere to standard question types established in literature.
Pre/Post Measures	User responses to surveys. These responses are analyzed for differences in the pre- and post-measures, usually to check for statistically significant differences.
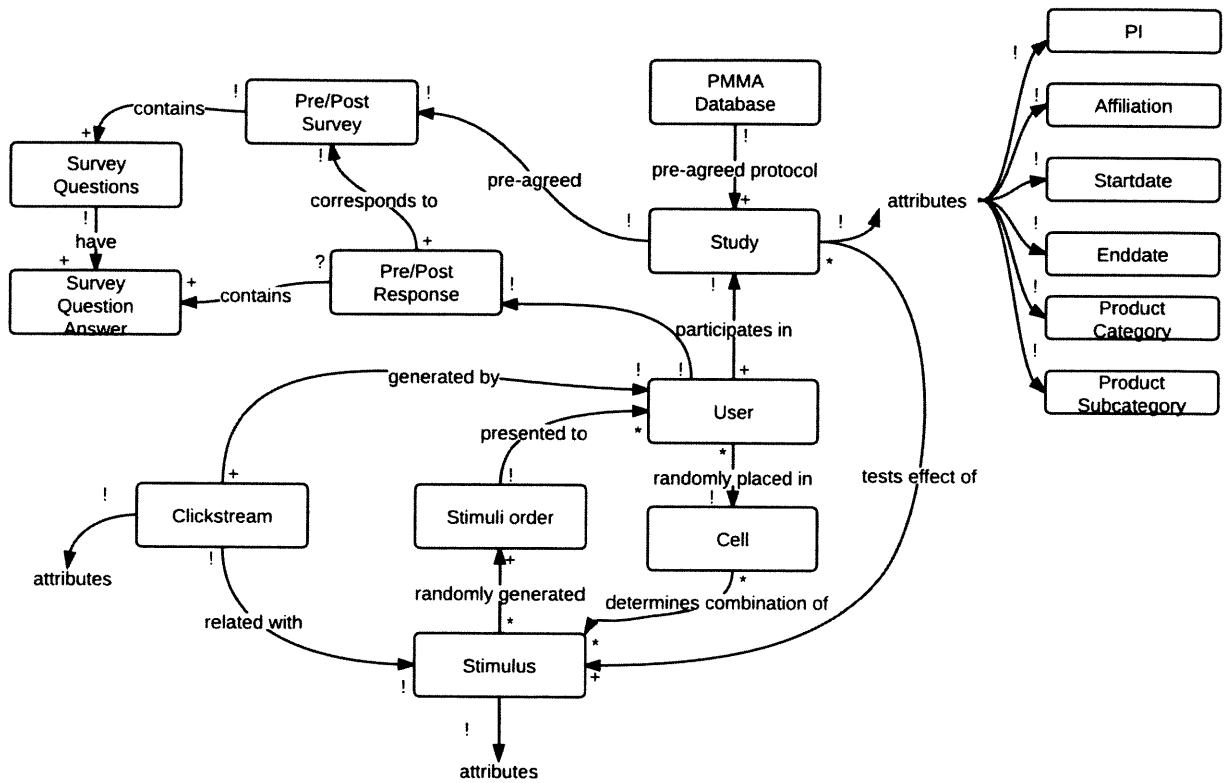
Figure 3-1: PMMA object model

3.2.3 Database schema

From the object model, there is a relatively straightforward algorithm to translate to a normalized relational database schema. Simply put, each object is defined as either an "entity," which has a persistent identity, and can be loosely thought of as a class in an object-oriented programming sense. An "attribute," on the other hand, has no identity of its own without a corresponding "entity" and represents not a class but perhaps a class field or parameter. Relations are handled based on multiplicity. The full procedure is shown in [10].

Figures 3-2 and 3-3 presents the database schema that results from following this procedure, as well as a few manual adjustments. It is expressed in generic SQL.

STUDY	Type	Key
study_ID	int	PK
study_title	varchar	
start_date	date	
end_date	date	
affiliated_institution_ID	int	FK
primary_investigator_ID	int	FK
product_category_ID	int	FK
product_subcategory_ID	int	FK

USER_STIMULUS (CELL)	Type	Key
user_stimulus_ID	int	PK
user_ID	int	FK
stimulus_ID	int	FK

STIMULUS_ORDER	Type	Key
stimulus_order_ID	int	PK
stimulus_ID_{n} *repeated {n} times for maximum number of stimuli	int	FK

PRE_POST_RESPONSES	Type	Key
pre_post_response_ID	int	PK
user_ID	int	FK
question_ID	int	FK
response	varchar	
timestamp	datetime	

USER	Type	Key
user_ID	int	PK
study_ID	int	FK
stimulus_order_ID	int	FK

STIMULUS	Type	Key
stimulus_ID	int	PK
name	varchar	
media_category_ID	int	FK
description	varchar	
long_description	varchar	

CLICKSTREAM	Type	Key
clickstream_ID	int	PK
user_ID	int	FK
stimulus_ID	int	FK
action	varchar	
timestamp	datetime	

PRE_POST_SURVEY	Type	Key
question_ID	int	PK
study_ID	int	FK
question_description	varchar	

Figure 3-2: PMMA database schema, main entities

INSTITUTION	Type	Key
institution_id	int	PK
institution	varchar	

INVESTIGATOR	Type	Key
investigator_id	int	PK
name	varchar	

PRODUCT_CATEGORY	Type	Key
product_category_id	int	PK
product_category	varchar	

PRODUCT_SUBCATEGORY	Type	Key
product_subcategory_id	int	PK
product_subcategory	varchar	

MEDIA_CATEGORY	Type	Key
media_category_id	int	PK
media_category	varchar	

Figure 3-3: PMMA database schema, additional tables.

3.2.4 Design discussion

This schema is not a perfectly normalized database. [11] While all attempts at a perfectly, properly normalized database were made in earnest, the schema was adjusted for ease of use and readability as well. For example, the *stimulus_order* table is a clear example. This table will contain as many fields as the maximum number of stimuli presented to a user in any single experiment. It is possible that this table will have to be adjusted as the PMMA database expands. The reason this design decision was made was because it is important for researchers to be able to easily extract the stimuli presented to a user. There is also some redundancy introduced to the system, as the order of stimuli implicitly also communicates the information about which cell the user is in.

The *clickstream* table is another example of a design defect. *Clickstream* should probably be two separate tables, one that encodes the mapping from a user to a stimulus, and

another that records the actions taken. While the chosen design is not completely normal, it still produces the desired information storage with little overhead. It is a little easier for a researcher to scan through this table and quickly infer how a user may have interacted with a stimulus.

Overall, the schema is fairly normalized. There is not much redundancy overall in the table. In terms of performance, it should perform rather well. The lack of redundancy suggests that many join queries may be issued to extract meaningful, human-readable sets of data, and with proper indexing, this can be adequately handled.

3.3. Applications and uses

With the PMMA database schema in place, written in common SQL, this database can be created on any computer system running an ubiquitous version of SQL such as MySQL or PostgreSQL. An initial implementation was created on the MIT Student Information Processing Board's MySQL service as a proof-of-concept. <cite sql.mit.edu>

With the database initialized and ready for input, PMMA studies can now be conducted and data entered. The rest of this thesis describes the implementation and execution of the first study, Chevrolet New/Traditional Media-Mix Modeling.

With the database successfully populated with data from experiments, researchers can conduct meta-analyses across multiple sets of independent variables. For example, one could study the effects of media irrespective of the actual product category (cars, insurance, fashion, etc.) or study only the effect of a specific brand (Coca-Cola, General Motors, etc.).

4. NEW/TRADITIONAL MEDIA-MIX MODELING

The first study to go into the PMMA database is an experiment on the effect of various media advertising stimuli on marketing funnel measures for Chevrolet vehicles. Specifically, the experiment is a media-mix modeling experiment, which aims to discern the relative effects of selected media.

4.1 Stimuli media

The experimental design of this study, determined by a team of marketing professors from MIT, Erasmus, and INSEAD, calls for a full factorial design on four main stimuli media, and a separate fractional factorial design on an additional three media. The four main stimuli media are Facebook, banner ads, Google search ads, and TV ads. The three additional sub-experiment media are YouTube, Twitter, and blogs.

4.1.1 Social media

The primary motivation behind the experiment as a whole is to determine the best way to allocate marketing dollars to the different media stimuli. Specifically, GM was interested in finding out how to include social media in their media mix, so Facebook, YouTube, Twitter, and blogs were included.

4.1.2 Traditional media

Not only is the relationship between the different social media important, but perhaps as important, if not more, is how this compares to the traditional media channels. For this, we include TV advertisements, banner ads, and search ads.

4.2 Stimuli content and presentation

This section describes how the actual stimuli were designed for the seven media. Two aspects uniquely determine a stimuli exposure: 1) the UI element that is experimentally manipulated, and 2) the actual copy (text, images, etc.) of material that is manipulated.

The criteria for determining the actual stimuli content were moderately specified. Based on the context of the experiment, it was important that the stimuli be something that Chevrolet could actually spend money on. There must be relative parity between the stimuli, so a loose window of roughly one or two minutes was designated as a target exposure time. The quality of the media was targeted at above-average, to prevent confounding the media effect (Facebook vs. banner ads) with the copy effect (lucratively successful viral YouTube video vs. mediocre Facebook post).

4.2.1 Facebook

Facebook, currently the world's most popular social network, allows brands like Chevrolet multiple avenues to interact with users, spanning both paid and free. For example, any brand can set up a brand page and upload content to that page. Facebook users who "Like" that brand page would then receive updates to their News Feed about that brand's activity on Facebook. This interaction is free. Brands can also pay for sponsored advertising, displaying either pure advertising or promoted advertising (displaying that a friend of the user likes a certain brand, for example). Recently, Facebook began to test promoted content directly in a user's News Feed, in which brands can purchase extra EdgeRank consideration. For example, a user may start seeing stories from her friends about certain brands that would not have otherwise shown up had that brand not paid to give the story an extra bump in the news feed [12].
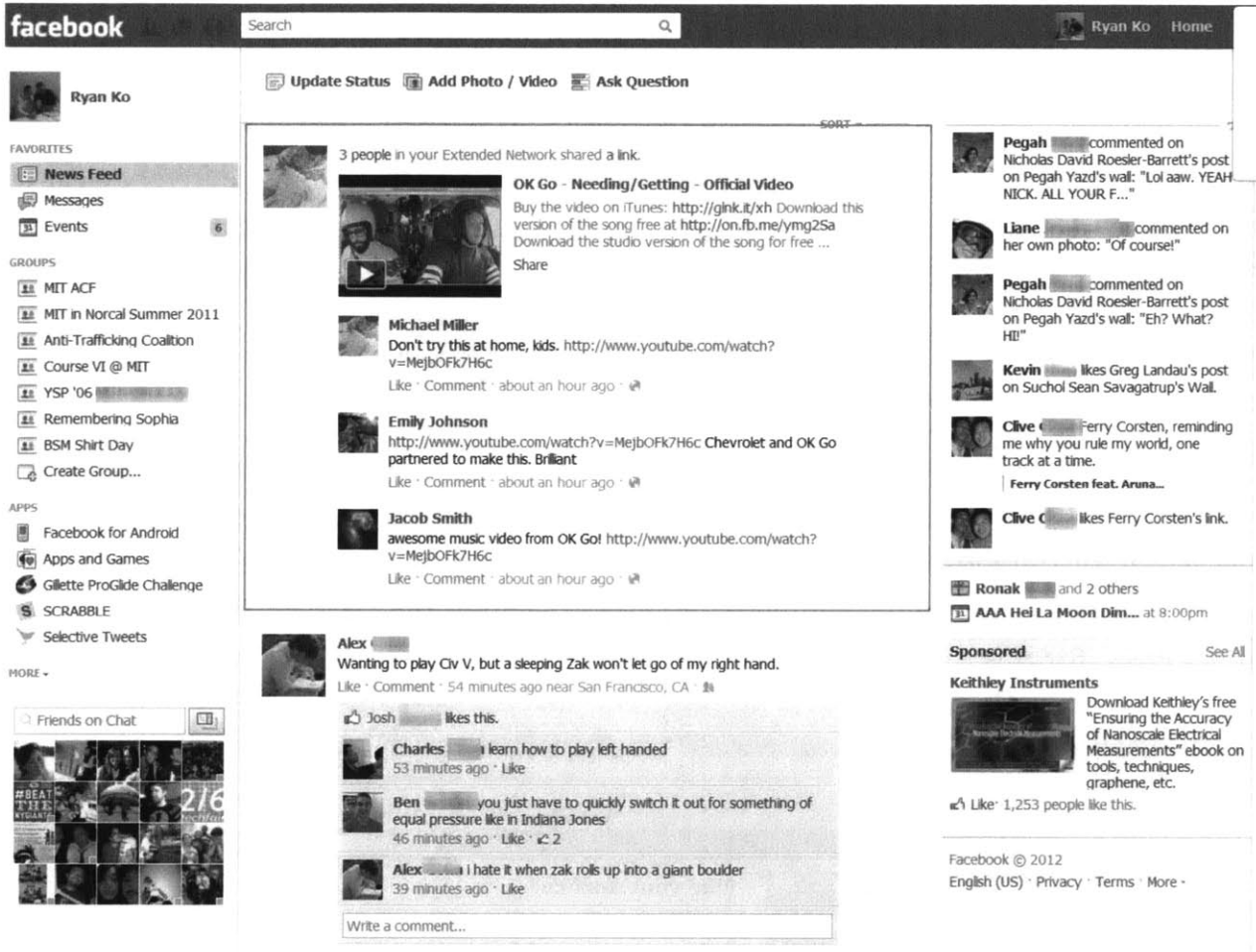
Figure 4-1: Facebook stimulus

There are a slew of different options to pick from to test the media effect of Facebook. Ultimately, we decided to create our own, a hybrid of a few of the options above. Figure 4-1 shows a screen shot of the Facebook stimulus. The noteworthy features of this stimulus include the fact that this is an artificial stimulus. We decided it would be somewhat unauthentic if we displayed promotional Chevrolet content in a manner that would lead the user to believe that it originated from a friend, so we introduced an element of misdirection in the "Extended Network" feature. The profiles created for the "Extended Network" are real Facebook profiles with generic names, interests. The content used is flexible, and in its current manifestation, is a YouTube video.

The reasoning for picking this, as opposed to a regular advertisement, comes from the thought experiment about a Facebook user and where that user's gaze is on the page. Facebook click-through rates are mediocre, and in fact, General Motors has decided to withdraw all current paid advertising from Facebook [13]! This made it very clear to us that we needed to test something that is clearly different from traditional Facebook advertising, so we went with the promoted story in the user's News Feed.

4.2.2 Banners

This traditional media is rather simple compared to Facebook. As the target user of this study was people who intended to purchase a vehicle within the next four years, we selected Edmunds.com, a very common website for researching new cars. We decided to use the topmost banner ad. Figure 4-2 shows the UI element that we manipulate for this experiment.
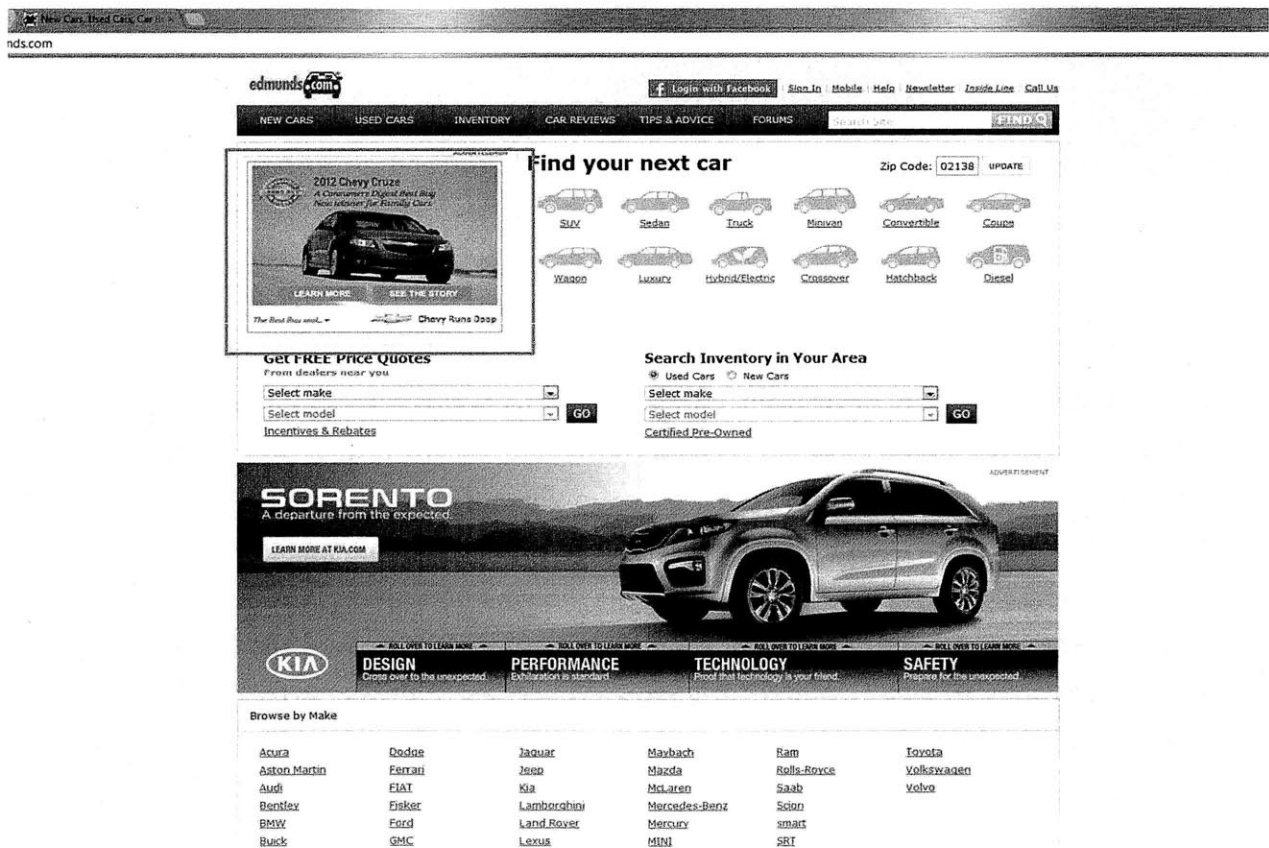
Figure 4-2: Banner stimulus

4.2.3 Search

Search, another one of the traditional media, was also relatively straightforward. We decided on manipulating the topmost Google search ad result. Figure 4-3 shows the ad selected for manipulation.
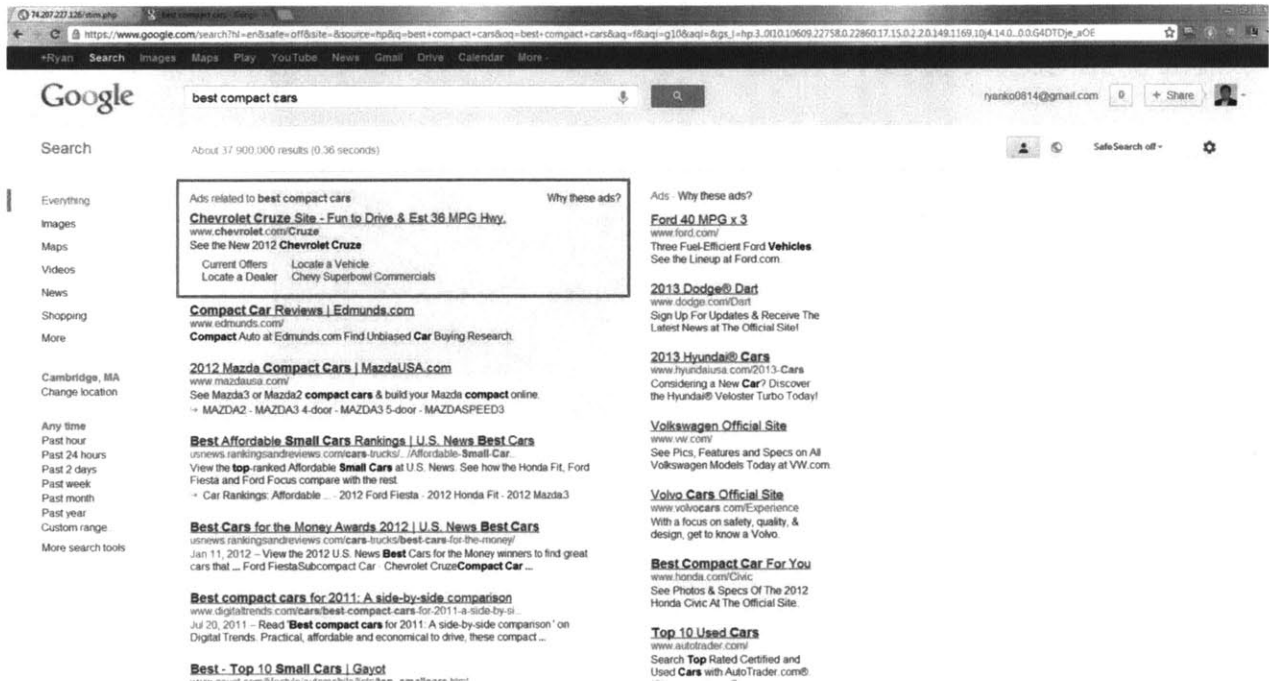
Figure 4-3: Search stimulus

4.2.4 TV

TV is a traditional medium. Usually, TV advertisements are presented to users watching TV shows, interleaved in the show. However, since this is an experiment done via computer, the TV stimulus had to be simulated. Furthermore, it would be unrealistic to ask users to sit through a full 30-minute TV show. Not only would it make it very difficult to retain users, it would also disturb parity, as users would only be exposed to the other stimuli for a time period on the order of one to two minutes.

Thus, the TV stimulus was designed to, in a time interval of one to two minutes, simulate the TV-watching experience. A 30-second TV ad was spliced into the middle

of 90 seconds of a TV show. The video was hosted on YouTube, but played on a website inside a frame with a TV and TV stand. Figure 4-4 shows the TV stimulus.

Figure 4-4: TV stimulus

4.2.5 Twitter

Twitter, a popular microblogging platform, was used as one of the social media. Similar to Facebook, there are a number of ways for a brand to interact with individuals. In addition to the free opportunities to create Twitter accounts and post tweets from them, brands have three specific ways to advertise: Promoted Tweets, Promoted Trends, and Promoted Accounts [14].

As we are looking to establish similar media exposures across the different media, we chose Promoted Tweets. This closely mirrors the Facebook experience, as the Twitter timeline is the analog to the Facebook news feed in terms of function served to the user. Figure 4-5 shows a Promoted Tweet.

Figure 4-5: Twitter stimulus

4.2.6 YouTube

Brands can purchase many different forms of advertising on YouTube as well. The most expensive is the banner advertisement on the home page. There are also sponsored video search results, as well as sponsored videos that are recommended to users in various parts of the site.

We elected to manipulate sponsored video search results. Our reasoning was twofold: first, users are often on YouTube with a specific purpose, and search much more often than they browse and wantonly click around; second, we are already testing banner advertisements in other parts of the experiment, and a video search result is unique to YouTube.

Figure 4-6 shows the YouTube stimulus.
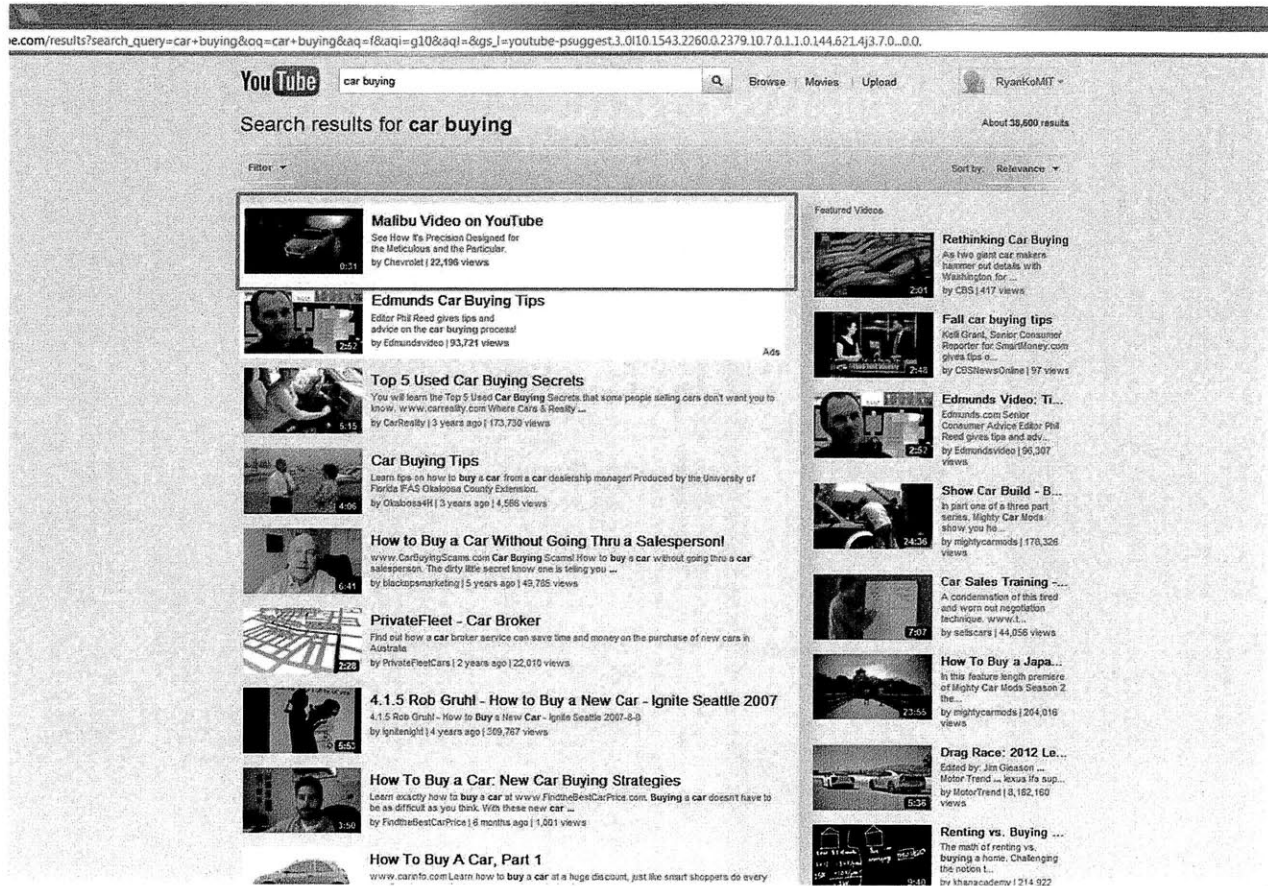
Figure 4-6: YouTube stimulus

4.2.7 Blog

This media is perhaps the most underspecified, and was very challenging to decide. We decided to take Chevrolet-sponsored blog content and insert it as a blog post into a popular automotive blog. At the time of writing of this document, the automotive blog has not been specified. Figure 4-7 shows Jalopnik, an automotive blog that is a candidate for consideration.
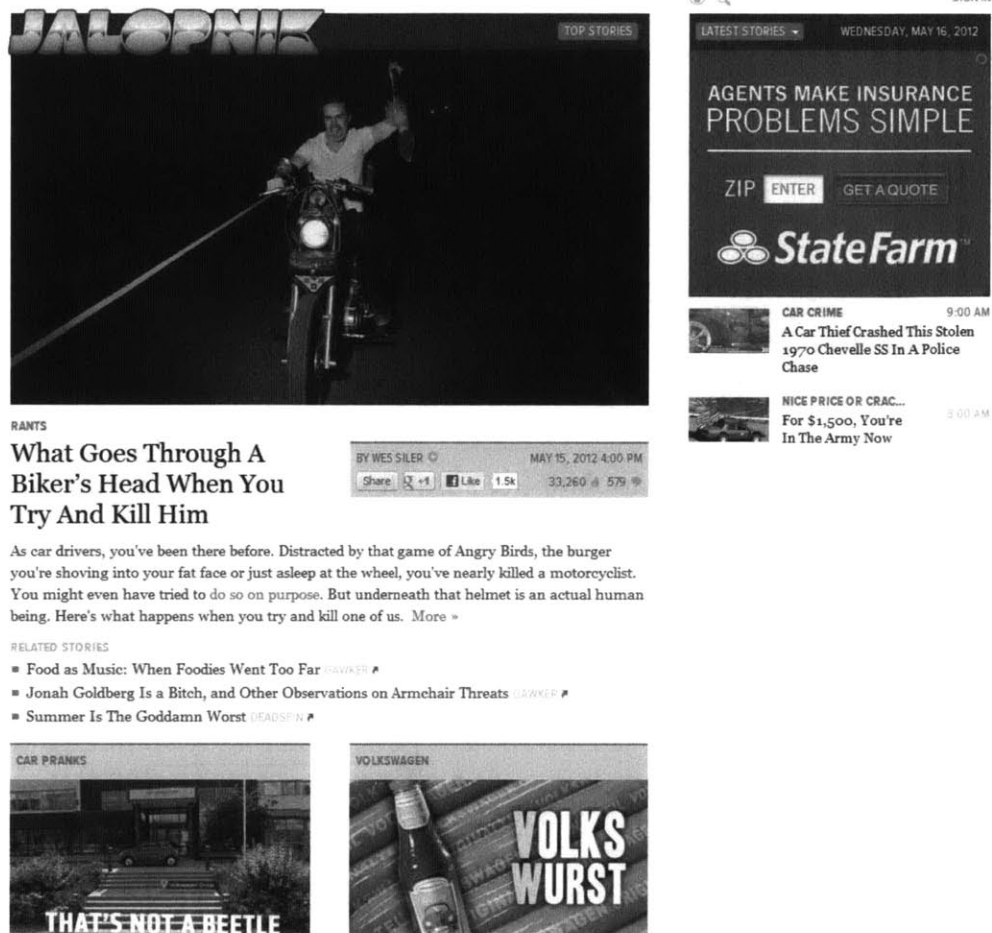
Figure 4-7: Blog stimulus

4.3 System architecture

The technical infrastructure for this experiment consists of three main parts. They are shown in Figure 4-8 and explained briefly in this section and in detail in the following sections.

The flow for a user is linear. First, the user answers the pre-survey, which is presented in the form of an online form with questions. Then, the user is exposed to the stimuli. Lastly, the user answers the post-survey. For this flow to execute correctly, there are three necessary parts.

First, a questionnaire system must be in place to properly handle users taking surveys. Very simple examples of questionnaire systems include SurveyMonkey or Google Forms. However, simple solutions do not allow for advanced logic in the questionnaire. For example, researchers may opt to ask different questions based on users' responses to prior questions, or display different stimuli as a result of question response. Thus, a more advanced solution is needed.

Second, a system to display the correct stimuli in the correct order to the users must be in place. This system needs to be able to smoothly transition a user from the pre-survey to the stimuli and back to the post-survey.

Third, a system is needed to manipulate the stimuli so that users see the specified UI elements and designated content.
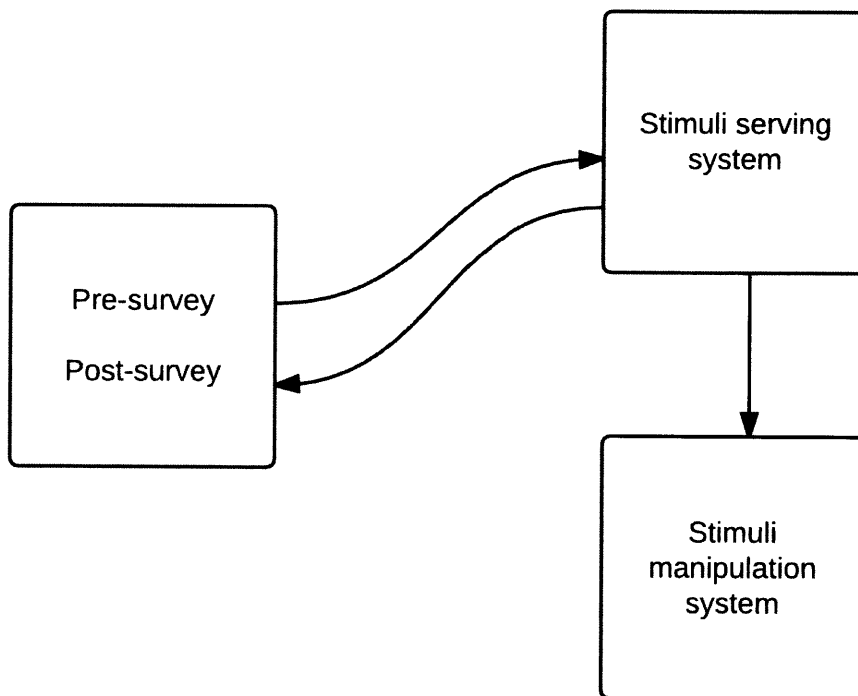
Figure 4-8: System architecture of new/traditional media-mix modeling experiment

4.4 Chrome extension

One of the difficulties in running such marketing studies is the relationship between the advertiser and the advertising platform. For example, establishing a controlled research environment in which to test the effect of Facebook ads is difficult without paying Facebook a hefty sum of money. Even with the purchase of advertising, it would not be in the interest of online advertising platforms to allow third parties to run live experiments.

Prior to this experiment, the standard way of handling the problem of not being able to use the actual media was to use surrogate stimuli. For example, without the full use of Edmunds or Kelley Blue Book, researchers built a website that mimicked the functionality of aforementioned automotive websites. Consumers were asked to go to such surrogate sites, where advertising would be presented and before-and-after effects would be studied.

Due to the complexity of modern, AJAX-websites such as Facebook and Twitter, building our own surrogate stimuli was not an option. Unfortunately, it is neither possible nor financially feasible to directly arrange with sites like Facebook or Twitter for such an experiment to be conducted, either.

Instead, a Google Chrome Extension was used to modify the DOM of web pages that users viewed. This way, we could modify the look-and-feel of certain websites without having to actually handle the sites. Instead, the system waits for the user to download the website, then modifies it. An example of a Google Chrome Extension is AdBlock [15]. This popular piece of software, with over 3.3 million downloads, is an extension that removes from users' views any advertisements. Similarly, we would create a Chrome extension that would modify and manipulate certain UI elements of the stimuli media.

4.4.1 Initial concerns and challenges

A preliminary concern was that very few users would be willing to download Google Chrome and an untrusted extension. Gongos, the panel provider for the users in the first iteration of the study, ran feasibility tests to measure the drop-off rate in users

unwilling to continue. Not only did we need to make sure we were not losing too many users, we also had to make sure that the population of users who indeed downloaded Google Chrome and/or the extension were representative of the population as a whole and did not bias the sample. Fortunately, we determined that using a Chrome Extension was indeed feasible.

4.4.2 Content scripts

The critical aspect of the Chrome extension was Content Scripts, which are JavaScript files that are run in the context of web pages. They are run after the DOM of web pages is loaded [16].

One content script was created for each stimuli media. Each one manipulated the media to display the designated content based on information passed to it by the stimuli serving system.

4.4.3 Background page

The Chrome extension runs in a separate, isolated environment for security reasons. As a result, disjoint pieces of the Extension cannot communicate with each other, or with the web, except through the background page, which is a DOM page (.html or .js) that runs for the duration of the extension [17]. For this extension, the background page was responsible for many roles.

First, the background page had to maintain state of the system. One content script was set up to read the various parameters of the user based on the survey system, and that script wrote that state to the background page. This state is stored centrally on the background page, so that whenever a content script needed to access information about the user to determine what content to inject or stimulus to show, this communication happened via the background page.

Second, the background page had to manipulate the browser itself. The flow of the experiment made it such that when the user finished a stimulus, clicking a button would open a new browser tab with a new stimulus. The background page, responsible for task and state, opens a new tab.

Third, the background page can send requests to the Internet, and was responsible for making asynchronous requests to the PMMA database to log the user's clickstream.

4.4.4 Message passing

As content scripts run in the environment of the DOM of the page they modify, they need a way to communicate with the background page. Chrome extensions handle this via message passing, a way for content scripts to send requests to background pages and vice versa. This is similar in concept to AJAX calls sent asynchronously on the web, but instead of a web page requesting information from a server on some other part of the Internet, this is two isolated environments, a content script and its background page.

Messages were implemented to handle all of the functionality of the Chrome extension: to manipulate the browser to open new tabs for stimuli, to write to the clickstream database, to maintain state, etc.

4.5 Stimuli serving site

The Chrome extension is half the story of how stimuli are served. A database-backed web application was also created to persist the data collected, as well as direct user flow and handle the procedural aspects of the experiment.

This webapp provides a URL for the pre-survey to transition a user into. Using GET and POST requests, the survey system is able to communicate parameters about a user, such as what product segment to display for content, which stimuli to show, etc. The app then proceeds to link users to stimuli, in order. In parallel, the installed content scripts in the Chrome extension modify the stimuli appropriately. Figures 4-9 and 4-10 show the two main views of the web application: the instructions page the user lands on when passed in from the pre-survey, and the stimuli instructions page. Navigation is linear using the arrow button.
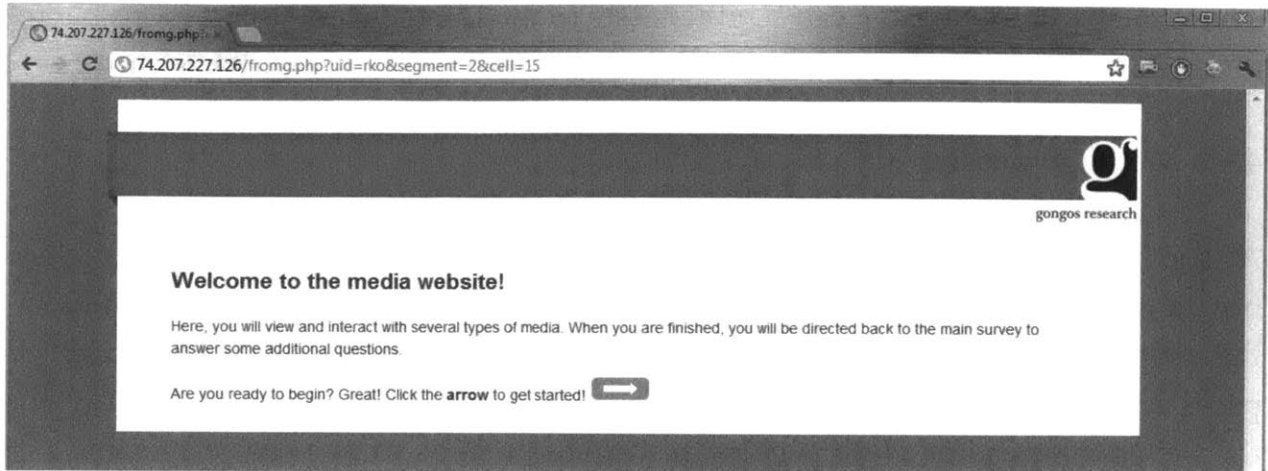
Figure 4-9: Stimuli serving site start page
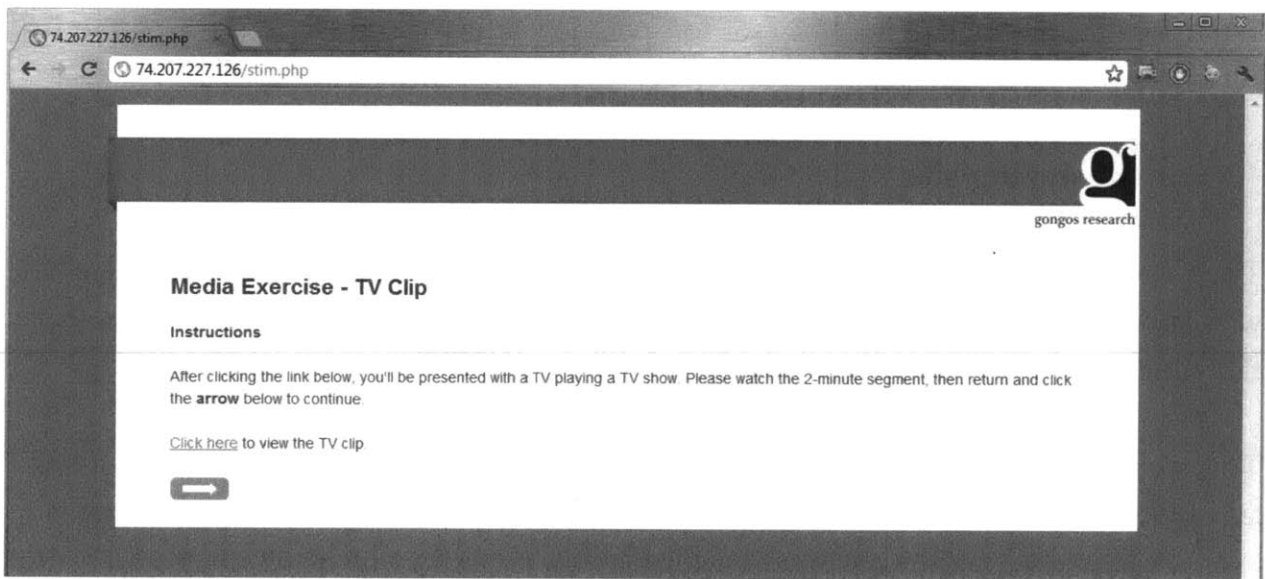
Figure 4-10: Stimuli serving site stimulus instructions page

4.5.1 Click tracking

The content scripts add event listeners to the injected and manipulated content and measure when users click or hover over the content. This information is written into the database.

4.5.2 Enforcement

Based on prior experiments, in Internet-based market research, fraud is an issue because often, users are incentivized to complete studies for small monetary gain. Thus, some users simply click "Next" whenever possible, and do not follow the instructions or view the stimuli in earnest. Thus, the system, through a combination of content script and web app, is able to enforce certain constraints on user interaction. For example, if a user spends 2 seconds on a 2-minute TV segment, then the system can pop up a warning message asking the user to view the rest of the TV segment.

4.5.3 Cells and segments

These two pieces of information are passed to the stimuli serving site and Chrome extension when the survey system passes the user in. The stimuli serving site writes the information to database, and the extension writes it to the background page. This way, state is accessible by both modules.

The cell is the section of the full factorial experiment the user is randomly placed in. The cell determines which stimuli are shown to the user. The webapp randomizes the order of these stimuli.

The segment is optional. In this experiment, though, the segment refers to which type of car the pre-survey determines the user to be interested in. For example, the three segments used are small car, compact car, and mid-size sedan.

4.6 Pre/post survey

As mentioned in Section 4.3, simple online survey solutions like Google Forms or SurveyMonkey are inadequate to handle branching logic or advanced survey flow. As a result, more advanced options are discussed here.

4.6.1 Survey design and development

The pre/post survey questionnaires were developed in conjunction with a team of professors from MIT, Erasmus, and INSEAD, as well as personnel from GM.

4.6.2 Gongos Research

GM's partner market research company Gongos Research was responsible for both recruiting enough users to participate in the study, and to implement the surveys. Gongos employs a team of programmers and custom-built the surveys. For this incarnation of this experiment, Gongos was used.

4.6.3 Qualtrics

MIT Sloan's preferred survey system is Qualtrics [18], a quiet-yet-accelerating young technology startup. Qualtrics provides very powerful yet customizable survey solutions and is quickly being adopted by most of the top-tier business schools around the world.

The research intention was to use Qualtrics once we finished the initial run of the experiment with GM. Qualtrics allows for powerful abstraction and collaboration, as users from around the globe can modify, share, and translate surveys.

Thus, while the initial execution of the first PMMA experiment uses Gongos, the long-term intent is to shift to a more modular, collaborative solution that avoids system lock-in of custom-programmed surveys, which does not scale well.

5. PRELIMINARY RESULTS

5.1 AIOC feasibility pre-test

In preparation for the full 13,000-user experiment, a 50-user feasibility test was first deployed to the Auto Insight Online Community (AIOC), an online community of automotive enthusiasts and consumers incentivized to participate in various market research experiments with Amazon gift certificates and other small monetary perks [19].

The purpose of this test was akin to a dress rehearsal: to ensure that the experimental design, protocol, flow, and technical infrastructure was feasible for a full deployment. Furthermore, it provided a low-risk avenue to work out any bugs before committing full financial resources to the full deployment.

The purpose of this test was NOT to gather preliminary data and use it to extrapolate what a full sample would look like. This is because the AIOC respondents are generally automotive enthusiasts and technically savvy, which is not representative of a full-scale sample that is more representative of the U.S. population as a whole.

Thus, in terms of metrics, the measurements recorded about the AIOC pre-test had to do with the design of the experiment itself. We measured statistics about how many people started but did not finish the survey, the average time spent on each stimulus, the number of people who were flagged for attempting to "game" the system, etc.

5.2 Measured numbers

5.2.1 Users per car segment

Gongos Research admitted to the experiment the first fifty users who completed the pre-survey, navigated through the stimuli serving system, and completed the post-survey. The users must have met the conditions that they intended to purchase a sedan in the next four years. Based on their responses to the pre-survey, they were placed in one of the following three car segments: small, compact, or mid-size, and

stimuli media were displayed accordingly. Table 5.1 shows the AIOC pre-test users bucketed by car segment.

Table 5.1: AIOC pre-test users by car segment

Small Car	9
Compact Car	13
Mid-size Car	28

In actuality, sedans are split into five segments, numbered 1-5. The three displayed in Table 5.1 are 2, 3, and 4 respectively. 1 is a "micro" and 5 is for full-size sedans.

5.2.2 Enforcement triggers

In the AIOC pretest, a rudimentary enforcement criterion was used to ensure that users were spending an appropriate minimum amount of time on each stimulus. If the user tried to advance to the next stimulus within 30 seconds of opening that stimulus, he would be asked to return to the stimulus and spend more time. Table 5.2 shows the number of distinct enforcement "triggers" by stimulus.

Table 5.2: AIOC pre-test enforcement triggers by stimulus

Banners	16
Facebook	15
Search	19
TV	6

Note that any given user can "trigger" the enforcement check multiple times per stimulus. No user that completed the study generated more than six total triggers.

5.2.3 Average time spent per stimulus

The system did not enforce that users must finish the system in one sitting. As a result, there were quite a few cases where people spent significantly longer to complete the stimuli-serving portion of the pre-test. Presumably, they left and returned hours later

and completed. Table 5.3 shows the average time spent per stimulus, ignoring those times greater than 17 minutes (where there is a very clear drop-off).

Table 5.3: AIOC pre-test average time spent per stimulus (sec)

Banners	175
Facebook	143
Search	141
TV	183

5.2.4 Clickthrough

For all 50 users, across all four stimuli, only three clicks were logged. All three were generated by different users who clicked an injected Google search advertisement. No clicks were logged for any injected content on Facebook or Edmunds. Because the TV stimulus is passive and did not require user interaction, activity was not logged.

5.2.5 Mouse Actions

The number of times a user's mouse navigated into and out of the injected content was measured. Table 5.4 shows the results.

Table 5.4: AIOC pre-test average number of mousein and mouseout actions

Banners	2.4
Facebook	3.7
Search	4.2

Because the TV stimulus is passive and did not require user interaction, activity was not logged.

5.3 Qualitative feedback

Gongos Research collected qualitative feedback from users who successfully completed the survey. A primary concern of many users was their privacy and security. Despite the fact that the Chrome extension was branded with a Gongos logo, and

came with the assurance that it was easily installable, free of malware, and easily uninstallable, many users balked at this step and refused to download the extension. Users mentioned that this was because of the default warning message that Google Chrome displays when installing extensions. Figure 5-1 shows the dialog box presented.
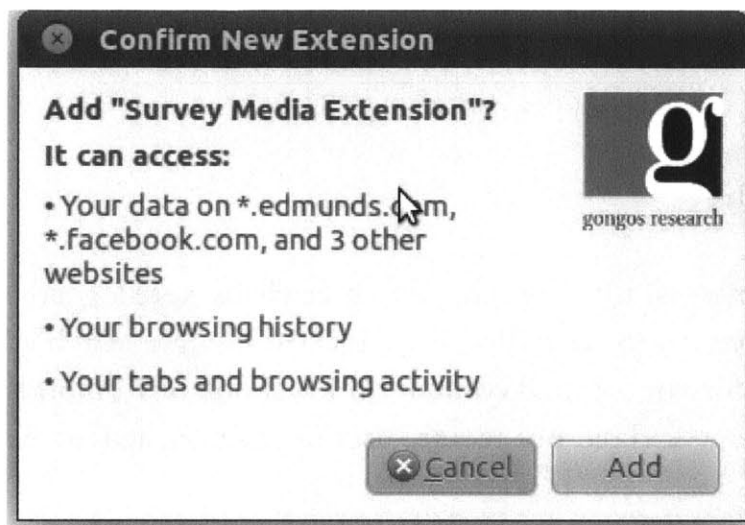
Figure 5-1: Chrome extension installation dialog box

6. DISCUSSION

This section includes an evaluation of all aspects of Chevrolet New/Traditional Media-Mix Modeling study currently executed, from the design phase through the AIOC pre-test. It discusses the requisite improvements necessary to go from the AIOC pre-test to the full U.S. experiment.

6.1. Technical evaluation

This is a brief technical evaluation. It is intended more as a checklist than a thorough discussion.

6.1.1 Usability

Each individual view to the user in the stimuli serving site is very simple and the clear call to action is the arrow button. This was done to mimic Gongos Research's presurvey UI elements as best as possible so that to the user, it did not seem like they were changing from a Gongos site to a MIT server and back. In terms of usability, while the site is not the most aesthetically pleasing, it is clean, simple, and fairly easy to use.

The Chrome Extension installation takes a few mouse clicks, and has a simple three-click uninstall. Other than that, it subtly modifies content on already existing web pages, so the net change in usability is relatively low.

6.1.2 Performance and infrastructure

The stimuli serving site was hosted on a Linode VPS located in Atlanta, GA, and the database was located at MIT, hosted by sql.mit.edu, a SIPB service, in Cambridge, MA. No noteworthy performance issues were noted, though 50 users is not a significant sample to assert that the system does not suffer from any performance concerns. However, sql.mit.edu is not meant for performance-critical applications, and further consideration of more secure, robust solutions for hosting are absolutely warranted for the full-scale 13,000-user test.

6.1.3 State and race conditions

The primary difficulty and challenges in building and maintaining the technical infrastructure for this project, including the Chrome extension, stimuli serving site, and data store, is the flow. Due to the client and server nature of the extension and site, state is disjointly stored across all three systems: on the client in a Chrome extension background page, on the server via PHP session, and in the MySQL database. This can lead to various issues of synchronicity.

The most obvious issue is simply ensuring that all three sets of state do not deviate, and if they do, provide a graceful solution for adjudicating conflicts. This is a nontrivial challenge and various forms of redundancy and checking were put in place in the system.

Another challenge is time. A user's system clock may differ from the clock on the server and clock on database, and even if the clocks were synchronized, latency may throw off the numbers, anyway. Fortunately, it is not required that the times synchronize exactly. The design is such that any functionality on any of the three systems requires only the time of its own system. Thus, care is taken such that the Chrome extension only runs time calculations on the user's system clock, and the data calculations for time are only run based on MySQL date() functions.

6.2 Measured numbers

This section discusses the measured numbers presented in Section 5.2.

6.2.1 Users per car segment

Ideally, users would be split evenly across segments. Chevrolet sells cars in segments 2 through 5; the Sonic, Cruze, Malibu, and Impala, respectively. However, for the purposes of this study, because Impala is mostly a fleet vehicle and not sold commercially in significant volumes, users who were sorted into segment 5 were shown mid-size (segment 4) stimuli. This explains why slightly more than half the sample was placed in the mid-size car segment. However, with this data, there is a convincing argument to be made that even if Impala is not the correct car to use,

another GM brand's full-size sedan should be used for segment 5 to balance out the segments. For example, the Buick Lacrosse is a full-size car.

6.2.2 Enforcement triggers

The number of enforcement triggers struck me as high. For many reasons, this was ultimately a flawed approach to enforcement we can improve upon.

First, there is a philosophical debate about whether enforcement to prevent spammers is useful at all. The reasoning is that a spammer who is caught by minimal enforcement measures would simply then spend the minimum amount of time and effort anyway. If we asked for 30 seconds, they'd give 30 seconds. Thus, it's better to just let them through, and filter out the data later. However, the problem is that every spammer that is allowed to pass successfully through the system is wasted money and resources.

Second, any amount of time specified is arbitrary, since our goal is to test natural exposures to media. Perhaps a user who reads very quickly truly spends less than 30 seconds at a time on her Facebook news feed.

Third, we did not enforce a maximum amount of time.

The current proposed enforcement solution takes these considerations into account. A two-tiered approach will be put in place for future tests. In this, the first tier forces users who do not click on each stimuli at least once to do so, or else they cannot continue further. This is absolute and there is no way around it. In the second tier, a users who click to the next stimulus is asked to verify a statement that they earnestly spent enough time and energy on the stimulus. This "guilt-trip" approach is not absolute -- a mal-intending user would still be able to pass through the site. However, this two-tiered approach attempts to strike a healthy medium.

6.2.3 Average time spent per stimulus

Though the average time spent per stimulus fell squarely in the 2-3 minute range originally specified, there were still a nontrivial amount of people who clocked in at

tens of minutes, even hours or days per stimulus. It is possible these people left and came back to their computers to complete the study. However, this is problematic as we cannot truly measure the time spent. This means that for the next iteration, it would be useful to have a maximum exposure time, for example. If the system had a way to tell if a user fell idle, then this problem would be avoided, too.

6.2.4 Clickthrough

Though nobody on the team was surprised that there were so few clickthroughs, this is slightly worrisome. Clickthrough rates for banner ads, for example, average tenths of a percent, but even still, that's a very low volume, even for the full test of 13,000 users. We took a look at various reasons why, and as it turns out, the wording of our instructions may not have been conducive to the desired behavior from users. Many slight modifications will be made to ensure that we are simulating the correct media exposures.

6.2.5 Mouse actions

Though logging mousein and mouseout is important, perhaps a more interesting statistic is hovertime, the amount of time the user spent. The next version of the system will include the time the user spent hovering in the injected content as well.

6.3 Qualitative feedback

In this era of an Internet laden with malware and malicious attacks, it is reasonable that users would have privacy and security concerns about research software. However, if we had presented to users very clearly the exact function of the Chrome extension, we suspect that users would have much less qualms about downloading and installing it, especially if told beforehand how simple it is to uninstall.

As such, the next iteration will be much more informative, and explain to the user exactly which Chrome dialog boxes will pop up. It will reassure the user that the software is not malicious.

6.4 Feasibility

Though the AIOC feasibility pre-test had its fair share of minor hiccups, 50 complete data points were indeed collected and logged. We conclude that such technology and protocol are indeed feasible for online market research studies.

7. NEXT STEPS

7.1 USA scale-up

Pending completion of all of the aforementioned improvements and adjustments, the experiment will be run on a sample of 13,000 users.

7.2 International scale-up

After the United States study is run and incorporated into the PMMA database, similar studies will be run internationally. Based on the collaborators on the research team, the likely next countries will be Netherlands and China. This will involve re-programming of the Chrome extension to account for local stimuli and media. For example, in China, sites like RenRen and Sina Weibo dominate. Twitter and Facebook are mere afterthoughts. Translation will also be necessary, as well as cultural studies to ensure that our protocol is still culturally valid.

7.3 Further work

Full experiments in three separate geographic locales provide an ample starting point for the PMMA database. Once this is established, more growth and expansion become feasible.

With a dedicated PMMA team responsible for making protocol decisions and curating the database, the process to running experiments can be streamlined and shared with collaborators worldwide.

Studies can be run on a variety of different variables. For example, instead of looking at the relative effects of Facebook and TV, a study could examine the effectiveness of various brand interactions with Facebook.

Furthermore, a slew of different media, stimuli, and products can be used for further research and included in the PMMA database for meta-analysis.

8. CONCLUSION

This section details the lessons learned from the presented work, as well as their ramifications to interested stakeholders.

The first take-away is that this thesis presents preliminary evidence of the feasibility of both PMMA methodology and the use of a web-based system for media-mix modeling. By designing and implementing both systems and guiding through a feasibility test, we have taken a significant step towards a demonstration of this prototype system. The next steps, which include a full 13,000-user experiment with scale-up to related experiments globally, are the natural progression to establishing PMMA.

The main challenges encountered were primarily due to complexity and uncertainty. Designing a PMMA database proved to be difficult because the design needs to be established before conducting experiments and knowing exactly what data needs to be stored. As such, many tradeoffs are made to ensure future flexibility and ease of use. Careful consideration of the design of the database is critical to the longevity of a successful PMMA.

With feasibility comes opportunity for both the PMMA concept and Chrome extension concept. Marketing experts, from both academia and industry alike, should seek to incorporate principles of standardized protocols and possibly establish larger data sets like PMMA databases for their own use. This work points to the increased potential of new technologies like web browser extensions to contribute to market research. As society gradually shifts toward consuming more and more Internet media and less traditional media, the fields of marketing science and computer science will continue to converge as technical programming savvy will continue to enable more powerful, scalable, and meaningful market research.

As a computer science student conducting interdisciplinary research, I end with a few personal thoughts about the experience for future graduate students. Seeing the impact of one's technical expertise is inspiring and empowering. Interdisciplinary research, especially with a multi-stakeholder team, is a great way to see the impact of one's work. What makes this work significant is that multiple viewpoints and opinions were all incorporated into the final design and implementation, a process that can be challenging at times but lead to much more careful, premeditated, and thorough work.

APPENDIX

A.1 Source code access

The source code for all technical systems detailed in this thesis is hosted in a private BitBucket.org git repository. As the work described is currently in-progress, it is not ready for publication of any kind. Frequent changes are currently being made and will continue to be made as the project progresses from the pre-test to the full trial, and any subsequent scale-ups.

However, the author and technical collaborators are willing to share the code. Please contact the author to request access.

A.2 Summary of content displayed

Table A.1 summarizes the content injected by the Chrome extension, broken down by media type.

<div align="center">Table A.1: Stimuli content displayed</div>

Main experiment

Banners	Banner ad on Edmunds.com
Facebook	Insert story into user's news feed
Search	Google search result ad
TV	TV ad sandwiched in tv show content

Sub-experiment

Twitter	Promoted Tweet
YouTube	Video search result ad
Blog	Insert blog article into popular automotive blog

A.3 AIOC pre/post survey questionnaire

This section contains the text of the questionnaires administered to users as the pre/post surveys for the AIOC pre/post measures. This is a draft document; due to the preliminary nature of the AIOC pre-test for feasibility, this document may err slightly due to live changes made while the test was deployed. Iterations will be made

before the full-scale test to improve the wording of questions, and certain questions may be adjusted or removed to adjust for the timing of the experiment flow.

[US Completes = 2 points
US Term = 0 points]

[QUOTAS]

1. Total Sample (n=50) [ALL FINAL COMPLETES]

2. Vehicle Segment
   A. Micro Car (Tracking) [SEGMENT=1]
   B. Small Car (Tracking) [SEGMENT=2]
   C. Compact Car (Tracking) [SEGMENT=3]
   D. Mid-size Car (Tracking) [SEGMENT=4]
   E. Full-size Car (Tracking) [SEGMENT=5]

SECTION 100: INTRO/SCREENING, SOCIO-DEMOS
SECTION 200: DOWNLOADS
SECTION 300: PRE STIMULI MEASURES
SECTION 400: STIMULI PRESENTATION
SECTION 500: POST STIMULI MEASURES
SECTION 600: STIMULI EVALUATION
SECTION 800: CULTURAL QUESTIONS AND ADDITIONAL DEMOGRAPHICS

[SECTION 100: INTRO/SCREENING, SOCIO-DEMOS]

I100. Thank you for participating in this Auto Insight survey.

This survey will take approximately 20-25 minutes to complete. If you have any questions or concerns about this survey please email our team at autoinsight@gongos.com.

Please click the ARROW to begin the survey.

[AGE AND INCOME ARE COLLECTED ON AIOC AND WILL BE APPENDED TO DATA]

Q110. Are you:

1 Male
2 Female

Q115. Please enter your zip code:

[NUMERICAL BOX, RANGE 00000-99999][FORCE 5 DIGITS]

Q116. For each of the following occupations, please indicate if you, or any close friend or relative of yours, is currently employed or used to work in any of them. (Select all that apply)

[ACCEPT MULTIPLE ANSWERS]

1 Advertising **[SOFT TERMINATE]**
2 Airlines
3 Automotive Dealership **[SOFT TERMINATE]**
4 Automotive Manufacturer **[SOFT TERMINATE]**
5 Banking
6 Hotel Trade
7 Insurance
8 Market Research **[SOFT TERMINATE]**
9 Press, Radio, TV, Journalism **[SOFT TERMINATE]**
10 Supplier to the Automotive Industry **[SOFT TERMINATE]**
11 None of the above **[HOLD][DO NOT ALLOW CONFLICTING ANSWERS]**

Q120. When do you plan to purchase/lease your next new (not used) vehicle?

1 within the next 1-6 months
2 within the next 7-12 months
3 within the next 1 to 2 years
4 within the next 2 to 3 years
5 within the next 3 to 4 years
6 in more than 4 years **[SOFT TERMINATE AND SKIP TO Q135]**
7 I do not plan to purchase/lease a new vehicle **[SOFT TERMINATE AND SKIP TO Q135]**

Q125. What <u>types</u> of vehicles will you consider for your next new vehicle? (Please select all that apply)

[ACCEPT MULTIPLE RESPONSES]

1 Two Door Car (Coupe)
2 Four Door Car (Sedan)
3 Sports Car
4 Station Wagon
5 Compact Pickup Truck
6 Full-size Pickup Truck
7 Minivan
8 Full-size Van
9 Small Sport Utility Vehicle
10 Midsize Sport Utility Vehicle
11 Large Sport Utility Vehicle
12 Other (Please Specify) **[SPECIFY]**
13 None of the above **[DO NOT ALLOW CONFLICTING ANSWERS]**

[SOFT TERMINATE IF Q125<>1 OR 2]

[ASK IF Q125=1 OR 2]

Q130. Which of the following vehicle types will you consider for your next new vehicle? (Please select all that apply)

[ACCEPT MULTIPLE ANSWERS]

1 Micro Car (e.g., Smart fortwo, Chevrolet Spark, Mitsubishi i)
2 Small Car (e.g., Ford Fiesta, Chevrolet Sonic, Honda Fit)
3 Compact Car (e.g., Honda Civic, Hyundai Elantra, Mazda 3)
4 Mid-size Car (e.g., Honda Accord, Nissan Altima, Chevrolet Malibu)
5 Full-size Car (e.g., Chrysler 300, Nissan Maxima)
6 Luxury Car (e.g., Audi A6, Cadillac CTS)

[SOFT TERMINATE IF Q130<>1-5]

[MEDIA EXPOSURE/USE]

Q135. On average, how much time do you spend per week using the following Internet sites?

_1 Facebook **[NUMERICAL BOX, RANGE 000-280]** hours
_2 Twitter **[NUMERICAL BOX, RANGE 000-280]** hours
_3 YouTube **[NUMERICAL BOX, RANGE 000-280]** hours
_4 Other social network sites (e.g., LinkedIn, Google+) **[NUMERICAL BOX, RANGE 000-280]** hours
_5 Google search **[NUMERICAL BOX, RANGE 000-280]** hours
_6 Other search engines (e.g., Bing, Yahoo!) **[NUMERICAL BOX, RANGE 000-280]** hours

[TERMINATE IF Q135_1=0]
[TERMINATE ALL SOFT TERMS HERE]

[SECTION 200: DOWNLOADS]

[CHECK BROWSER AND FLAG AS CHROME OR OTHER]
[IF OTHER, SHOW Q205]
[IF CHROME, SKIP TO Q205a]

Q205. In order to participate in this survey you will need Google Chrome (an Internet browser offered by Google) and a simple browser extension that will add capabilities to Chrome. This extension will allow us to show you slightly modified versions of the web pages you will view for this research in order to get your feedback on them. Google Chrome is a trusted, leading web-browser and the extension is completely safe and secure. Once the survey has been completed, you may keep the Google Chrome browser and the extension, or, if you prefer, you may uninstall the Chrome browser and/or the extension with the instructions that will be provided. The entire install and uninstall process will take approximately 5 minutes.

You are not currently using Chrome. Do you have Chrome installed on the computer you are currently using?

1 Yes **[SKIP TO Q215]**
2 No, but I can/will download and install it **[SKIP TO Q210]**
3 No, and I cannot/will not download and install it **[TERMINATE]**

[IF CHROME, ASK Q205a]

Q205a. In order to participate in this survey you will need a simple browser extension that will add capabilities to Google Chrome. This extension will allow us to show you slightly modified versions of the web pages you will view for this research in order to get your feedback on them. The extension is completely safe and secure. Once the survey has been completed, you may keep the Google Chrome extension, or, if you prefer, you may uninstall it with the instructions that will be provided. The entire install and uninstall process will take approximately 1-2 minutes.

Are you willing/able to download this Google Chrome extension (easy to follow instructions will be provided)?

1 Yes **[SKIP TO Q215]**
2 No, I cannot install it on the computer I am using **[SKIP TO TERM SCREEN]**
3 No, I am not interested **[SKIP TO TERM SCREEN]**

I210. You have indicated that you do not have Google Chrome installed on your computer. Please follow the steps below to download and install Google Chrome.

1. Click on the following link to navigate to the download site: https://www.google.com/chrome
2. Click on the large "Download Google Chrome" button.
3. A pop-up box will appear. Uncheck the "Set Google Chrome as my default browser" option. This will ensure your favorite browser remains your default.
4. Click the large button that says "Accept and Install."
5. Google Chrome may download and install itself. If it does not automatically start, a pop-up box will appear. Click "Save File."
6. Chrome Setup will download. Open the setup file by double-clicking on the file.
7. A pop-up box will appear. Click "Run."
8. Chrome installation will begin.

That's it! Once you have successfully downloaded and installed Chrome, click next the arrow button below to continue.

If you need more detailed instructions (including pictures) please click **here**. **[LINK TO CHROME_DETAILED]**

Q213. Were you able to download Google Chrome?

1 Yes
2 No **[TERMINATE]**

I215. You will need to install a simple Google Chrome extension in order to participate in this survey. This is a very quick and easy process. Please follow the steps below:

Open Google Chrome (if it is not already open).

1. Copy and paste (or type in) the following link into your Google Chrome address bar and click enter: http://dl.dropbox.com/u/1569056/CRX.crx
2. A pop-up box may appear at the bottom of your browser. Click Continue.
3. A dialogue box titled "Confirm New Extension" will appear that says "Add Survey Media Extension"? Click Add.

That's it! The extension is now installed.

If you need more detailed instructions (including pictures) please click **here**. **[LINK TO EXT_DETAILED]**

Click the ARROW below to continue.

Q217. Were you able to download the extension?

1 Yes
2 No **[TERMINATE]**

I220. Okay! You now have Google Chrome open and the extension installed. At this point in the survey we are going to ask you to switch browsers to Google Chrome (NOTE: If you are already viewing this page from Google Chrome, please skip the steps below and click the arrow to proceed).

1. Please copy and paste the following link into a new Google Chrome window: **[INSERT SURVEY LINK]**
2. Once you have the link open in Chrome, please close or minimize this window and resume the survey with Chrome. You no longer need to have this page open.

Note: When you open the link above in Chrome, it will first take you to the survey intro screen. Click the arrow to proceed and you will be skipped ahead to the appropriate section of the survey.

[SHOW ON SECOND PASS OF I220]

I220. Welcome back! At this point you should be in the Google Chrome browser and have the extension installed. Thank you for completing this process. Please click next to continue.

If you do not see an arrow button, you are not using the Chrome Browser. You may only complete the rest of this survey using the Chrome Browser.

[VERIFY CHROME AND EXTENSION ARE BEING USED. PASS NEEDED INFORMATION TO MIT SERVER. IF YES, SKIP TO Q225. IF NOT, SHOW I221]

I221. Our system indicates you are not using Google Chrome and/or the browser extension. Please install Chrome + the extension and switch to the Chrome browser if you have not already (using the steps below).

[SHOW CHROME DETAILED STEPS]
[VERIFY CHROME AND EXTENSION ARE BEING USED. IF YES, SHOW Q225. IF NOT, SHOW I221 AGAIN]

Q225. In this survey, we will ask you to review four different types of media.

Before continuing with the survey, we'd like to confirm that you are able to view videos so you can best provide insight! Please be sure to have your speakers turned on.

<u>NOTE: It may take a few seconds for the video to load – please be patient.</u>

[RED TEXT] You will only have one opportunity to answer this question.

[INSERT YouTube clip]

Were you able to see the video clip?

1 Yes
2 No **[TERMINATE]**

Q230. To ensure your settings are allowing you to appropriately view the video clips, can you please tell us what you saw in the clip you just viewed?

1 Ball bouncing **[TERMINATE]**
2 Lions walking towards hyenas
3 Car driving down curved road **[TERMINATE]**
4 Dog chasing a cat **[TERMINATE]**

[SECTION 300: PRE STIMULI MEASURES]

[PRODUCT INVENTORY AND PRODUCT USE]

Q300. Please tell us about the vehicle(s) you have in your household. <u>Start by entering the vehicle you drive most often</u>, and then click ARROW to enter additional vehicles.

<u>Note</u>: Not all makes and models will appear. If your vehicle is not listed, please choose <I>"Other"</I> in the "Make" drop down box. DO NOT substitute another model.

_1 Make **[DROPDOWN BOX WITH MAKES FROM MAKE MODEL LIST 1]**

_2 Model **[DROPDOWN BOX WITH MODELS FROM MAKE MODEL LIST 1]**

_3 Model year **[DROPDOWN BOX WITH 1="2012", 2="2011" 3="2010", 4="2009", 5="2008", 6="2007", 7="2006", 8="2005", 9="2004", 10="2003", 11="2002" 12="2001 or older"] [NOTE RECORDS YEAR – NOT NUMBER]**

_4 New/used **[DROPDOWN BOX WITH 1="Purchased New", 2="Leased New", 3= "Used"]**

_5 Year vehicle was purchased/leased **[DROPDOWN BOX WITH 1="2012", 2="2011" 3="2010", 4="2009", 5="2008", 6="2007", 7="2006", 8="2005", 9="2004", 10="2003", 11="2002" 12="2001 or earlier"] [NOTE RECORDS YEAR – NOT NUMBER]**

_6 Average number of miles driven each year **[NUMERICAL BOX, RANGE 000000-999999]** miles

_7 Do you have any other vehicles in your household? **[DROPDOWN BOX WITH 1= "Yes", 2= "No"] [ONLY SHOW ON VEHICLES 1-2][ALLOW UP TO 3 VEHICLES][ON VEHICLES 2-3, QUESTION TEXT SHOULD READ "Please tell us about another vehicle in your household."]**

[ALLOW ESCAPE BOX AT BOTTOM OF VEHICLE 1 PAGE "I do not have any vehicles in my household."] [DO NOT ALLOW CONFLICTING ANSWERS]

[ASK IF MORE THAN ONE VEHICLE ENTERED IN Q300]
[AUTO FILL WITH VEHICLE ENTERED IN Q300 IF ONLY ONE VEHICLE IN Q300]

Q305. Which of your household's current vehicles are you likely to replace next?

1 **[INSERT Q300 VEHICLE 1 MY, MAKE, MODEL]**
2 **[INSERT Q300 VEHICLE 2 MY, MAKE, MODEL]**
3 **[INSERT Q300 VEHICLE 3 MY, MAKE, MODEL]**
4 Other (please specify) **[SPECIFY][ONLY SHOW IF THREE VEHICLES ARE ENTERED]**

Q310. Which of the following information sources do you/would you use while shopping for a new vehicle? (Select all that apply)

[ACCEPT MULTIPLE ANSWERS]
[RANDOMIZE]

1 Family/friend/word of mouth
2 Magazine advertisements
3 Automotive magazine reviews
4 Newspaper advertisements
5 Newspaper reviews
6 Consumer guides (e.g., Consumer Reports)
7 TV advertisements
8 Radio advertisements
9 Outdoor advertisements
10 Salesperson at the dealership
11 Dealer's/manufacturer's brochures
12 Dealer's/manufacturer's Web sites
13 Third-party Web sites (e.g., Edmunds.com)
14 E-mail from dealer/manufacturer
15 Direct mail from the dealer/manufacturer
16 Auto shows
17 Dealer/manufacturer sponsored event
18 Automotive blog
19 Facebook
20 Twitter
21 Online videos (e.g., YouTube)
22 None of these **[HOLD][DO NOT ALLOW CONFLICTING ANSWERS]**

[MEDIA EXPOSURE/USE]

Q315. On average, how much time do you spend per week doing the following?

[RANDOMIZE]

_1 Watching television **[NUMERICAL BOX, RANGE 000-280]** hours
_2 Listening to the radio **[NUMERICAL BOX, RANGE 000-280]** hours
_3 Using a mobile phone **[NUMERICAL BOX, RANGE 000-280]** hours
_4 Reading newspaper(s) **[NUMERICAL BOX, RANGE 000-280]** hours
_5 Reading magazine(s) **[NUMERICAL BOX, RANGE 000-280]** hours
_6 Using a tablet (e.g., iPad) **[NUMERICAL BOX, RANGE 000-280]** hours

---

Q320. How familiar are you with each of the following automotive brands?

[7 POINT SCALE WHERE 1="Not at all familiar", 3="Somewhat unfamiliar", 4="Neither familiar nor unfamiliar", 5="Somewhat familiar", 7="Very familiar"]

[RANDOMIZE]

_1 Chevrolet
_2 Dodge
_3 Honda
_4 Mazda
_5 Ford
_6 Toyota
_7 Kia
_8 Nissan
_9 Volkswagen
_10 Hyundai

[CONSIDERATION - BRAND]

Q321. Thinking about your next new vehicle, what is the likelihood that you would consider each of the following automotive brands?

[10 POINT SCALE WHERE 1="10% or less" 2="20%", 3="30%", 4="40%", 5="50%", 6="60%", 7="70%", 8="80%", 9="90%", 10="100%"]

[RANDOMIZE]

_1 Chevrolet
_2 Dodge
_3 Honda
_4 Mazda
_5 Ford
_6 Toyota
_7 Kia
_8 Nissan
_9 Volkswagen
_10 Hyundai

Q325. If you had to replace your vehicle tomorrow, please tell us which new two and/or four door cars(s) you would consider. Use the drop down list(s) to select the <u>car(s)</u> you would consider (up to 5 cars) starting with the vehicle you would consider <u>most</u>. Please list all the two-to-four door cars you would possibly consider (up to 5), even if you would only be somewhat likely to consider them.

_1 Car 1 (Highest Preference) **[DROPDOWN BOX OF ONLY COUPES AND SEDANS][FORCE]**
_2 Car 2 **[DROPDOWN BOX OF ONLY COUPES AND SEDANS][DO NOT FORCE]**
_3 Car 3 **[DROPDOWN BOX OF ONLY COUPES AND SEDANS][DO NOT FORCE]**
_4 Car 4 **[DROPDOWN BOX OF ONLY COUPES AND SEDANS][DO NOT FORCE]**
_5 Car 5 **[DROPDOWN BOX OF ONLY COUPES AND SEDANS][DO NOT FORCE]**

[VEHICLE CAN ONLY BE SELECTED ONCE: _1<>_2<>_3<>_4<>_5]

[PULL IN VEHICLES FROM Q325]

Q329. Thinking about the cars that you would consider for your next new vehicle (listed below), what is the likelihood that you would consider each?

[10 POINT SCALE WHERE 1="10% or less" 2="20%", 3="30%", 4="40%", 5="50%", 6="60%", 7="70%", 8="80%", 9="90%", 10="100%"]

_1 **[INSERT Q325_1]**
_2 **[INSERT Q325_2]**
_3 **[INSERT Q325_3]**
_4 **[INSERT Q325_4]**
_5 **[INSERT Q325_5]**

[DETERMINE WHICH OF _1-_5 IS RATED HIGHEST. ASSIGN SEGMENT (QUOTA 2) BASED ON HIGHEST _1-_5. IF TIE, RANDOMLY ASSIGN TO ONE OF THE TIED SEGMENTS.]

[FLAG AS STIMULI 1, 2, or 3]

IF HIGHEST 1-5 FLAGGED HERE (CAN BE MULTIPLE) <>Q325_1, FLAG AS BAD DATA.

[PULL IN VEHICLES FROM Q325]
[IF ONLY ONE VEHICLE FOR Q325, ASSIGN 100 POINTS AND SKIP]

Q330. Thinking about the vehicles that you would consider for your next new vehicle (listed below), how much would you prefer to purchase each vehicle?

Please assign a total of 100 points across the vehicles by typing a number into the box beside each vehicle. Assign more points to the vehicle(s) that you prefer most and fewer points to the vehicle(s) that you prefer least. Allocate the points as you would like, but remember that the total must equal 100 points.

_1 **[INSERT Q325_1] [NUMERICAL BOX][ALLOW 3 DIGITS]**
_2 **[INSERT Q325_2] [NUMERICAL BOX][ALLOW 3 DIGITS]**
_3 **[INSERT Q325_3] [NUMERICAL BOX][ALLOW 3 DIGITS]**
_4 **[INSERT Q325_4] [NUMERICAL BOX][ALLOW 3 DIGITS]**
_5 **[INSERT Q325_5] [NUMERICAL BOX][ALLOW 3 DIGITS]**

[IF HIGHEST 1-5 HERE (CAN BE MULTIPLE) <>Q325_1, FLAG AS BAD DATA.]

Total = **[INSERT RUNNING TOTAL]**
(Please remember, the total of your assigned points must equal 100)

I339. We are now going to ask you about three specific vehicle brands (one at a time). These may or may not be brands you would consider for your next purchase.

Click the ARROW below to continue.

[REPEAT Q340 FOR Q320_1 AND THE TWO OTHER BRANDS WITH THE GREATEST FAMILIARITY][RANDOMIZE ORDER OF BRANDS][IF THERE IS A TIE IN TOP BRANDS, RANDOMLY SELECT FROM THOSE BRANDS]

Q340. Please tell us how much you agree or disagree with the following statements as it pertains to
[INSERT BRAND].

[7 POINT SCALE WHERE 1="Strongly Disagree", 3="Somewhat Disagree", 4="Neither Agree Nor Disagree", 5="Somewhat Agree", AND 7="Strongly Agree"]
[RANDOMIZE]

_1 The quality of this brand is very high
_2 I need lots more information about this brand before I'd buy it
_3 I know I can count on this brand being there in the future
_4 My overall feeling about the brand is favorable
_5 This brand delivers what it promises
_6 This brand has a name you can trust

[PRODUCT ATTRIBUTES]

Q345. Please tell us how important each of the following attributes are to you when purchasing or leasing a vehicle.
[7 POINT SCALE WHERE 1="Not At All Important", 3="Not Very Important", 4="Neutral", 5="Somewhat Important", AND 7="Very Important"]
[RANDOMIZE]

_1 Dependable
_2 Quality materials/finish
_3 Good value for the money
_4 Attractive styling
_5 Fuel efficient
_6 Responsive handling
_7 Advanced features
_8 Safe
_9 Fun to drive
_10 Exciting
_11 Distinctive
_12 Innovative
_13 Environmentally friendly

[REPEAT Q350 FOR SAME BRANDS AS SHOWN IN Q340]

Q350. Please indicate how well each of the following attributes describes **[INSERT BRAND]**.

[7 POINT SCALE WHERE 1="Does Not At All Describe", 3="Does Not Describe Very Well", 4="Neutral", 5="Describes Somewhat well", AND 7="Completely Describes"]
[RANDOMIZE]

_1 Dependable
_2 Quality materials/finish
_3 Good value for the money
_4 Attractive styling
_5 Fuel efficient
_6 Responsive handling
_7 Advanced features
_8 Safe
_9 Fun to drive
_10 Exciting
_11 Distinctive
_12 Innovative
_13 Environmentally friendly

[SECTION 400: STIMULI PRESENTATION]

I400. You are now going to be shown four different media. You will see all four media and then be asked questions about each. Please note that the media site will look slightly different than typical AIOC surveys and that it will direct you to external sites (e.g., Edmunds.com, Facebook.com).

Click the ARROW below to continue to the media site. **[DIRECTS TO MIT SERVER]**

[Pass the following information to MIT URL:
- **HTTP post**
- **Unique ID of the user**
- **Car segment]**

Welcome to the media website!

Here, you will view and interact with several types of media. When you are finished, you will be directed back to the main survey to answer some additional questions.

Are you ready to begin? Great! Click the arrow to get started!

Media Exercise - Search

Instructions

After clicking the link below, you'll be presented with a popular internet search engine. Please take a few minutes to research the cars that you indicated you would consider purchasing, then return and click the arrow below to continue.

Click here to visit the search engine.

Media Exercise - TV Clip

Instructions

After clicking the link below, you'll be presented with a TV playing a TV show. Please watch the 2-minute segment, then return and click the arrow below to continue.

Click here to view the TV clip.

Media Exercise - Facebook

Instructions

After clicking the link below, you'll be presented with Facebook.com. Please log in and browse Facebook for at least 2 minutes (but not much longer) and use the site as you normally would, then return and click the arrow below to continue.

Click here to visit Facebook.

Media Exercise - Automotive Website

Instructions

After clicking the link below, you'll be presented with a popular automotive web site. Please spend at least 2 minutes (but not much longer) researching the car(s) that you indicated you would consider purchasing, then return and click the arrow below to continue.

Click here to visit the automotive website.

Thanks for completing the media exercises!

Please click the arrow below to return to the survey.

[SEND BACK TO GONGOS]

[MIT TO SEND BACK:
- **ORDER SHOWN**
- **UNIQUE ID**
- **SUCCESSFULLY COMPLETED (TRUE/FALSE)]**

[SECTION 500: POST STIMULI MEASURES]

I519. Welcome back! Some of the next few questions may look similar to those you have previously answered. We thank you in advance for thoughtfully considering and answering each question.

Click the ARROW below to continue.

[AWARENESS]

Q520. How familiar are you with each of the following automotive brands?

[7 POINT SCALE WHERE 1="Not at all familiar", 3="Somewhat unfamiliar", 4="Neither familiar nor unfamiliar", 5="Somewhat familiar", 7="Very familiar"]

[RANDOMIZE]

_1 Chevrolet
_2 Dodge
_3 Honda
_4 Mazda
_5 Ford
_6 Toyota
_7 Kia
_8 Nissan
_9 Volkswagen
_10 Hyundai

[CONSIDERATION - BRAND]

Q521. Thinking about your next new vehicle, what is the likelihood that you would consider each of the following automotive brands?

[10 POINT SCALE WHERE 1="10% or less" 2="20%", 3="30%", 4="40%", 5="50%", 6="60%", 7="70%", 8="80%", 9="90%", 10="100%"]

[RANDOMIZE]

_1 Chevrolet
_2 Dodge
_3 Honda
_4 Mazda
_5 Ford
_6 Toyota
_7 Kia
_8 Nissan
_9 Volkswagen
_10 Hyundai

[CONSIDERATION]

Q525. If you had to replace your vehicle tomorrow, please tell us which new two and/or four door cars(s) you would consider. Use the drop down list(s) to select the <u>car(s)</u> you would consider (up to 5 cars) starting with the vehicle you would consider <u>most</u>. Please list all the two-to-four door cars you would possibly consider (up to 5), even if you would only be somewhat likely to consider them.

_1 Car 1 (Highest Preference) **[DROPDOWN BOX OF ONLY COUPES AND SEDANS][FORCE]**
_2 Car 2 **[DROPDOWN BOX OF ONLY COUPES AND SEDANS][DO NOT FORCE]**
_3 Car 3 **[DROPDOWN BOX OF ONLY COUPES AND SEDANS][DO NOT FORCE]**
_4 Car 4 **[DROPDOWN BOX OF ONLY COUPES AND SEDANS][DO NOT FORCE]**
_5 Car 5 **[DROPDOWN BOX OF ONLY COUPES AND SEDANS][DO NOT FORCE]**

[VEHICLE CAN ONLY BE SELECTED ONCE: _1<>_2<>_3<>_4<>_5]

[PROBABILITY OF CONSIDERATION]

[PULL IN VEHICLES FROM Q525 AND 325. SHOW EACH VEHICLE ONLY ONCE IF SELECTED IN BOTH Q325 AND 525.]

Q529. Thinking about the cars that you would consider for your next vehicle purchase (listed below), what is the likelihood that you would consider each?

Note: The list below includes all the vehicles you previously indicated you would consider.

[10 POINT SCALE WHERE 1="10% or less" 2="20%", 3="30%", 4="40%", 5="50%", 6="60%", 7="70%", 8="80%", 9="90%", 10="100%"]

_1 **[INSERT Q325_1]**
_2 **[INSERT Q325_2]**
_3 **[INSERT Q325_3]**
_4 **[INSERT Q325_4]**
_5 **[INSERT Q325_5]**
_6 **[INSERT Q525_1]**
_7 **[INSERT Q525_2]**
_8 **[INSERT Q525_3]**
_9 **[INSERT Q525_4]**
_10 **[INSERT Q525_5]**

[PULL IN VEHICLES FROM Q525 AND 325. SHOW EACH VEHICLE ONLY ONCE IF SELECTED IN BOTH Q325 AND 525.]
[IF ONLY ONE VEHICLE FOR Q525/Q325, ASSIGN 100 POINTS AND SKIP]

Q530. Thinking about the vehicles that you would consider for your next vehicle purchase (listed below), how much would you prefer to purchase each vehicle?

Note: The list below includes all the vehicles you previously indicated you would consider.

Please assign a total of 100 points across the vehicles by typing a number into the box beside each vehicle. Assign more points to the vehicle(s) that you prefer most and fewer points to the vehicle(s) that you prefer least. Allocate the points as you would like, but remember that the total must equal 100 points.

_1 **[INSERT Q325_1] [NUMERICAL BOX][ALLOW 3 DIGITS]**
_2 **[INSERT Q325_2] [NUMERICAL BOX][ALLOW 3 DIGITS]**
_3 **[INSERT Q325_3] [NUMERICAL BOX][ALLOW 3 DIGITS]**
_4 **[INSERT Q325_4] [NUMERICAL BOX][ALLOW 3 DIGITS]**
_5 **[INSERT Q325_5] [NUMERICAL BOX][ALLOW 3 DIGITS]**
_6 **[INSERT Q525_1] [NUMERICAL BOX][ALLOW 3 DIGITS]**
_7 **[INSERT Q525_2] [NUMERICAL BOX][ALLOW 3 DIGITS]**
_8 **[INSERT Q525_3] [NUMERICAL BOX][ALLOW 3 DIGITS]**
_9 **[INSERT Q525_4] [NUMERICAL BOX][ALLOW 3 DIGITS]**
_10 **[INSERT Q525_5] [NUMERICAL BOX][ALLOW 3 DIGITS]**

Total = **[INSERT RUNNING TOTAL]**
(Please remember, the total of your assigned points must equal 100)

I539. We are now going to ask you about three specific vehicle brands (one at a time). These may or may not be brands you would consider for your next purchase.

Click the ARROW below to continue.

[REPEAT Q540 SAME BRANDS SHOWN IN Q340]

Q540. Please tell us how much you agree or disagree with the following statements as it pertains to **[INSERT BRAND]**.

[7 POINT SCALE WHERE 1="Strongly Disagree", 3="Somewhat Disagree", 4="Neither Agree Nor Disagree", 5="Somewhat Agree", AND 7="Strongly Agree"]
[RANDOMIZE]

_1 The quality of this brand is very high
_2 I need lots more information about this brand before I'd buy it
_3 I know I can count on this brand being there in the future
_4 My overall feeling about the brand is favorable
_5 This brand delivers what it promises
_6 This brand has a name you can trust

[REPEAT Q550 FOR SAME BRANDS AS SHOWN IN Q340]

Q550. Please indicate how well each for the following attributes describes **[INSERT BRAND]**.

[7 POINT SCALE WHERE 1="Does Not At All Describe", 3="Does Not Describe Very Well", 4="Neutral", 5="Describes Somewhat well", AND 7="Completely Describes"]
[RANDOMIZE]

_1 Dependable
_2 Quality materials/finish
_3 Good value for the money
_4 Attractive styling
_5 Fuel efficient
_6 Responsive handling
_7 Advanced features
_8 Safe
_9 Fun to drive
_10 Exciting
_11 Distinctive
_12 Innovative
_13 Environmentally friendly

[SECTION 600: STIMULI QUESTIONS]

[SHOW QUESTION BLOCKS IN ORDER OF STIMULI]
[TV – I600-Q630]
[SEARCH – I635-Q670]
[BANNERS – I675-Q697]
[FACEBOOK – I900-Q915]

I600. This next set of questions is about the television clip you viewed.

Click the ARROW below to continue.

[AD OBSERVED]

Q602. Were you able to see and hear the television clip clearly?

1 Yes
2 No **[SKIP Q605-Q630] [FLAG AS BAD DATA BUT DO NOT TERMINATE]**

Q605. Did you see the car ad that appeared during the television clip?

1 Yes
2 No

[SKIP IF Q605=2]

Q610. What is the make and model name of the vehicle being advertised in the television clip?

[RANDOMIZE]

1 Chevrolet Sonic
2 Chevrolet Cruze
3 Chevrolet Malibu
4 Ford Fiesta
5 Ford Fusion
6 Ford Taurus
7 Mazda 3
8 Mazda 6
9 Chrysler 300
10 Chrysler 200
11 Dodge Avenger
12 Honda Civic
13 Honda Accord
14 Honda Fit
15 Toyota Corolla
16 Toyota Camry
17 Nissan Altima
18 I'm not sure **[HOLD]**

[AD ATTITUDE]

Q615. Please select the word that best completes this statement:

"My overall reaction to this television ad is…"

[RANDOMIZE]
[2 POINT SEMANTIC DIFFERNTIAL]

_1 favorable **[VS.]** unfavorable
_2 good **[VS.]** bad
_3 pleasant **[VS.]** unpleasant

[BRAND EXPOSURE]

[SKIP IF Q605=2]

Q620. Have you recently seen other communications related to the vehicle in the television clip?

1 Yes
2 No
3 Not sure

[SKIP IF Q605=2]

Q625. Have you recently searched for information online about the vehicle in the television clip?

1 Yes
2 No

Q630. Listed below are a number of different statements that people like you have made about ads. We'd like to know how you feel after watching the television ad.

Please indicate how strongly you agree or disagree with each statement using the scale below.

[7 POINT SCALE WHERE 1="Strongly Disagree" AND 7= "Strongly Agree"]

[RANDOMIZE STATEMENTS]
_1 This television ad made me feel that a Chevrolet **[INSERT MODEL BASED ON STIMULI FLAG]** is right for me
_2 I learned something new and helpful about the **[INSERT MODEL BASED ON STIMULI FLAG]**
_3 This television ad will attract my attention
_4 This television ad is original
_5 I will keep on watching this television ad
_6 This television ad made me want to find out more information about the **[INSERT MODEL BASED ON STIMULI FLAG]**

I635. This next set of questions is about the Google search you performed.

Click the ARROW below to continue.

Q640. Did you visit Google and search for auto information?

1 Yes
2 No **[SKIP Q650-Q655][FLAG AS BAD DATA BUT DO NOT TERMINATE]**

Q650. Did you click on the Chevrolet sponsored link?

1 Yes
2 No

Q655. What is the make and model name of the vehicle being advertised in the Chevrolet sponsored link?

[RANDOMIZE]

1 Chevrolet Sonic
2 Chevrolet Cruze
3 Chevrolet Malibu
4 Ford Fiesta
5 Ford Fusion
6 Ford Taurus
7 Mazda 3
8 Mazda 6
9 Chrysler 300
10 Chrysler 200
11 Dodge Avenger
12 Honda Civic
13 Honda Accord
14 Honda Fit
15 Toyota Corolla
16 Toyota Camry
17 Nissan Altima
18 I'm not sure [HOLD]

I675. This next set of questions is about your visit to Edmunds.com.

Click the ARROW below to continue.

Q677. Did you visit Edmunds.com?

1 Yes
2 No [SKIP Q687-Q697][FLAG AS BAD DATA BUT DO NOT TERMINATE]

Q687. What is the make and model name of the vehicle being advertised in the banner ad?

[RANDOMIZE]

1 Chevrolet Sonic
2 Chevrolet Cruze
3 Chevrolet Malibu
4 Ford Fiesta
5 Ford Fusion
6 Ford Taurus
7 Mazda 3
8 Mazda 6
9 Chrysler 300
10 Chrysler 200
11 Dodge Avenger
12 Honda Civic
13 Honda Accord
14 Honda Fit
15 Toyota Corolla
16 Toyota Camry
17 Nissan Altima
18 I'm not sure **[HOLD]**

Q695. Have you recently searched for information online about the vehicle in the banner ad?

1 Yes
2 No

Q697. Listed below are a number of different statements that people like you have made about banner ads. We'd like to know how you feel after viewing this banner ad.

Please indicate how strongly you agree or disagree with each statement using the scale below.

[7 POINT SCALE WHERE 1="Strongly Disagree" AND 7= "Strongly Agree"]

[RANDOMIZE STATEMENTS]
_1 This banner ad made me feel that a Chevrolet **[INSERT MODEL BASED ON STIMULI FLAG]** is right for me
_2 I learned something new and helpful about the Chevrolet **[INSERT MODEL BASED ON STIMULI FLAG]**
_3 This banner ad will attract my attention
_4 This banner ad is original
_5 This banner ad made me want to find out more information about the Chevrolet **[INSERT MODEL BASED ON STIMULI FLAG]**

I900. This next set of questions is about your visit to Facebook.

Click the ARROW below to continue.

Q905. Did you visit Facebook.com?

1 Yes
2 No **[SKIP Q910-Q915][FLAG AS BAD DATA BUT DO NOT TERMINATE]**

Q910. Did you see Chevrolet in your news feed?

1 Yes
2 No

[SKIP IF Q910=2]

Q915. Did you share Chevrolet's post?

1 Yes
2 No

[SECTION 800: CULTURAL QUESTIONS AND ADDITIONAL DEMOGRAPHICS]

I800. You're almost done! The following questions will be used for classification purposes only. All of your responses will remain confidential.

Click the ARROW below to continue.

_____

Q805. Please read each description and think about how much each person is or is not like you. Please use the scale below to indicate how much the person in the description is like you.

[5 POINT SCALE WHERE 1="Not like me", 2="A little like me", 3="Somewhat like me", 4="Like me", AND 5="Very much like me"]
[ADAPT GENDER ACCORDING TO RESPONDENT'S GENDER]
[RANDOMIZE]

_1 Thinking up new ideas and being creative is important to **[him/her]**. **[He/She]** likes to do things in **[his/her]** own original way.
_2 It is important to **[him/her]** to be rich. **[He/She]** wants to have a lot of money and expensive things.
_3 **[He/She]** thinks it is important that every person in the world be treated equally. **[He/She]** believes everyone should have equal opportunities in life.
_4 It's important to **[him/her]** to show **[his/her]** abilities. **[He/She]** wants people to admire what **[he/she]** does.
_5 It is important to **[him/her]** to live in secure surroundings. **[He/She]** avoids anything that might endanger **[his/her]** safety.
_6 **[He/She]** likes surprises and is always looking for new things to do. **[He/She]** thinks it is important to do lots of different things in life.
_7 **[He/She]** believes that people should do what they're told. **[He/She]** thinks people should follow rules at all times, even when no-one is watching.
_8 It is important to **[him/her]** to listen to people who are different from **[him/her]**. Even when **[he/she]** disagrees with them, **[he/she]** still wants to understand them.
_9 It is important to **[him/her]** to be humble and modest. **[He/She]** tries not to draw attention to **[him/her]**self.
_10 Having a good time is important to **[him/her]**. **[He/She]** likes to "spoil" **[him/her]**self.
_11 It is important to **[him/her]** to make **[his/her]** own decisions about what **[he/she]** does. **[He/She]** likes to be free to plan and not depend on others.
_12 It's very important to **[him/her]** to help the people around **[him/her]**. **[He/She]** wants to care for their well-being.
_13 Being very successful is important to **[him/her]**. **[He/She]** hopes people will recognize **[his/her]** achievements.
_14 It is important to **[him/her]** that the government insures **[his/her]** safety against all threats. **[He/She]** wants the state to be strong so it can defend its citizens.
_15 **[He/She]** looks for adventures and likes to take risks. **[He/She]** wants to have an exciting life.
_16 It is important to **[him/her]** always to behave properly. **[He/She]** wants to avoid doing anything people would say is wrong.
_17 It is important to **[him/her]** to get respect from others. **[He/She]** wants people to do what **[he/she]** says.
_18 It is important to **[him/her]** to be loyal to **[his/her]** friends. **[He/She]** wants to devote **[him/her]**self to people close to **[him/her]**.
_19 **[He/She]** strongly believes that people should care for nature. Looking after the environment is important to **[him/her]**.

_20 Tradition is important to **[him/her]**. **[He/She]** tries to follow the customs handed down by **[his/her]** religion or **[his/her]** family.

_21 **[He/She]** seeks every chance **[he/she]** can to have fun. It is important to **[him/her]** to do things that give **[him/her]** pleasure.

Q820. What is the last grade of school you completed?

1 8th grade or less
2 Some high school
3 High school graduate
4 Vocational/trade/technical school
5 Some college
6 College graduate
7 Postgraduate study

Q825. Did you have any trouble understanding the language used in the media examples shown to you?

1 Yes
2 No

Q830. Including <u>yourself</u>, please enter the number of people in your household who are… (Please enter 0 if that age category does not apply to anyone in your household.)

_1 Under 5 years old **[NUMERICAL BOX][ALLOW RESPONSES 0-9]**
_2 5 to 12 years old **[NUMERICAL BOX][ALLOW RESPONSES 0-9]**
_3 13 to 16 years old **[NUMERICAL BOX][ALLOW RESPONSES 0-9]**
_4 17 to 21 years old **[NUMERICAL BOX][ALLOW RESPONSES 0-9]**
_5 Over 21 years old **[NUMERICAL BOX][ALLOW RESPONSES 0-9]**

Q835. Are you employed… (Select one only)

1 Full-time
2 Part-time
3 Retired
4 Self-employed
5 Homemaker/Stay at home parent
6 Student
7 Not employed

Q845. If you have answered all of the questions in this survey honestly, please select "blue" as the answer to this question.

[RANDOMIZE]

1 Red
2 Orange
3 Yellow
4 Green
5 Blue
6 Indigo
7 Violet

[IF Q845<>5, FLAG AS BAD DATA BUT DO NOT TERMINATE]

[THANK YOU, COMPLETION SCREEN]

Those are all of the questions we have. Thank you for your responses!

Please follow the instructions below in order to uninstall Google Chrome and the extension if desired:

Uninstall Chrome Extension:
1. Open Google Chrome (if it is not already open).
2. Right-click the Gongos Research logo in the top right corner.
3. Select "Remove from Chrome."
   [INSERT UNINSTALL.PNG]
4. A dialogue box will appear that says "Remove Survey Media Extension"? Click Remove. That's it! The extension is now uninstalled.

Uninstall Google Chrome (Windows Instructions):
1. Go to Start > All Programs > Google Chrome > Uninstall Google Chrome.
2. A dialogue box will appear that says "Are you sure you want to uninstall Google Chrome?" If you want to delete your user profile information, like your browser preferences, bookmarks, and history, select the "Also delete browser data" checkbox.
3. Click Uninstall. The uninstall process will begin.

Uninstall Google Chrome (Mac OS X Instructions):
1. Go to the folder containing Google Chrome (likely the Applications folder).
2. Drag Google Chrome to the Trash icon in the Dock. You'll need administrative rights if it's installed in your Applications folder. To remove the Google Chrome icon from your Dock, simply drag it out of the Dock with your mouse.

Please click the **ARROW** to return to the **Auto Insight Online Community**.

[TERMINATION SCREEN]

Thank you for trying to participate in this survey. Unfortunately, your answers did not meet the criteria to qualify and participate in this survey.

Please click the ARROW complete the survey.

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