netquest

Behavioral Data 101

How to Implement Behavioral Research

What's inside...

Introduction **Behavioral Data 101**

Quantitative market research relies mainly on survey data. But, all market research surveys have similar limitations. Sometimes, samples of participants may not be representative of the target population under study. On top of that, survey data can easily be skewed by researchers simply asking leading questions or formatting surveys in such a way that can impact how the panelists respond.

In addition to these risks, we cannot always rely on the honesty or accuracy of the respondents' answers to a survey. Often times panelists may choose not to give the whole truth on a survey, feel pressure to respond a certain way, or simply misrecall their responses.

Then the Internet came

The rise of the internet has made market research limitations even more intricate. Assume you want to understand the path to purchase for consumers who buy cars, a realistic market research situation. Now imagine a time when the internet wasn't prominent. In the pre-internet era, the decision making process and path to purchase was much more simple than it is today. This is because there was a lot less information for consumers. They simply had television, radio, newspapers, family, and friends to collect information about what car to buy... Where very few of those mediums had dedicated, in depth information about their purchase options.

Now consider today's current path to purchase, where the consumer is bombarded with information due to technology. When looking to purchase a car, the consumer has limitless information at his hands with the internet. All the while still being bombarded by television, radio, and friends and family. Today's consumer is on sensory overload.

The consumer can simply pull up Google and search for endless, in depth information about car options, from makes to models. He can check Facebook pages for sale by owner options, seek recommendations from an extensive friends list, and be exposed to multiple advertisements catered to his browsing activity. Once he decides on the type of car, he can visit dealership websites to peruse pricing options or see if he can find a good deal on a classified advertisement website such as Craigslist. In the end he simply opens Google Maps and picks the closest dealership because he's exhausted from all his research.

The same consumer receives a market research survey about why he chose the car he did. He doesn't tell you the first person he asked for car buying help was his mother, not his father. He doesn't tell you he used Facebook and Twitter to look for recommendations because he only had the option to select one social channel. Being embarrassed to admit something on a survey is a well-known limit. Surveys that skew the answer because of how they're created is also a common limit.

To add to this though...The majority of his customer journey thoroughly took place online. Now, the consumer can't recall if he used Facebook to look for recommendations first or if he went straight to Google for answers. He can't recall if he clicked on twelve websites before he had a make and model in mind to purchase or if it was twenty websites... Let alone the name of the websites. He does recall that maybe three car ads popped up during his customer journey, but then he thinks: 'Oh wait, maybe it was five advertisements'.

When should we ask, when should we measure

Research has provided evidence that to an extent, asking about online behaviors is ineffective. When respondents were asked about the last 5 websites they visited, just only 1% of a sample from a panel could correctly recall 5 out of 5 websites; 29% of them could not guess a single website.

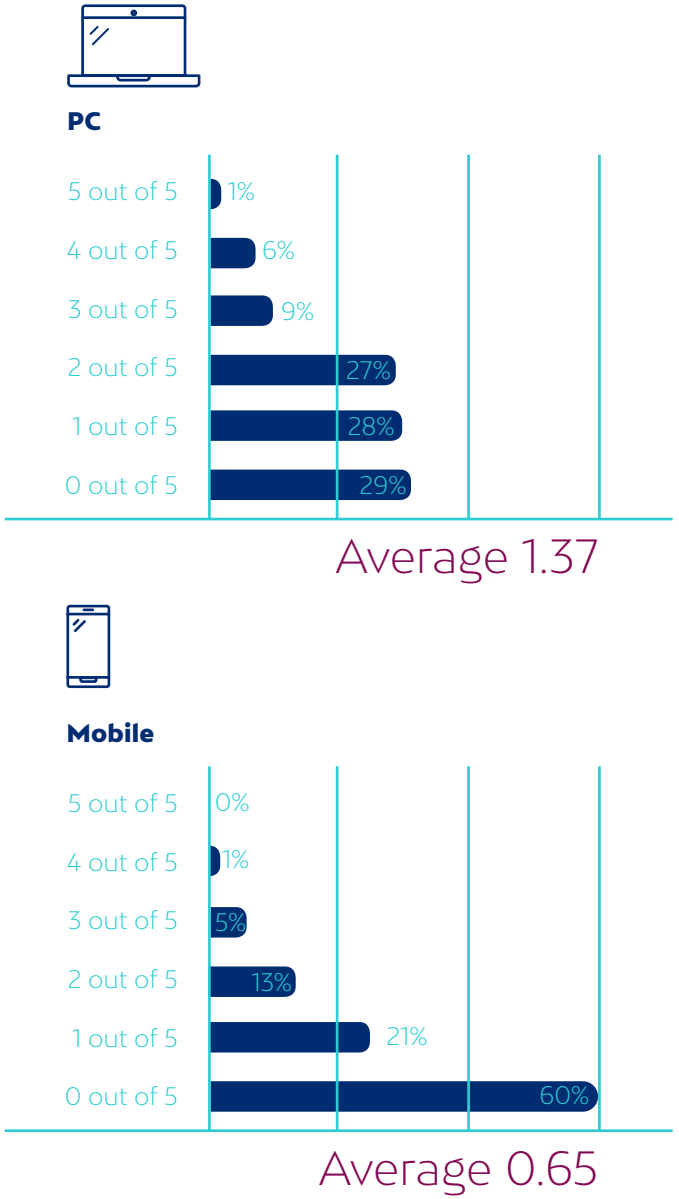
Today's consumers are online and overwhelmed by hundreds of micro-interactions with brands, products and influencers, in a way that they can barely recall. The wide adoption of the mobile internet has worsened this effect: the same experiment mentioned above showed that the ability to recall websites when users were using mobile internet was even worse.

With the majority of the path to purchase being conducted online, surveys simply do not work to solve such research questions. A wise combination of methods, mainly surveys and behavioral data, is much more effective. Utilize surveys to understand what consumers can recall; use behavioral data to understand what consumers actually do.

Behavioral data provides extensive information about what consumers do online. We can uncover the apps our consumers are using, the websites they are visiting and in what order, along with search terms used during their customer journey. Behavioral data is continually evolving to help the market research industry decrease the current research limitations we are struggling with when observing the online consumer. It's time to understand the whole consumer, it's time to utilize behavioral data. Read on to discover behavioral data capabilities. Welcome to the future of market research.

(*) Revilla, M., Ochoa, C., Loewe G., Voorend, R. (2015), "When should we ask, when should we measure? Comparing information from passive and active data collection", ESOMAR CONGRESS 2015, ISBN: 92-831-0283-5.

Recall of last 5 visited websites:



Types of passive data you can collect

Types of passive data you can collect

If surveys do not suffice to understand online behaviors, then what data sources are suitable? The behavior of online consumers can be better understood, analyzed, and quantified with data coming from methods of observation. Such data is known as "passive" behavioral data, because individuals under study do not actively participate in the research or respond to a survey. Rather, the individual goes about their daily activity online, while the researcher collects information on those activities.

What's important to understand is that "passive" does not imply "unauthorized". Any information from individuals should be collected with their explicit consent according to existing market research code of ethics and legal regulations. "Passive" simply means that individuals do not participate actively in the data collection, although they must consent to it.

Site-centric and user-centric

There are two types of methods to collect passive behavioral data online:

- **Site-centric** data is collected from websites and apps visited by consumers.
- **User-centric** data is collected from the consumers' browsing devices while visiting those websites.

Site-centric behavioral data

All websites collect data about their visitors. This is the most basic example of site-centric data. There's no doubt that this form of data is a valuable source of information, but it's limited.

The data from your specific website, such as the number of visits and most popular pages, is of course very important information. But, this data doesn't tell you anything about what visitors do before and after viewing your website.

1st party cookies add more value to this basic information. Thanks to them, websites track visitor sessions: paths that visitors follow across different website pages, including interactions like purchases. Although 1st party cookies draw a much more complete picture of visitors' behaviors, they say nothing about the visitors' profiles (age, gender, etc.) and their behavior outside the website.

To overcome these limitations, 3rd party cookies are frequently used. Cookies can only be read by the same website (domain) that issued the cookie to the user, but if a website includes content from another website (the 3rd party), then this second website can write and read its own cookies to the user. If several websites cooperate with the same 3rd party website, the later can track visitors across websites.

3rd party cookie is the standard technology for ad networks. It is used to infer a basic visitor's profile, to adapt ad content and to retarget ads (ads that follow you across different websites, showing an offering in which you were interested). However, regulatory authorities throughout the world are currently studying how they can lawfully limit using 3rd party cookies to secure the privacy of their citizens.

3rd party cookies are also used for market research purposes. Internet audiences can be measured by allowing a neutral entity to insert 3rd party cookies in all the websites, provided all these websites are willing to cooperate. Cookies can also be used to detect members of an online panel that have been exposed to an online ad, in order to describe the profile of the exposed target population and survey them to ask about their recall.

About cookies...

Cookies are small pieces of data that a website stores on the user's computer while the user is browsing. Cookies can only be read by the same website (domain name) that has stored it, due to security reasons.

Cookies improve the browsing experience by storing user's preferences. They allow the website to know that several consecutive web pages have been visited by the same user. Knowing that, content can be better presented. On top of that, websites can recognize users in future visits, adjusting the contents to their past preferences.

Google Analytics...

Google Analytics is a freemium tool that tracks and reports website traffic. It uses "page tags", a small JavaScript code that websites add to every page; the code counts the number of visits, captures metadata from the visitor's browser and sets/reads a cookie to enrich the basic statistic information.

That's how Google Analytics infers basic visitor profiles (gender, age, region) and browsers characteristics (type of browser, screen size, device). Analytics has become greatly popular; it provides critical information to website owners to optimize their content, site organization and client's acquisition strategies.

User-centric behavioral data

User-centric data is much more sophisticated than site-centric data. A sample of people must accept to install tracking software (interchangeably referred to as a “tracker” or “meter”) in their browsing devices, such as desktops, smartphones and tablets. The meter records visited websites, search terms and app usage for every device. Browsing information is extremely sensible and there are concerns that people may be reluctant to share this information. But, there are two ways to achieve a sample of people to install the tracker.

The first is to be transparent and rewarding: explain to participants the purpose of the metering and to give them something in exchange for sharing their information. The second, which we don’t recommend, is to install a tracker without explicit consent from participants. For instance, including software within another application, such as an antivirus or a search toolbar. In such cases, the meter’s existence is hidden behind the small print of the terms and conditions. There is no need to mention the low ethical standards of the later option.

Although user-centric data collected through a meter may be difficult to collect, it is worth the effort to convince consumers to share their information. This form of data paints a full picture of what consumers are doing online, from web browsing to app usage.

User-centric data does not require cooperation from the websites under study, so information is not limited to one or several websites as it is with site-centric data.

On top of this, if the meter is installed by a sample of people who belong on a survey panel (just as Netquest panels), you are able to combine surveyed data, deeply profiled information and behavioral data to develop deeper insights about your consumer.

Site-centric Vs User-centric behavioral data

	Pros	Cons
Site-centric data	Simple technology (cookies). Great to understand your own users. Low cost.	Partial information. Poor to study competitors. Requires website's cooperation. 3rd party cookies may be forbidden/limited in the future.
User-centric data	Full consumer's picture. Competitor's data available without their cooperation. Extensive browsing information.	Complex technology (meter). Higher cost. Less extensive information about a particular website.

What kind of insights can you get?

What kind of insights can you get?

Online behavioral data offers completely different types of insights from surveys and other declared information. Behavioral data is... real data! It's not skewed by opinions, preferences, or intentions. Behavioral data says nothing by itself, though.

The researcher has to crunch the data and connect the dots.

A successful new source of data

Behavioral data is useful for industries across the board, not strictly just online players; from FMCGs and travel companies to healthcare and leisure. Even for products that are purchased mostly offline (e.g. automotive) the online customer journey is increasingly relevant, so behavioral data can play a role in almost any industry.

Behavioral data has successfully been used to determine the different touchpoints (online and offline) for alcoholic beverage purchases and creating segments on the target audience.

Pernod Ricard (ESOMAR Latam 2017) used behavioral data to build a digital branding strategy to target alcohol consumers with relevant content. As a result, purchase habits increased and as did traffic to the e-commerce platform.

Behavioral data has also been used to predict tendencies in regards to real estate (through analyzing search terms, by reviewing when people stop searching for apartments to rent, and when they start looking to purchase all made available through behavioral data).

Of course, as any type of data, behavioral data must be approached with caution when creating insights. For example, The Center for Disease Control tried to use searches for "flu" to replace doctor surveys. What made sense at first (using search terms as a predictor for the flu and it's location), turned out to be directly influenced by the media coverage on the flu, and therefore not an excellent predictor.

So, behavioral data can generate insights based on actual activity. If combined with a stable panel, and an accurate measuring tool, this type of data can provide unique insights like no other data before it.

Why is this data so valuable? Observing online behavior serves two main purposes: measuring reality and discovering opportunities.

(*) ESOMAR Latam 2017, "Wine, cocktails and beer... and all those in between", Maria Alejandra Velandia and Gabriela Parias, Pernod Ricard.

Measuring reality

The Internet is a changing environment; new websites emerge while others disappear. Measuring what happens in such conditions is challenging. Behavioral data, in its different forms, are the only reasonable way to do so.

Audiences.

Behavioral data can be used to objectively measure the audiences of websites. If user-centric data is used, consumer's behavioral data can be evaluated without cooperation from the websites they visit. If the data comes from an online panel where participants are sampled and profiled, they can also be evaluated per socio-economic groups such as gender, age, social class and regions. Online audiences are the measure of the success for websites, as well as a way to assess their value (as companies), and the potential ad revenue they can produce.

Ad effectiveness / targeted audiences.

It is an endless quest for any marketing department and ad agency: making the most of their budgets. Click-through rates analysis, A|B testing, landing page optimization, there are many disciplines focused on improving the return on investment of the online advertisement.

But, who is the person behind the screen? Behavioral data allows researchers to enhance the usual research process. Instead of analyzing how people interact with the ad and trying to infer who they are, behavioral data allows us to analyze how our target population browses the internet. Questions such as which websites they visit or where they look for information on our product category, can lead to improved targeting, advertising and budget allocating.

Search terms research.

Websites pay special attention to which keywords are used by their users to find them. With this information, companies invest a lot of money to position their websites in the top search engine pages for those keywords.

While it is true that there are tools that help companies to measure which keywords are driving more traffic to their websites, again the information is site-centric and partial. The information is about your keywords and, at best, about popular keywords.

Behavioral data allows us to fully understand how our target population uses search engines; how they get information about product categories, not only to reach a website to make a purchase but also to make a decision on that purchase.

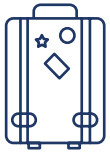
E-commerce measurement.

Behavioral data can also provide e-commerce websites with critical information about their competitors: which competitors attract more visitors, which products they sell, conversion rate, average purchase ticket. This is a completely new area of research that unparallels information provided by retail and consumer panels in the offline world. New initiatives like NETRICA* are offering solutions in this area.

*Netrica offers data on the most important indicators for an ecommerce site. More info at netrica.com.

Discovering opportunities

Behavioral data can be used not only to measure, but to discover insights about consumers. If you are used to working with survey data, we recommend becoming open minded, and embrace this new type of data for what it is: a precise record of online activities across different devices.



Customer journey.

The customer journey spans a variety of touchpoints by which the customer moves from awareness to real interest and purchase. This journey increasingly takes place online, so behavioral data is great to understand consumer's habits and motivations, in order to develop a seamless experience that ensures each step contributes to the overall journey.

Think about a diaper manufacturer. Understanding the online behavior of parents with children under two years old will give them a whole different perspective on their main target. They could know if they were searching for diapers online (or even buying them), if they were comparing different manufacturers, when they started doing it (before the children were born or after), and where are they getting their information from (communities, specialized sites, etc).

You could even go one step beyond, and if stable data is available, research the period beginning six months before the children were born, and follow the parents' online behavior until the children stop using diapers. A stable behavioral panel will give you that opportunity. This might help you know, not only where, but when you should try to influence the parents' decision on the right brand for their children.

These insights may lead the product development and a successful communication campaign.

The why behind the what.

Surveys are frequently used to reveal information about motivations and preferences. Very often, we are interested in information regarding a very specific moment of the customer journey, for instance, the time of purchase. But as we have seen, people have difficulty recalling facts, particularly about online activity.

Behavioral data can be used to (1) detect when people are doing a particular activity (e.g. purchasing a product, visiting a website, checking reviews, etc.) and (2) send them a survey to understand why they were partaking in that activity.

Combining surveys and behavioral data in such way provides insightful information on motivations and preferences, related to specific moments in time, while avoiding memory limitations.

What does behavioral data look like?

What does behavioral data look like?

Behavioral data has little in common with survey data. The amount of data is much larger and its structure is completely different. Dealing with behavioral data files can be challenging if you are used to working only with survey data.

Let's say you decide to take on your first online behavioral research project. For instance, you want to analyze the customer journey of people that have bought at least one airline ticket online in the last 3 months.

What type of data file are you going to receive?

- Row data
- Clickstream files
- Processed data

Data depends on the device

It is important to take into account which data is collected for each device, otherwise you might be making assumptions based on false ground.

For example, if a tracker collects some data points in Android that it does not get from iOS, you must take this into consideration when running your analysis.

What information is collected?

Data capabilities

		Desktop	Android	iOS
Url Tracking	Http traffic	✓	✓	✓
	Https traffic	✓	✓	×
	Incognito browsing	✓	✓	×
App Tracking	App name	-	✓	✓
	App start time	-	✓	✓
	App duration	-	✓	Estimated
	Offline apps	-	✓	×
	In app behavior	-	×	×
Search Terms	Search Terms	✓	✓	×

Metering technologies

Capturing the online activity from a device is a tricky issue. Although a user gives you his consent to share his navigation, browsing devices are designed to protect such information. There are 3 strategies to overcome this difficulty.

Plug-in

By adding a plug-in to the browser, the visited URLs as well as some contents inside the web pages can be captured and sent to a central server.

Pros:

- ✓ Reliable
- ✓ Easy installation.

Cons:

- ✕ Mobile browsers do not accept plug-ins (yet).

VPN

Virtual Private Networks (VPN) are safe connections established over a less secure network (like the internet). Many companies use VPNs to allow their employees to connect to a corporate server through the internet.

A fake VPN can be created to deviate the online traffic of a device, collect the information, and return the traffic to the internet. This process occurs within the device.

Pros:

- ✓ Reliable
- ✓ Easy installation.

Cons:

- ✕ Not available in iOS.

Proxy

For very restrictive devices in terms of security, the internet traffic can be deviated through an external server (proxy). The data is inspected in such server and redirected to the internet.

This is an intrusive solution: if the proxy server is down or running slowly, the internet navigation of the participant would be affected.

Pros:

- ✓ Valid for restrictive devices (iOS).

Cons:

- ✕ Complex set-up.
- ✕ Intrusive.
- ✕ Participant could experience problems.

Raw data

Behavioral data collection is a complex process. The meter collects unstructured data constantly, including a lot of paradata (data about the data); most of the paradata must be combined to produce data that is understandable by humans. Furthermore, collected data differs depending on the device. For example, the technical solution to collect data from Android and iOS devices is different, so the data collected in each case is different as well. As a result, raw data files are illegible in practice.

In order to simplify the analysis, behavioral raw data files are normally pre-processed to produce a clickstream file.

Clickstream files

A clickstream file is a text file (CSV) that contains information on every action made by each individual while using a specific device.

A basic clickstream file will have at least these three elements:

- **ID:** a unique alphanumeric code per individual that allows to relate activities from the same individuals as well as create segments of participants.
- **Action:** Description of the particular online action that the participant made. When working with browsing information, this will most likely be the URL or domain the individual visited. For mobile devices (both smartphones or tablets) information on the apps being used is also included. A piece of specific data might be found in regards to search terms, since there you should find both the search engine, and the search query.
- **Timestamp:** Date and exact time of each action.

Additional data may be included in a clickstream file, such as the active time (an estimation on the duration of each action), device type (desktop, smartphone or tablet), operative system, type of connection (3G / wifi), etc.

Desktop Clickstream

The following figure is an example of desktop clickstream data. It contains, as mentioned earlier, a personal ID, the action that took place (in this case both URL and Domain), the timestamp (date and time), and the active time (seconds).

- **panelist_id**
- **url**
- **domain**
- **used_at**
- **duration**

	A	B	C	D	E
1	**panelist_id**	**url**	**domain**	**used_at**	**duration**
2	b0013a5c32f9782d	123rf.com/stock-photo/	123rf.com	7/9/17 10:18	8
3	b0013a5c32f9782d	123rf.com/stock-photo/	123rf.com	7/9/17 10:19	44
4	3f0bc2975c4d7f29	17track.net/en/track?nums=	17track.net	22/8/17 13:46	10
5	5549771d3cc50c1c	17track.net/en/track?nums=&fc=0	17track.net	13/9/17 23:06	15
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60	63903d15b318f244	adultfriendfinder.com/profile2/?#ql/results/40	adultfriendfinder.co	8/9/17 10:54	30
61	63903d15b318f244	adultfriendfinder.com/p/main.cgi?#main?/	adultfriendfinder.co	14/9/17 11:01	16
62	63903d15b318f244	adultfriendfinder.com/p/mc/cover.cgi?	adultfriendfinder.co	14/9/17 12:41	2

Mobile Clickstream

A mobile clickstream file presents some different types of data for action type. In this case you will have not only the browsing activity (URLs, domains), but the app usage as well.

- **panelist_id**
- **url**
- **domain**
- **app name**
- **used_at**
- **duration**

	A	B	C	D	E	F
1	**panelist_id**	**url**	**domain**	**app_name**	**used_at**	**duration**
2	00088046b0171f4c			Facebook Messenger	15/8/17 7:39	262
3	00088046b0171f4c			Facebook	15/8/17 8:08	186
4	da1357bb60ac04ad	adobe.com	adobe.com		15/8/17 13:42	75
5	00088046b0171f4c			Lucktastic Scratch	15/8/17 19:52	1850
6	00088046b0171f4c			Facebook	15/8/17 21:02	248
7	00088046b0171f4c			Facebook	15/8/17 21:06	150
8	f33585b50274bf24	accuweather.com/	accuweather.com		16/8/17 6:24	0
9	c2568103c90451d7	9gag.com/	9gag.com		16/8/17 6:55	6
10	c2568103c90451d7	9gag.com/	9gag.com		16/8/17 6:55	3
11	c2568103c90451d7	9gag.com/external/cacheable-info	9gag.com		16/8/17 6:55	2
12	c2568103c90451d7	9gag.com/tv/p/aP7v20/degrasse-tyso	9gag.com		16/8/17 6:56	1
13	c2568103c90451d7	9gag.com/tv/p/aP7v20/?ref=desc	9gag.com		16/8/17 6:56	0
14	c2568103c90451d7	9gag.com/external/cacheable-info	9gag.com		16/8/17 6:56	1
15	c2568103c90451d7	9gag.com/external/cacheable-info	9gag.com		16/8/17 6:57	8
16	c2568103c90451d7	9gag.com/	9gag.com		16/8/17 7:16	1
17	c2568103c90451d7	9gag.com/	9gag.com		16/8/17 7:16	1
18	c2568103c90451d7	9gag.com/	9gag.com		16/8/17 7:16	7
19	c2568103c90451d7	9gag.com/tv/p/?ref=mfsidebar	9gag.com		16/8/17 7:17	2
20	c2568103c90451d7	9gag.com/external/cacheable-info	9gag.com		16/8/17 7:17	2
21	3227ad263f4b6c57	adultfriendfinder.com	adultfriendfinder.com		17/8/17 22:01	0
22	3227ad263f4b6c57	adultfriendfinder.com	adultfriendfinder.com		17/8/17 23:41	0
23	33685bdfafcc7057	accuweather.com	accuweather.com		19/8/17 10:49	25
24	450d0f5b53d5af54	aa.com/	aa.com		19/8/17 17:45	5
25	33685bdfafcc7057	accuweather.com	accuweather.com		20/8/17 10:29	32
26	3227ad263f4b6c57	adultfriendfinder.com	adultfriendfinder.com		20/8/17 21:22	0
27	264af10fb644c777	aa.com	aa.com		22/8/17 9:04	0
28	264af10fb644c777	aa.com	aa.com		22/8/17 9:04	0
29	3227ad263f4b6c57	adultfriendfinder.com	adultfriendfinder.com		23/8/17 19:05	0
30	3227ad263f4b6c57	adultfriendfinder.com	adultfriendfinder.com		23/8/17 22:28	0
31	390ad5321aa52cb4	adultfriendfinder.com	adultfriendfinder.com		24/8/17 6:17	0
32	3227ad263f4b6c57	adultfriendfinder.com	adultfriendfinder.com		26/8/17 8:18	0
33	3227ad263f4b6c57	adultfriendfinder.com	adultfriendfinder.com		27/8/17 9:23	0
34	23b2217465f35868	accuweather.com	accuweather.com		27/8/17 18:36	109
35	ba39b7d666f6dda1	accuweather.com	accuweather.com		28/8/17 0:08	214
36	4a33ccfb058faa41	adultfriendfinder.com/	adultfriendfinder.com		28/8/17 9:00	5
37	9a596a99c3b3a216	accuweather.com/	accuweather.com		28/8/17 13:06	5
38	23b2217465f35868	accuweather.com	accuweather.com		28/8/17 18:34	12
39	33685bdfafcc7057	accuweather.com	accuweather.com		29/8/17 20:42	16
40	3227ad263f4b6c57	adultfriendfinder.com	adultfriendfinder.com		29/8/17 22:22	0
41	33685bdfafcc7057	accuweather.com	accuweather.com		30/8/17 7:33	93
42	f89b61b6c8a5773b	accuweather.com	accuweather.com		30/8/17 17:44	159
43	91379fbcd081accc	adultfriendfinder.com/	adultfriendfinder.com		31/8/17 8:42	16
44	732c0578d37b8365	adultfriendfinder.com	adultfriendfinder.com		1/9/17 1:19	0
45	f33585b50274bf24	accuweather.com/	accuweather.com		3/9/17 18:15	0
46	f33585b50274bf24	accuweather.com/	accuweather.com		3/9/17 18:15	0
47	5b80509f256017dc	9gag.com/	9gag.com		4/9/17 12:03	3
48	0007921a2577d346			Facebook	6/9/17 12:52	393
49	0007921a2577d346			Facebook	6/9/17 13:00	486
50	0007921a2577d346			Facebook	6/9/17 17:16	9
51	0007921a2577d346			MLB.com At Bat	6/9/17 21:17	36
52	3227ad263f4b6c57	adultfriendfinder.com	adultfriendfinder.com		6/9/17 21:44	0
53	0007921a2577d346			AccuWeather	6/9/17 21:51	11
54	0007921a2577d346			MLB.com At Bat	6/9/17 22:08	30
55	0007921a2577d346			MLB.com At Bat	6/9/17 22:21	194
56	0007921a2577d346			AccuWeather	6/9/17 22:32	5
57	0007921a2577d346			MLB.com At Bat	6/9/17 22:57	119
58	0007921a2577d346			MLB.com At Bat	6/9/17 23:11	1
59	3227ad263f4b6c57	adultfriendfinder.com	adultfriendfinder.com		7/9/17 8:32	0
60	0007921a2577d346			AccuWeather	7/9/17 12:04	42
61	0007921a2577d346			AccuWeather	7/9/17 12:28	172
62	0007921a2577d346			AccuWeather	7/9/17 12:33	19

One step beyond: Taxonomy

The size of behavioral data files is considerable, and therefore it is useful to obtain any other type of data that helps make sense of it. Granularity is one of the greatest assets behavioral data has, but working with this level of detail can make it really hard for researchers to order and process it. To avoid this trouble, taxonomy is frequently added to clickstream files.

A taxonomy is a way to classify and organize websites into different categories, such as “general shopping”, “media”, “airlines”, “automotive”...

Of course, there are many different possible taxonomies. You can use a standard taxonomy provided by a 3rd party, or develop your own taxonomy to fit your research interests.

When applied to data, taxonomy easily helps make sense of data.

	A	B	C	D	E	F	G
1	**panelist_id**	**url**	**domain**	**used_at**	**duration**	**category**	**subcategory**
2	b0013a5c32f9782d	123rf.com/stock-photo/	123rf.com	7/9/17 10:18	8	Arts & Entertainment	Photography
3	b0013a5c32f9782d	123rf.com/stock-photo/	123rf.com	7/9/17 10:19	44	Arts & Entertainment	Photography
4	3f0bc2975c4d7f29	17track.net/en/track?nums=	17track.net	22/8/17 13:46	10	Business Industry	Business Services
5	5549771d3cc50c1c	17track.net/en/track?nums=&fc	17track.net	13/9/17 23:06	15	Business Industry	Business Services
6	5767c2a2196d7c7c	17track.net/en	17track.net	18/8/17 23:25	16	Business Industry	Business Services
7	5767c2a2196d7c7c	17track.net/en/track?nums=&fc	17track.net	18/8/17 23:30	151	Business Industry	Business Services
8	5767c2a2196d7c7c	17track.net/en/track?nums=	17track.net	19/8/17 3:53	90	Business Industry	Business Services
9	82b997c2af81b6a6	17track.net/en/track?nums=	17track.net	6/9/17 6:12	8	Business Industry	Business Services
10	5767c2a2196d7c7c	17track.net/en/track?nums=	17track.net	18/8/17 23:30	18	Business Industry	Business Services
11	3f0bc2975c4d7f29	17track.net/en	17track.net	22/8/17 13:45	12	Business Industry	Business Services
12	d1ff5357c05abbf7	1fichier.com/?	1fichier.com	26/8/17 18:17	30	Internet Services	File Sharing
13	d1ff5357c05abbf7	1fichier.com/?	1fichier.com	26/8/17 18:15	1	Internet Services	File Sharing
14	6d4d81d6043f1280	90min.com/posts/?a_aid=	90min.com	5/9/17 8:18	14	News and Media	Sports
15	6d4d81d6043f1280	90min.com/posts/?a_aid=	90min.com	8/9/17 21:12	14	News and Media	Sports
16	358b416a5623daf9	9gag.com/?ref=fbpic	9gag.com	27/8/17 15:12	0	Arts & Entertainment	Humor
17	358b416a5623daf9	9gag.com/?ref=fbpic	9gag.com	28/8/17 18:29	2	Arts & Entertainment	Humor
18	358b416a5623daf9	9gag.com/?ref=fbpic	9gag.com	27/8/17 3:56	0	Arts & Entertainment	Humor
19	358b416a5623daf9	9gag.com/?ref=fbpic	9gag.com	27/8/17 9:43	1	Arts & Entertainment	Humor
20	358b416a5623daf9	9gag.com/?ref=fbpic	9gag.com	28/8/17 2:06	2	Arts & Entertainment	Humor
21	a38158d58dad168b	accuweather.com/en/us//weath	accuweather.com	2/9/17 14:24	24	News and Media	Weather
22	a38158d58dad168b	accuweather.com/en/us//weath	accuweather.com	4/9/17 6:40	14	News and Media	Weather
23	a38158d58dad168b	accuweather.com/en/us//daily-v	accuweather.com	7/9/17 14:01	16	News and Media	Weather
24	a38158d58dad168b	accuweather.com/en/us//weath	accuweather.com	14/9/17 9:51	46	News and Media	Weather
25	a38158d58dad168b	accuweather.com	accuweather.com	15/9/17 6:05	6	News and Media	Weather
26	1318b5d57d9cfb8a	accuweather.com/en/us//weath	accuweather.com	8/9/17 13:05	4	News and Media	Weather
27	6869b256b9656043	accuweather.com/en/us//daily-v	accuweather.com	14/9/17 20:45	16	News and Media	Weather
28	950f4b59d46542a0	accuweather.com/en/us/syracus	accuweather.com	1/9/17 10:34	0	News and Media	Weather
29	950f4b59d46542a0	accuweather.com/en/us/syracus	accuweather.com	1/9/17 10:41	0	News and Media	Weather
30	a38158d58dad168b	accuweather.com/en/us//weath	accuweather.com	26/8/17 8:08	10	News and Media	Weather
31	a38158d58dad168b	accuweather.com	accuweather.com	1/9/17 5:48	5	News and Media	Weather
32	a38158d58dad168b	accuweather.com	accuweather.com	4/9/17 13:11	7	News and Media	Weather
33	a38158d58dad168b	accuweather.com/en/us//daily-v	accuweather.com	7/9/17 14:01	6	News and Media	Weather
34	a38158d58dad168b	accuweather.com/en/us//daily-v	accuweather.com	10/9/17 12:33	8	News and Media	Weather
35	a38158d58dad168b	accuweather.com/en/us//minut	accuweather.com	12/9/17 5:13	0	News and Media	Weather
36	cbb66b01d45dfa43	accuweather.com/en/videos/	accuweather.com	6/9/17 13:49	30	News and Media	Weather
37	23b2217465f35868	accuweather.com/en/us//hourly	accuweather.com	27/8/17 21:02	2	News and Media	Weather
38	408500c2b543c77f	accuweather.com/en/us/virginia	accuweather.com	25/8/17 21:02	1	News and Media	Weather
39	6869b256b9656043	accuweather.com/en/us//weath	accuweather.com	14/9/17 14:11	19	News and Media	Weather
40	950f4b59d46542a0	accuweather.com/en/us/syracus	accuweather.com	1/9/17 10:22	4	News and Media	Weather
41	a38158d58dad168b	accuweather.com/en/us//weath	accuweather.com	26/8/17 5:08	20	News and Media	Weather
42	a38158d58dad168b	accuweather.com/en/us//minut	accuweather.com	27/8/17 9:24	6	News and Media	Weather
43	a38158d58dad168b	accuweather.com/en/us//minut	accuweather.com	27/8/17 14:29	38	News and Media	Weather
44	a38158d58dad168b	accuweather.com	accuweather.com	30/8/17 10:14	5	News and Media	Weather
45	a38158d58dad168b	accuweather.com/en/us//weath	accuweather.com	31/8/17 6:32	0	News and Media	Weather
46	a38158d58dad168b	accuweather.com/en/us//daily-v	accuweather.com	31/8/17 15:13	8	News and Media	Weather
47	a38158d58dad168b	accuweather.com	accuweather.com	2/9/17 8:04	9	News and Media	Weather
48	a38158d58dad168b	accuweather.com/en/us//daily-v	accuweather.com	4/9/17 3:37	14	News and Media	Weather
49	a38158d58dad168b	accuweather.com/en/us//weath	accuweather.com	4/9/17 8:17	9	News and Media	Weather
50	a38158d58dad168b	accuweather.com/en/us//weath	accuweather.com	7/9/17 9:16	10	News and Media	Weather
51	63903d15b318f244	adultfriendfinder.com/p/main.c	adultfriendfinder.cc	7/9/17 9:26	22	Adult	Online Cams
52	63903d15b318f244	adultfriendfinder.com/p/main.c	adultfriendfinder.cc	7/9/17 9:37	4	Adult	Online Cams
53	63903d15b318f244	adultfriendfinder.com/profile2/	adultfriendfinder.cc	7/9/17 15:53	2	Adult	Online Cams
54	63903d15b318f244	adultfriendfinder.com/profile2/	adultfriendfinder.cc	7/9/17 22:22	2	Adult	Online Cams
55	63903d15b318f244	adultfriendfinder.com/p/update	adultfriendfinder.cc	8/9/17 10:23	6	Adult	Online Cams
56	63903d15b318f244	adultfriendfinder.com/profile2/#	adultfriendfinder.cc	8/9/17 10:24	22	Adult	Online Cams
57	63903d15b318f244	adultfriendfinder.com/profile2/#	adultfriendfinder.cc	8/9/17 10:38	28	Adult	Online Cams
58	63903d15b318f244	adultfriendfinder.com/p/main.c	adultfriendfinder.cc	8/9/17 10:41	22	Adult	Online Cams
59	63903d15b318f244	adultfriendfinder.com/p/chat/m	adultfriendfinder.cc	8/9/17 10:49	30	Adult	Online Cams
60	63903d15b318f244	adultfriendfinder.com/profile2/	adultfriendfinder.cc	8/9/17 10:54	30	Adult	Online Cams
61	63903d15b318f244	adultfriendfinder.com/p/main.c	adultfriendfinder.cc	14/9/17 11:01	16	Adult	Online Cams
62	63903d15b318f244	adultfriendfinder.com/p/mc/coy	adultfriendfinder.cc	14/9/17 12:41	2	Adult	Online Cams

Processed Data

Insight generation requires you to go one step beyond processing. This next step is usually done with specific tools (view chapter 'Privacy concerns in a data driven world' for more details). Independently of the statistical tools you use, the next natural level of processing is turning clickstream into tabulated data. This means aggregating your clickstream information into more direct and visual results, from where you can start extracting insights.

Using the three basic data points that clickstream provides (ID, action, and timestamp), and combining it with socio-demographic and other profiling data, there is an almost infinite number of tables that can be produced. Deciding which ones will add more value to the results of the current research is the first challenge to be faced (see chapter 'Tools to help you analyze behavioral data').

Once the relevant results are tabulated, the next level of data processing will be, if needed, turning those results into dashboards. This format can be used to make a more direct visual impact, and is mostly used when dealing with ongoing projects. It will allow you to follow the most relevant KPIs closely.

Basic concepts of behavioral data you need to undestand first

Reach.
Number of people that performed a specific action (visit a site, use an app, etc).

Duration.
Time spent doing a specific action.

Pageviews.
Request to load a web page.

Visits.
A visit is a series of page views within a domain (e.g. facebook.com) or address (e.g. facebook.com/events) visited by the same participant in a limited period of time.

Data journey: from the tracker to researchers

1.
Behavioral data log: raw data which is unintelligible.

2.
Clickstream: a file with a sequence of actions from users (visits to webpages, apps...).

3.
Tabulated data: summary of actions Vs panelists data (e.g. males vs females vs most popular websites).

4.
Visual: graphics, infographics, dynamic report...

First steps in behavioral research

First steps in behavioral research

The first step when working with behavioral data is to think which questions we want to answer through our behavioral dataset, and what format will best answer those questions. To get those questions, you must think how online activity influences your business.

This will, of course, depend on the activity you want to research. Whether it is an FMCG manufacturer, a travel agency, a grocery shop, or an e-commerce, all organizations are impacted by events that take place online.

Finding those events, making information about them available in a concrete and direct way, is what behavioral data is used for.

As mentioned, behavioral data generates large amounts of information. Obtaining actionable insights from that information is only possible if you start with a clear objective, and know exactly what you are looking for. Otherwise, we will find yourselves going through large processing, time and resources consuming efforts, and achieving only partial results.

Since the amount of results you can obtain from behavioral data basically depends on researcher's imagination, you must have a clear starting point, and a roadmap to your objective.

Using some of the KPIs mentioned in chapter,'What does behavioral data look like?' might prove useful when running your first behavioral data projects. It will provide useful data points that are easy to process and turn in results.

For example, comparing the reach of your client's website with its competence is always an interesting data point to explore. Looking for duplicities between the client's website and its competitors is a frequent next step.

If those sites provide the opportunity to buy online, a frequent approach is trying to find the conversion funnel for each competitor. This is done by finding confirmation URLs in the clickstream data, and comparing them with all the visits that site received.

But even if your client is not a "pure online" business, knowing what their target is doing online will provide valuable insights, not only for advertising purposes (which sites they visit, or apps they use, when, through which devices), but also to redefine your offering based on that knowledge.

If used to working with survey data, you may face the difficulty of thinking on how this new type of data can help you deliver actionable insights to your clients from a different perspective. But there is one more possibility, combining behavioral data and stated information to reach a whole new level of insights.

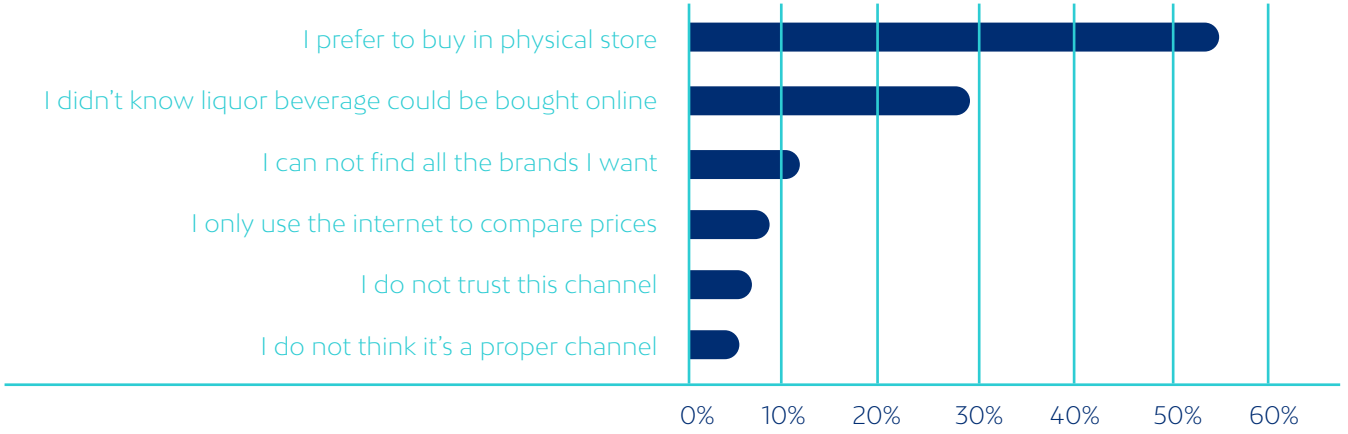
By combining both data sources we can get the best from both worlds. The precise register of online actions will give us an overview on how people navigate, and the extra layer of data that comes from asking for reasons, feelings and attitudes.

Data related to...	Behavioral data	Stated Information	Behavioral + Stated
Actions	Accurate information.	Relies on respondent's memory.	Combining behavioral and stated information we have the possibility to fill all the data gaps.
Opinions/Context	No available data.	Direct information from respondents.	

A real-life case of data combination

‘A Digital Path to Purchase in the Liquor and Spirits Industry’

Paper presented by Pernod Ricard in Esomar Latam 2017 with data from Netquest’s Behavioral panel.



Research objectives

- Identify the online behavior of the target audience.
- Identify the “buyer’s path to purchase”.
- Develop an action plan to impact the buyers and influence them in the right place.

Design of the investigation

- Methodology: Digital ethnography using passive metering technology.
- Target: Frequent consumers of alcoholic beverages.
- Sample: 661 people from stratum 1-6 Colombia.
- One-month of online navigation data.

Thanks to an analysis of users’ digital behavior (behavioral objective data), it was possible to demonstrate, for example, that consumers of alcoholic beverages are not very far along in the adoption of e-commerce as the preferred buying method yet, but they do use the Internet as a source of information.

By analyzing over 96,300 keywords, the brand was able to identify the logic behind searches within a certain category of the research, as well as the effect of those searches on online purchasing. This analysis was key in identifying different consumer journeys within this category.

These results revealed that, unlike other categories, such as fashion, beauty, or technology, liquor is not spontaneously searched for online. This understanding help researchers to define 5 diferent liquor journeys:

- What is happening tonight?
- Where can I find alcohol at an affordable price?
- What is the best liquor brand?
- I am looking for a specific brand.
- How to prepare cocktails.

This research, based on the combination of two types of data, allowed the brand to:

- Understand each phase of the alcohol purchase process.
- Identify main consumer journeys.
- Define the main opportunities:
  - › Creating triggers by activating touch points and connecting to occasional consumption.
  - › Educating users about the benefits of the online channel and providing information about the different types and brands of alcohol.
  - › Building trust around the channel.
  - › Integrating online and offline channels.
  - › Generating spaces where recommendations can be searched for and shared, allowing constant feedback.

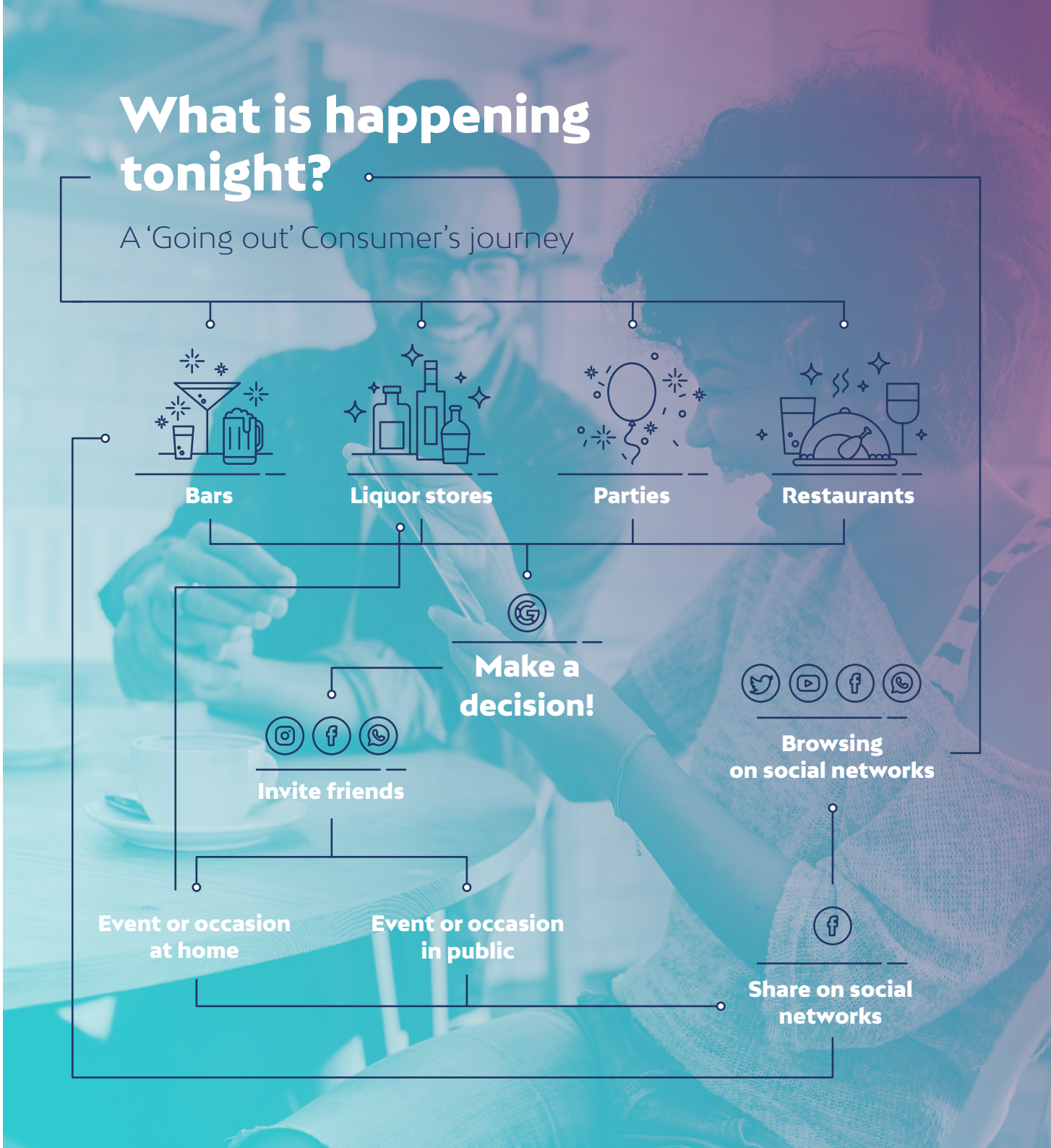
By the end of 2016, with only two strategies activated for two journeys, sales grew 135% through the e-commerce channels, thanks to efforts to reach consumers at the right time, with the right message, and by offering solutions and value.

With SEO and SEM actions, their conversion was increased from 4% to 16%.

The brand reached more than 9 million people per month, generating a 12% engagement in their publications.

By understanding the buyer through behavioral data, the client's brand awareness increased, purchasing behavior changed, and their brand grew in the e-commerce channel.

netquest.com



Tools to analyze behavioral data

Tools to analyze behavioral data

You as a researcher may be used to working with analysis tools, such as Excel or SPSS. You maybe have used SAS or Stata. But times are changing for data analysts; new tools are needed for these new times.

Size and flexibility

Two main capabilities are desirable for an analysis tool that deals with behavioral data.

First, the tool must be able to manage large data files. For example, the average size of a file with a month's worth of navigation data for a sample of 1,000 individuals is 1 GB. With traditional tools, files of this size are difficult to process.

Second, behavioral research is still under development; new analytical methods are still being developed. Tools must be flexible and not limited to pre-established analysis. In that sense, programming statistical languages have an edge over menu-based tools.

The following table shows how each tool performs in opening and ordering a typical behavioral data file, as well as how flexible they are in terms of programming capabilities and easiness to use.

	Time to open	Time to order	Programming capabilities	Easy to use
Excel	Can't open	Not applied	⊙	⊙⊙⊙⊙⊙
SPSS	~ 8 min	~ 2.5 min	⊙⊙	⊙⊙⊙⊙
Stata	~ 4.5 min	~ 1.5 min	⊙⊙⊙	⊙⊙⊙
R	~ 13.0 secs	~ 4.2 secs	⊙⊙⊙⊙	⊙⊙
Python	~ 65 secs	~ 20 secs	⊙⊙⊙⊙⊙	⊙

R and Python, the new kids in town

R and Python are the most used tools in data science. Contrary to traditional statistical software like SPSS and STATA, R and Python are programming languages. While R was born in the scientific realm for statistical computing and graphics, Python was conceived in the late 80's as a general purpose, high-level, programming language. In the last years, through the development of libraries like SciKit-learn, Numpy, and Pandas, Python made its way in the scientific community. Both tools are head-to-head in terms of usage in data science. Depending on the consulted source, the one leading the battle might change, and the debate is far from over.

Some key differences between them are:

- R is the lingua franca of statistics nowadays. However Python, being a multi-purpose language, makes it easier for companies to adopt since programmers and engineers find it less cryptic.
- While Python entry barrier is low, R has a steep learning curve.
- Visualizations in Python are usually more complex, and are not nearly as pleasing to the eye or as informative as R.
- R is mainly used when the data analysis tasks require standalone computing or analysis on individual servers. Python is generally used when the data analysis tasks need to be integrated with web apps or if statistics code needs to be incorporated into a production database.
- R is slower than Python. R was designed to make data analysis and statistics easier to do, not to make life easier for computers. However, some packages (e.g. data.tables, foreach, Riposte, etc.) substantially improve R's performance.
- Most new developments in statistics appear first in the R packages and then are adopted by Python.

Some commonalities:

- Open-Source: both are free to download and provide the rights to study, change, and distribute the software to anyone and for any purpose.
- Online Communities: In contrast with commercial softwares, R and Python dispose of online communities that offer support to their respective users.

New professionals are needed

Analyzing behavioral data is not only about tools, but about new skills and mindsets. New research is more about predicting than about describing; that means that data scientists are increasingly playing a major role in market research. Future researchers to deal with new types of data need to adopt such data science skills.

Privacy concerns in a data driven world

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Many big global brands have had legal problems with sensible data management, Disney and Facebook are just a couple of examples.

Things are clearly about to change in terms of privacy policies. The European Parliament has recently developed the GDPR (General Data Protection Regulation, that will come into force on May, 2018) which aims “to protect all EU citizens from privacy and data breaches in an increasingly data-driven world” and some other regions are all walking the same path.

There is no doubt that the entire world is starting to be very aware of the importance of protecting online users data, and promoting a responsible use of Personally Identifiable Information (PII).

You may have some concerns regarding the use of behavioral data to gather information:

- If the big ones are dealing with legal problems, why should you take the risk?
- How could you work with PII data without incurring on any international legal offense?
- Is there any chance to do it in an easy way?

Answer is yes, you can use behavioral data, and still this doesn’t have to conflict with any worldwide law or regulation.

How can you deal with privacy restrictions when running a behavioral data project? Privacy policies are something everyone in market research must deal with when handling data.

This does not mean privacy policies should be a concern; we simply must ensure we are educated and ethical about collecting and analyzing behavioral data. An easy approach to doing this correctly is by always keeping in mind our panelists. Care about the people: Put the participants in the middle of your strategy.

How do you do that? Here we have a couple of suggestions based on our own experience of dealing with PII for years until now.

At Netquest, we’ve always taken our panelists data privacy very seriously. We pride ourselves on this, respecting and rewarding our panelists is an important part of our DNA. Take care of who is providing you with behavioral data, it is your responsibility to ensure that the data provider is following these best practices; otherwise, you may be involved in legal issues.

How to respect the privacy of your panelists

Masking Data delivery.

Some algorithms allow you to work with clickstream data without the risk of transferring PII, by masking the parts of the URL that might contain PII.

Be transparent with participants.

The average person does not understand legal jargon. So just don't use it. Yes, that's possible. If you don't believe us, we invite you to visit our privacy page. It will take you less than two minutes and you will fully understand what kind of data our panel members are sharing with us (so they understand, too).

Ask for permission (and wait for acceptance).

Explaining how data collection works isn't enough. It's very important that you obtain the explicit acceptance from each and every one of the panelists you are gathering data from. A permission that must be clear and concise: Avoid the "small print" and the use of any ambiguous term.

Don't make the goodbye difficult.

It's understandable you want to avoid increased churn rate. But, making it difficult to exit a panel or remove a meter isn't ethical. Allow panelists to pause the tracker or leave a panel when they want. When you make the exiting process easy, it establishes a trust that might even bring them back.

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What’s in the future?

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A large majority of the population is highly anticipating technology will transform our everyday lives. But has the market research industry considered how technology will continue to transform our research methods? You may have heard the hype about major companies such as Uber, Tesla, and Google experimenting with self driving cars. These vehicles are predicted to be equipped with software that passively self-localizes the vehicle while simultaneously navigating the route it's on. Further technology will process sensory data with camera capabilities to scan the area around the vehicle for motion patterns and objects. The vehicles will also be capable of learning how to predict emergency situations and regular routes. All of this doesn't even begin to cover half of the technology involved.

In combination with smart cars, imagine the capabilities of smart televisions, smart houses, evolving smartphones, and more. Artificial intelligence, assistive technology, and mobile technology are continually becoming integral parts of our everyday lives. As we begin to become more attached to these developing technologies, we are agreeing to provide information about ourselves.

Do you know what this means for market research? More behavioral data on information that's currently impossible to collect. We'll eventually be able to pinpoint the movements, activities, and behaviors of our consumers like never before. Market researchers must harness the new methods to collect and interpret this data. Whereas, legislators must develop regulations to ensure this information doesn't end up in the wrong hands.

The future is here,
the future is behavioral data.

Behavioral data 101

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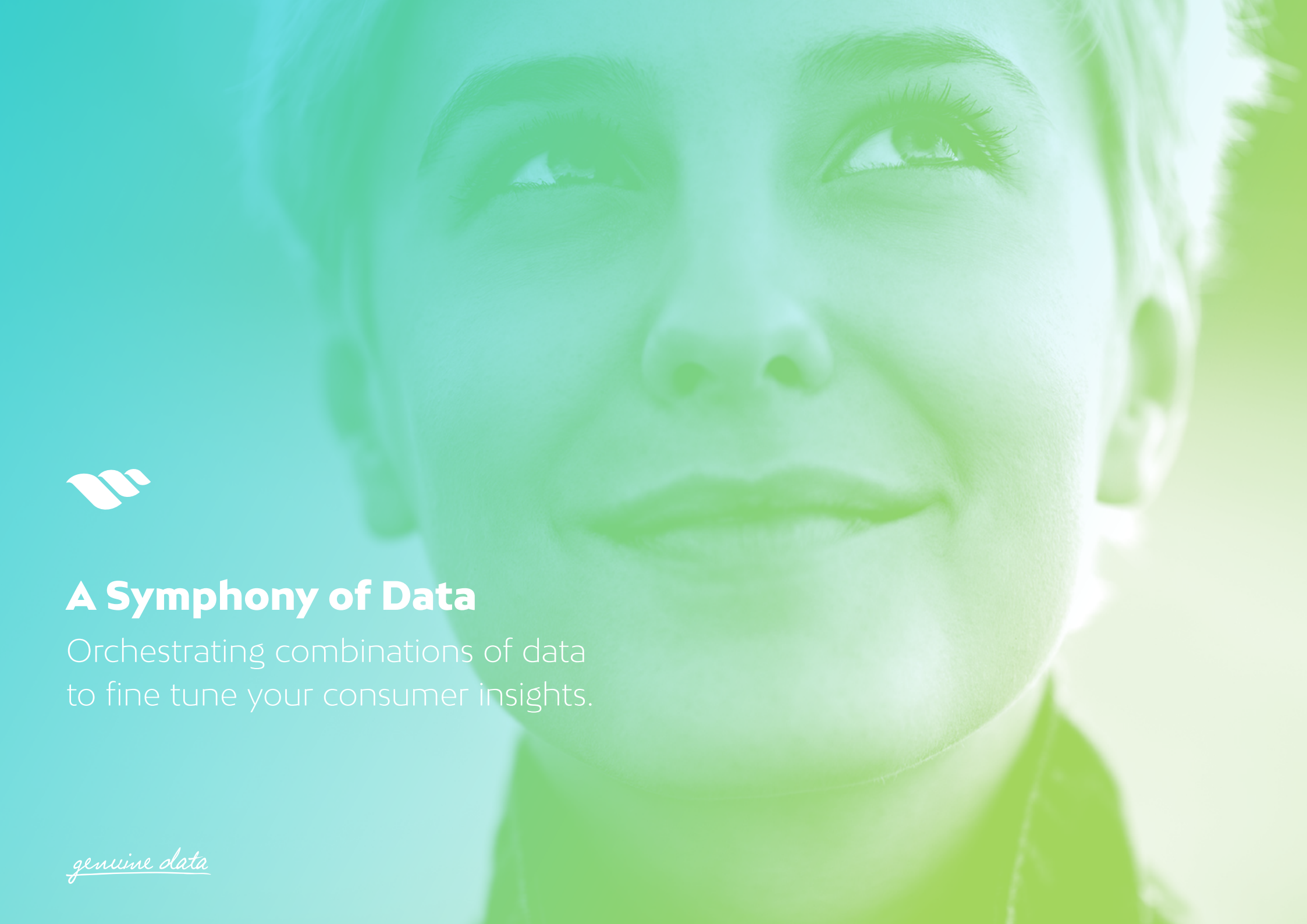
Thank you for reading.

Stay tuned with us.



A Symphony of Data

Orchestrating combinations of data
to fine tune your consumer insights.

genuine data