UNIVERSITY OF TWENTE

FACULTY OF BEHAVIOURAL MANAGEMENT & SOCIAL SCIENCES

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Conversion Rate Optimization

In e-commerce webshops

Master Thesis

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ABSTRACT

The world of e-commerce is rapidly growing; the global pandemic caused a surge in demand for the mobile shopping experience. E-commerce competition is at an all time high, meaning that research in conversion rate drivers is increasingly necessary. The goal of this research is to investigate the impact of specific design choices on customer's willingness to convert at the start of the conversion funnel of a webshop. The research question is: "What is the impact of different design elements in call-to-action buttons on conversion rates?" To answer this question, an experimental design is carried out on the e-commerce website of a Dutch kitchenware retailer, testing different design elements using eye tracking technology and Google Analytics data. Two hypotheses are tested. The first hypothesis focuses on the effect of salience on conversion rates and states that a button will be clicked and noticed more if it "jumps out" to the user. This hypothesis was based on the bottom-up control of attention theory where we assume that higher levels of contrast corresponds with more attention. This research resulted in the finding that design elements e.g. location, color, text weight, don't necessarily have any impact on conversion if users do not see the value of the call-to-action. The second hypothesis builds upon this; whether the text of the call-to-action (Familiar naming style such as "bestsellers" v.s. branded name such as "James' Choice") will have a significant association with the click through rate. The inclusion of a familiar naming convention was missing in experiment A and resulted in a significant increase in clicks to that page, confirming the hypothesis that users initially did not recognize the meaning of the button, and that that new understanding positively affects their willingness to follow the intended customer journey. This conclusion supports the SEEV model of attention control (Wickens, 2015), top-down control of attention (Orquin & Mueller Loose, 2013) as well as the conversion rate optimization framework by Soonsawad (2013), and provides valuable insights into these through real-world proof of these models.

ACKNOWLEDGEMENTS

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1. INTRODUCTION

In 2040, 95 percent of all purchases are projected to be facilitated by e-commerce (Nasdaq, 2017). In light of the coronavirus pandemic, this number might be achieved sooner as customers increasingly turn to digital sources to shop. According to Markus (2021), forecasts for 2021 show that the global e-commerce sales will amount to up to 4.8 trillion dollars, compared to 2.8 trillion dollars in 2018, which is an impressive growth of 2 trillion dollars over the course of 3 years. Keeping this in mind, e-commerce competitiveness is at an all time high, and it is as vital as ever for online vendors to optimize their conversion efficiency.

There is ample research on different factors that might influence conversion rates of returning or new customers across the entire customer decision process (Constantinides, 2004; Cho & Park, 2001; Hollebeek & Macky, 2019), but a lack of specific academic research for individual steps of the process. Call-to-action buttons encouraging customers to move through a conversion funnel are vital for this process (DigitalMarketer, 2018), and thus applying these in the most effective way is highly relevant for e-commerce websites. Websites typically do their own optimization research through A/B testing, copy testing, surveys and customer feedback, customer journey analysis, and usability testing (Ratia & Ruoho, 2016; Econsultancy, 2017), but do not publish their results in an academic setting. There has been academic research on the most optimal placing of a buy-button (Hernandez & Resnick, 2013), but it was limited. Other research has been done into the impact of call-to-actions on social media platforms (Handayani, 2018; Martinez-Lopez et. al., 2020), but not on the retailer websites these call-to-actions might link to. Therefore, the goal of this research is to investigate the impact of specific design choices on customer's willingness to convert at the start of the conversion funnel of a webshop. The research question is: "What is the impact of different design elements in call-to-action buttons on conversion rates?" To answer this question, an experimental design will be carried out on the e-commerce website of a Dutch kitchenware retailer, testing different design elements using eye tracking technology and Google Analytics data.

2. THEORY

Conversion funnel

The conversion funnel is defined as all steps taken by a customer to buy a product online (Ratia & Ruoho, 2016). Whilst the conversion funnel can be described in great detail, in its simplest form, the top of the conversion funnel (TOFU) is the awareness phase, the middle of the funnel (MOFU) is the evaluation phase, and the bottom of the funnel (BOFU) is the conversion phase (DigitalMarketer, 2018). Hollebeek and Macky (2019) compiled a list of definitions for digital content marketing, and many of these definitions center around targeting potential customers at different stages of the funnel, to retain and move them to the next stage, for example *"Creating, distributing and sharing relevant, compelling and timely content to engage customers at the appropriate point in their buying consideration processes, such that it encourages them to convert to a business building outcome."* (Wang et al., 2017, pp. 1-2) In practice, a percentage of customers fail to progress through each stage of the funnel. A digital marketer's goal, in essence, is to move a potential customer through all phases of the funnel, utilizing call-to-actions, resulting in a higher conversion rate for each call-to-action, and subsequently, purchase. Conversion rate optimization functions as a tool to do this. The conversion funnel is most often described as 4 stages:

1. Awareness (TOFU)

This stage of the funnel is solely to make prospective customers aware of the brand's existence. Social media, search engine results, and advertising to new potential customers can create awareness.

2. Interest (MOFU)

The interest stage is all about giving prospective customers a reason to inquire further about a brand or product. In digital marketing, getting visitors to your website to leave their email is a good conversion goal in this step. (DigitalMarketer, 2018; Ferenzi, 2021)

3. Desire

This is the stage in which the potential customer wants what you have to offer. Trust is important (Markus, 2021), and communicating the value proposition is vital.

4. Action (BOFU)

This step contains the macro action of purchasing your product. Moving through each step of the funnel is a small conversion, or micro action, but the conversion in this stage is a macro action, where the customer pays for your product (Soonsawad, 2013). (Ratia & Ruoho, 2016; Murphy, 2018; Ferenzi, 2021; Markus, 2021).

Customer decision process

Another method of describing the journey a customer makes to conversion is the customer decision process (Soonsawad, 2013; Constantinides, 2004). Where the conversion funnel places the retailer at its center, the customer decision process describes the same journey from the customer's perspective. Shankar et al. (2016) similarly describe the mobile shopper journey using the following steps, with the customer decision process in brackets:

1. motivation/goals (need recognition)
2. Search and discover (information search)
3. Evaluation and choice (evaluation and purchase)
4. Post purchase (post purchase)

The full customer decision process is described as follows:

1. Need Recognition

This stage and the next coincide with the awareness stage in the conversion funnel. In this first stage, the customer establishes a need.

2. Information search

The customer has a need, and in this stage searches for ways to fulfill this need.

3. Evaluation

The evaluation stage coincides with the middle of the funnel: interest and desire. This is the time in which the customer evaluates his or her options.

4. Purchase

Naturally, this stage coincides with the action stage of the conversion funnel. The customer takes action and makes a purchase.

5. Post-purchase

Post-purchase behavior, such as posting a review or recommending the vendor via word of mouth is part of this last stage. It is mentioned due to its high value to online retailers (Stephen, 2016). Kannan (2017) describes the way positive reviews help, but negative reviews have a bigger impact on prospective customers.

Both conversion funnel and customer decision process theories provide a framework for marketing activities.

Conversion rate drivers

Constantinides (2004) notes that a big part of the web experience is, besides providing the consumer with their wants and needs, directing the customer through the purchasing process. Constantinides (2004) presents five factors that are meant to deliver this web experience. These factors are divided into three categories. These categories are *functionality factors:* Usability and Interactivity, *psychological factors:* Trust, and *content factors*: Aesthetics and Marketing mix. Each of these factors contain subcategories with which to identify them with. For example, Aesthetics is divided into Design, Presentation quality, Design elements, and Style/atmosphere. However, Soonsawad (2013) revises these set of factors to include Catalyst and Persuasion. Soonsawad (2013) also created a framework, dividing the seven factors across the customer decision process, as seen in figure 1.

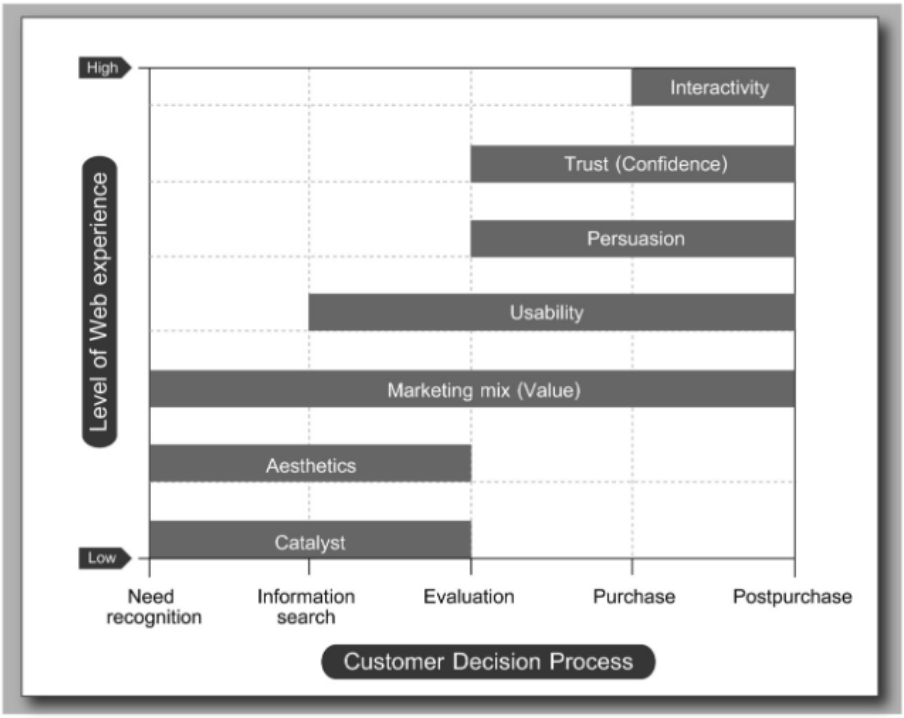

Figure 1: Conversion rate optimization framework. Source: Soonsawad (2013)

To judge the success of these factors in individual cases, the conversion rate is an appropriate measure, as it indicates how many customers navigated through the process. However, it is not the only measure. Cho and Park (2001) developed the electronic commerce user-consumer satisfaction index (ECUSI) in order to measure a user's satisfaction of a given internet shopping environment. The assumption is that the higher the level ECUSI, the higher the chance of conversion and website use. ECUSI contains a list of factors that influence purchase intention, namely (1) Product information, (2) Consumer service, (3) Purchase result and delivery, (4) Site design, (5) Purchasing process, (6) Product merchandising, (7) Delivery time and charge, (8) Payment methods, (9) Ease of use, and (10) Additional information services.

Good user experience can lead to a positive perception of a retailer (Cho & Park, 2001) and compelling aesthetic design can have a positive impact on sentiment towards products (Van Rompay et al., 2010) The

question is whether consumers' sentiments play an important role in their conversion. Lorenzo-Romero et al. (2013) find that as long as the exposure time is not under one second, aesthetic design does have a positive impact on the conversion rate.

Call-to-action

As mentioned before, there are macro actions and micro actions, otherwise called macro and micro conversions (Soonsawad, 2013). Both macro and micro actions can be encouraged using call-to-action buttons in a web page. These can be anything from "Continue reading" to "Pay here". Web articles like Lica (2020), Thompson (2020), Matson (2021) and Merlin (2017) advise the strategically placing, sizing and coloring of call-to-action buttons, using examples from various websites. Using contrasting colourization makes buttons more visible and thus more accessible, but bigger isn't always better according to these authors. General consensus is that a button visible above the fold, i.e. without having to scroll down the page, is most effective.

Hernandez and Resnick (2013) utilized the theory of user scan patterns to determine the most effective placement of a call-to-action. Their eye-tracking findings supported the theory that having the call-to-action above the fold on the left side of the page resulted in lower time to first click and lower time to first fixation on the button. Martinez-Lopez et. al. (2020) found that having an integrated path-to-purchase after a buy-button call-to-action increased customers' perception of the ease of purchase and it increased chances of willingness to buy and impulse buying. Another related study by Martinez-Lopez et. al. (2020) looked at the hierarchical sequence of buy-buttons on social media platforms. Furthermore, the impact of call-to-actions on instagram doesn't always lead to purchase behaviour through instagram, but can lead to purchase intention in the corresponding online stores (Handayani, 2018).

3. THEORETICAL AND PRACTICAL CONTRIBUTION

The theoretical component of this research will continue to build upon the frameworks provided by Constantinides (2004) and Soonsawad (2013). Furthermore, this research will go into more detail of specifically the impact of call-to-actions on conversion rates. Findings on the most opportune design and placement of call-to-actions on webshops is relevant for the field of UI design, digital marketing and e-commerce. The use of real-life conversion data through a case study of jamescooke.com will enhance the reliability of the results; as Lorenzo-Romero et al. (2013) note, a real purchasing setting compared to a survey would provide more accurate and reliable information on the effects of web design theories. In terms of practical contribution, the findings will provide applicable answers to the question of what to heed when designing for the purpose of increasing the conversion rate for e-commerce retailers.

4. RESEARCH DESIGN EXPERIMENT A

E-commerce webshop James Cooke

www.Jamescooke.com is a branch of Wegter B.V., based in Oldenzaal, NL. James Cooke is a kitchenware retailer selling cutlery, crockery, glassware, pots and pans amongst various other items. www.Jamescooke.com carries over 20 different kitchenware brands, such as Ballarini, Borgonovo, Palmer, Pyrex, and Royal Leerdam, and currently the demographics of visitors to jamescooke.com can be found in figure 2. (Wegter, 2022)

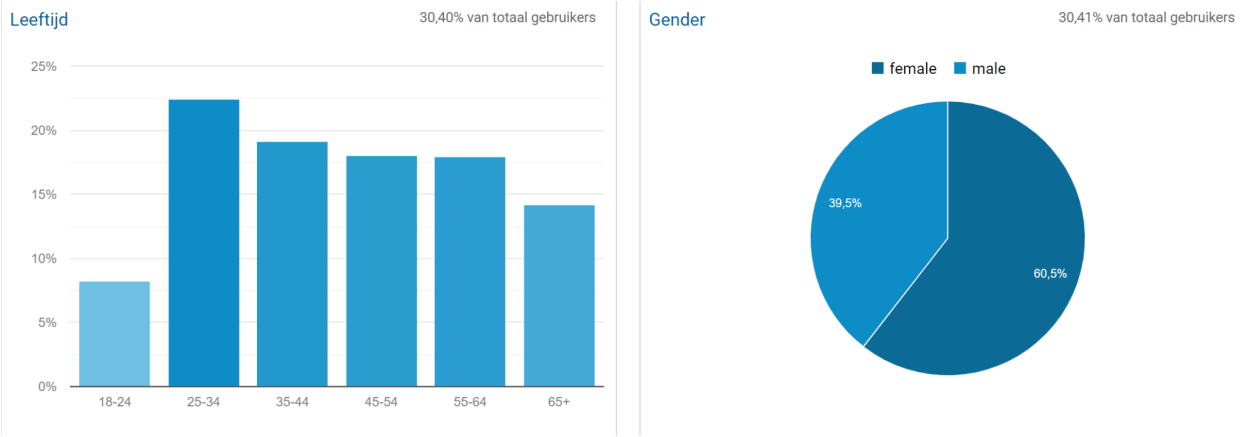

Figure 2:User demographics to www.jamescooke.com. Source: Wegter B.V. (2022)

Comparison of different types of call-to-actions

The call-to-action buttons that were measured on the webshop were "sign up for newsletter", "create an account", "add to cart", and "top picks" AKA "James' Choice" (referring to James' favorite choice in products.) The click through data for each of these CTAs was measured using Google Analytics and Hotjar during the period of 20 December 2021 to 18th January 2022. The purpose of measuring the CTR for each of these CTAs was to compare and select the CTA to use for experimentation.

The total number of new users on the website during this period was 6.456 users.

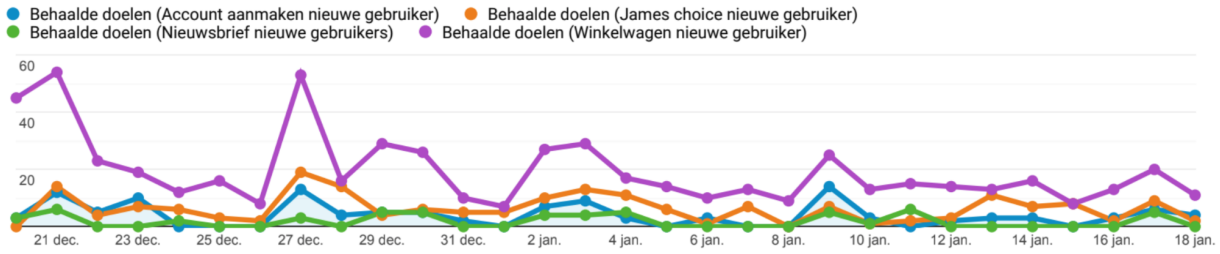

Figure 3: Click through rate of chosen call-to-actions over time. Source: Wegter B.V.(2022)

Call-to-action	**Click through rate**	**Transactions**
James Choice (above: James Choice nieuwe gebruiker)	189 (2,9%)	12
Newsletter (above: Nieuwsbrief nieuwe gebruiker)	54 (0,84%)	10
Add to cart (above: Winkelwagen nieuwe gebruiker)	585 (9,1%)	93
Create account (above: Account aanmaken nieuwe gebruiker)	119 (1,8%)	22

Table 1: CTAs, their CTR and subsequent transactions. Source: Wegter B.V.(2022)

In consultation with the marketing team of Wegter B.V. based on the data in table 1 and figure 3, the decision was made to continue the research using the "James' Choice" call-to-action. This decision was made due to the estimate that improving this CTA will help introduce new customers to the conversion funnel. Typically, users creating an account or joining the newsletter already know that they want to shop at www.jamescooke.com, and are planning to come back later or utilize a discount code from the sign up

(Wegter B.V., 2021). Users browsing the website's top picks don't necessarily have a product purchase in mind yet and are new and potential prospects. The goal is to direct new users to the website's top picks: the easiest place to browse products, and through this insert the new user into the next stage of the conversion funnel. Through this reasoning, the James' Choice call-to-action button was chosen for further research within this paper.

Part 1: Multivariate testing of call-to-action button design

Following the descriptive research above, an experimental design and eye-tracking experiment will take place. Visitors to www.Jamescooke.com will be presented with one of several versions of the design of the web shop, discussed in table 2 and presented in Appendix A. The visual location and design of the call-to-action button "James' Choice" on the website will vary per session, in accordance with the brand style guide of James Cooke. Taking into account the conversion rate optimization framework by Soonsawad (2013), we will focus specifically on aesthetics, keeping other factors constant.

	A: Location	**B: Color**	**C: Font weight**
1.	0: In menu bar	0: Gray	0: Regular
2.	0: In menu bar	0: Gray	1: Bold
3.	0: In menu bar	1: Pink	0: Regular
4.	0: In menu bar	1: Pink	1: Bold
5.	1: Left on page, below menu bar	0: Gray	0: Regular
6.	1: Left on page, below menu bar	0: Gray	1: Bold
7.	1: Left on page, below menu bar	1: Pink	0: Regular
8.	1: Left on page, below menu bar	1: Pink	1: Bold

Table 2: Explanation of variant design.

Each version will be exposed to customers an equal amount across several weeks. Using Google analytics, the click through rate of each of the designs will be recorded. This creates the opportunity to test the following hypotheses based on the literature study.

H0a: There is no association between design elements and click through rate.

H1a: Buttons to the left on the page, below the menu bar will result in more clicks.

H2a: The pink button will result in more clicks than the gray button.

H3a: Buttons with bolded text will result in more clicks than buttons with regular text.

As Lica (2020), Thompson (2020), Matson (2021) and Merlin (2017) advise the strategically placing, sizing and coloring of call-to-action buttons, including using contrasting colourization makes buttons more visible and thus more accessible, these hypotheses were formulated based on the principles of design, such as described by White (2011). In which is illustrated that creating contrast in color, location or size increases salience and allows the designer to create visual focal points for the user. Based on this theory of focal points, the hypothesis that the button will grab more attention when it is contrasted with the rest of the menu items, either in location, size or color. Similar to what Treisman and Gelade (1980) state, is that our visual perception is coded based on features such as color, orientation, spatial frequency, brightness, direction of movement. The purpose of this experiment is to determine what effects the alternation in these features have on the attractiveness of our CTA.

A chi-square test will be performed to test the significance of the results. These hypotheses have been translated into a conceptual framework, as seen in figure 4. In this experiment, each independent variable has a contrasting and non-contrasting state, and based on the theory a higher degree of contrast will result in a higher degree of visual attention, which, as Hernandez and Resnick (2013) find, is positively correlated with the click through rate.

Measures

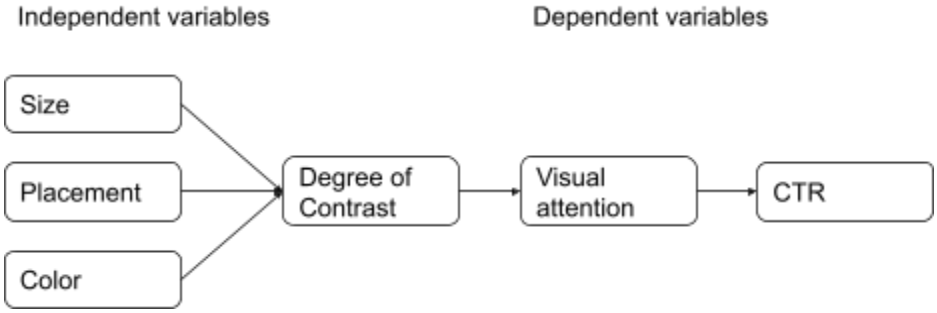

Figure 4: Conceptual framework

	Dependent variable
H1	Click through rate
H2	Click through rate
H3	Click through rate

Table 3: Dependent variables for each hypothesis.

Extraneous variable	**How to control**
Other call-to-action buttons might distract visitors' attention.	Keep the rest of the website consistent across the experiment.
New and returning visitors might respond differently to call-to-actions, especially if returning visitors had already responded in the past.	Only use new visitors for the measurement.
The intention of a visitor might differ per person, e.g. to find a specific product, to read the blog, to check for sale. This will impact whether they respond to the call-to-action.	Intention of visitors is not controllable, however, by only measuring new visitors, we assume that the users will still find themselves around the start of the customer decision process and the conversion funnel. These are the target users for this call-to-action.

Table 4: Controlling extraneous variables

Table 4 concerns extraneous variables. Controlling for extraneous variables is more straightforward in a laboratory setting, however for any experiment it is relevant to consider this. As this is a "live" setting, albeit online, it will never be as sterile as a lab experiment. Situational variables occurring in the home of

the viewer such as temperature differences and screen resolution are not controllable, along with demographics and mood of the participant, but such is the nature of using data from a real-life setting. Still, we attempt to keep the extraneous variables we can control as constant across the experiment as possible, to ensure reliability is higher. This ensures that differences in dependent variables in population groups can be attributed to independent variables.

Part 2: Eye tracking

For the purpose of this research, additional eye-tracking research will be conducted on the different button designs by student project groups for the Masters course "Advanced Topics in Digital Marketing". This will be conducted using the facilities at the BMS lab at the University of Twente. The purpose of this is to study which button is most attention-grabbing. The participants will be recruited by means of convenience sampling at the University of Twente. A requirement for the participants is that they are not familiar with the website, have adequate vision and are familiar with online shopping in general. Additionally, by taking part, participants joined a raffle to win a cocktail set provided by Wegter B.V. as an incentive to join the research.

Data collection

Google Analytics will be used to retrieve the purchase data across a set time period. Google Analytics has been found to be a useful and reliable way to measure visitor behavior and web site statistics (Arendt & Wagner, 2010; Barba et. al., 2011; Cohen & Thorpe, 2015; Fang, 2007; Loftus, 2012; Pakkala, 2012; Plaza, 2011; 2009).

For the purpose of this research, additional eye-tracking research will be conducted. This will be conducted using the facilities at the BMS lab at the University of Twente, with Tobii Pro eye-tracking glasses and software.

Ethical considerations

Audio and video recordings will be collected through the eye-tracking glasses at the BMS lab at University of Twente. Participants will sign a consent form detailing they are free to stop the research at any moment. This data will be securely stored and after concluding the research the data will be destroyed. Beyond that, there will be data minimization on personal details, and the click through data will be anonymous. Data security and storage will be GDPR compliant.

5. RESULTS EXPERIMENT A

Part 1: Multivariate testing of call-to-action button design and eye-tracking results

The experiment ran for a total of 69 days. A total of 1651 sessions were recorded, which consist of new visitors to the web version of the homepage of www.jamescooke.com. Below is a summary of the data. In Appendix A you will find a representation of each variant design.

Variant	sessions	conversions	conversion rate
A0-B0-C0	208	17	8.2%
A0-B0-C1	221	9	4.1%
A0-B1-C0	201	6	3.0%
A0-B1-C1	213	9	4.2%
A1-B0-C0	204	9	4.4%
A1-B0-C1	203	14	6.9%
A1-B1-C0	203	9	4.4%
A1-B1-C1	198	4	2.0%
TOTAL	1651	77	4.7%

Table 5: Summary of conversion data in experiment A.1

In order to test the hypothesis that the variant designs have a significant association with the conversion rate, a statistical chi-square analysis was performed. The confidence interval is 95%, and the chi-square analysis to test the significance of the relationship between the variant and the conversion rate can be found in tables 6, and 7. The assumption that expected value of cells should be 5 or greater in at least 80% of cells has been met.

		Conversion		Total
		0	1	
Version	A0-B0-C0	191	17	208
	A0-B0-C1	212	9	221
	A0-B1-C0	195	6	201
	A0-B1-C1	204	9	213
	A1-B0-C0	194	9	203
	A1-B0-C1	189	14	203
	A1-B1-C0	195	9	204
	A1-B1-C1	194	4	198
Total		**1574**	**77**	**1651**

*Table 6: Version*conversion crosstabulation Experiment A*

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	$12,742^{a}$	7	,079
Likelihood Ratio	12,446	7	,087
N of Valid Cases	1651		

*Table 7: Chi-Square Tests. **a:** 0 cells (0,0%) have expected count less than 5. The minimum expected count is 9,23.*

In this case, the P-value (0,079) > alpha (0,05), so we cannot reject the null hypothesis. It can therefore be stated there was no observed significant relationship between design elements and CTR, X^2 (7, N = 1651) = 12.7, p = .079. There was no design that performed significantly better or worse than other designs.

Part 2: Eye Tracking

Performing an eye tracking research will provide the opportunity to test the assumption that more visual attention leads to a higher CTR, by comparing results of experiment A.1 and A.2. Besides that it is a reliable way to monitor which design gains the most attention (Orquin & Mueller Loose, 2013). This experiment takes a bottom-up control of attention view, as described by Orquin and Mueller Loose (2013). Visual saliency is the most important predictor of attention in this view, given the viewer has low task demands of attention, that is, if the viewer does not have a goal in mind (Orquin & Mueller Loose, 2013). Eye tracking participants were not informed of any goal, they were simply told to view the website. Since the eye tracking experiments of this research were performed by several groups as an assignment by students of the course Advanced Topics in Digital marketing at the University of Twente, there is not an equal distribution of participants for each version, demonstrated in table 8. The time that each participant looked at the screen also differs, this has been summarized in descriptive statistics in table 9.

Version	**Number of participants**
A0B0C0	4
A0B0C1	3
A0B1C0	4
A0B1C1	6
A1B0C0	6
A1B0C1	8
A1B1C0	4
A1B1C1	10
TOTAL:	**45**

Table 8: Number of participants per variant in experiment A.2

For this reason, the percentage of total time the participant has a fixation on the James Choice button has been calculated, in the variable Fixation percent. This data is also summarized in descriptive statistics, visible in table 9. Notable is that this is very low, and as visible in Appendix B, some variations did not record any eye fixations on the CTA at all.

	N	Minimum	Maximum	Mean	Std. Deviation
Totaltime	45	1,72	29,83	11,6764	7,25055
James choice	45	,00	1,27	,1880	,26751
Fixation percent	45	,0000000000	,18794326240	,0169179723	,03570969945
Valid N (listwise)	45				

Table 9: Descriptive statistics for Experiment A.2

		Levene Statistic	df1	df2	Sig.
Fixation percent	**Based on mean**	3,087	7	37	,012
	Based on Median	,619	7	37	,737
	Based on Median and with adjusted df	,619	7	11,182	,731
	Based on trimmed mean	2,185	7	37	,058

Table 10: Levene's Test for experiment A.2

This dataset fails Levene's test; P-value (0,012) < alpha (0,05), so we reject the null hypothesis of equal population variances. Thus, a Kruskal-Wallis test is performed:

	Version1	N	Mean Rank
Fixation percent	A0-B0-C0	4	21,13
	A0-B0-C1	3	16,50
	A0-B1-C0	4	22,63
	A0-B1-C1	6	21,25
	A1-B0-C0	6	27,92
	A1-B0-C1	8	18,94
	A1-B1-C0	4	27,75
	A1-B1-C1	10	25,30
		45	

Table 11: Ranks in experiment A.2

	Fixation percent
Kruskal-Wallis H	5,249
df	7
Asymp. Sig.	,630

Table 12: Kruskal-Wallis Test report for experiment A.2. Grouping variable: version

A Kruskal-Wallis test indicated that the fixations did not significantly differ across designs, H(7) = 5.249, p = .630. Comparable to experiment A.1, we cannot reject the null hypothesis. This lack of significance

for both experiments A.1 and A.2 indicates that the difference in contrast in each design element did not cause significantly more or less clicks or attention from new visitors to the homepage. The comparable non-significant results are encouraging in that the data does not violate the assumption that visual fixation leads to a higher CTR. However, it is still surprising as it is not in consonance with the hypothesis that more contrast will lead to *at least* more visual attention. This leads us to believe that salience is not enough to demand the attention of the viewer in this case. This is further explored in experiment B.

6. RESEARCH DESIGN EXPERIMENT B

Multivariate testing of button names

Due to the inconclusive results of experiment A, we move away from a bottom-up control of visual attention and consider that a top-down control of visual attention describes a visitor to the webshop more accurately. This is otherwise described as goal-driven attention, that is, attention is driven by the goal of the viewer (Orquin & Mueller Loose, 2013). A new visitor to an e-commerce website is looking for more information or products as they are in the information search stage of the customer decision process. Consecutively, Wickens (2015) developed a model for visual scanning called SEEV, and later developed this into a model called N-SEEV for dynamic environments, (Wickens, 2021) that is based on four components: Salience, effort, expectancy and value. According to the SEEV model, Salience – Effort + Expectancy + Value = Net attractiveness. This net attractiveness can predict the likelihood of moving to that Area of Interest (AoI). Effort refers to the physical effort it would take the user to move to this AoI. Expectancy refers to the expectancy of events at the AoI, and value is defined by Wickens (2015) as the degree of relevance multiplied by the importance of the task for the viewer. This model was created to determine visual attention, but as Hernandez and Resnick (2013) describe, and as we assume with this research design, visual attention can be correlated with the CTR of CTAs. Salience is the factor that was focused on in experiment A, defined as the contrast. However, due to the lack of significant differences in CTRs for each design, it is possible that the perceived effort of looking at and clicking on the CTA is higher than the expected value of doing so in comparison to the CTAs around it, in order to complete the goal the visitor has. As Orquin and Mueller Loose (2013) put it, AoI's with a higher task relevance will receive more attention, and James' Choice was not perceived to have a high task relevance. However, this perception is not in correlation with the designed conversion funnel: a new visitor searching for inspiration or information about shopping at www.jamescooke.com would benefit from a page with an overview of top products. Due to this discrepancy, the following experiment has been set up. Based on the assumption that users underestimate or misattribute the value that the CTA will provide for them, the hypothesis arose that new visitors to the website might not know what "James' Choice" means. Therefore, it was hypothesized that a different name for this button would create more clarity, and thus more accurate estimations of value, which would lead to a higher CTR. To test this hypothesis, three new variations were created:

	Name
1.	James' Choice
2.	Bestsellers
3.	Top Picks
4.	Trending

Table 13: Variants for experiment B

These designs can be found in Appendix C. These variations were chosen with the goal of being familiar terms for users, so that they are more likely to correctly estimate the value the button will provide them. These variations were formulated through several deliberations with the marketing team of Wegter B.V., and were chosen based on an internal examination of the practices of Wegter B.V. 's competitors and peers in the field of E-commerce. To be clear, these variations were chosen for their familiar meaning to the average new user, which is a feature "James' Choice" has the risk of missing. These are accompanied by the hypothesis and the null hypothesis:
H0b: The name will have no association with the click through rate.
H1b: The name will have a significant association with the click through rate.

Measures

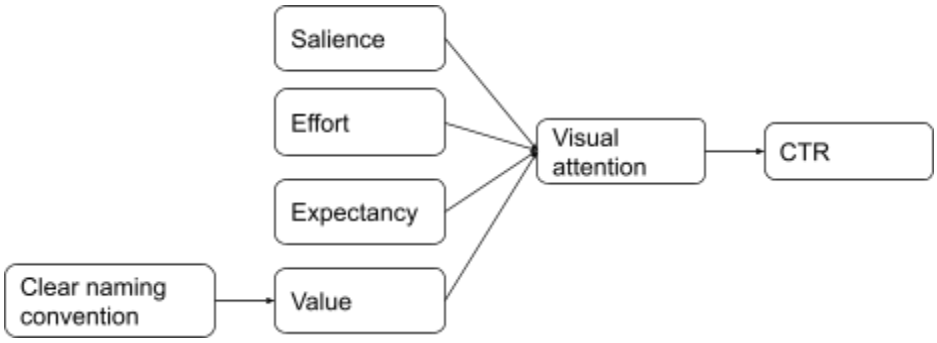

Figure 5: Conceptual framework 2.0 based on SEEV (Wickens, 2015)

The conceptual framework in figure 5 has been updated to include the factors in Wickens' (2015) SEEV model. Our independent variables impact the value associated with the CTA. In experiment B the Salience or degree of contrast will be kept equal.

	Dependent variable	**Independent variable**
H1	Click through rate	Name of the button

Table 14: Dependent and independent variables for experiment B

Extraneous variable	**How to control**
Other call-to-action buttons might distract visitors' attention.	Keep the rest of the website consistent across the experiment.
New and returning visitors might respond differently to call-to-actions, especially if returning visitors had already responded in the past.	Only use new visitors for the measurement.
The intention of a visitor might differ per person, e.g. to find a specific product, to read the blog, to check for sale. This will impact whether they respond to the call-to-action.	Intention of visitors is not controllable, however, by only measuring new visitors, we assume that the users will still find themselves around the start of the customer decision process and the conversion funnel. These are the target users for this call-to-action.

Table 15: Controlling extraneous variables in experiment B

Data Collection

Google Optimize and Google Analytics will be used to retrieve the quantitative click-through data across a set time period.

7. RESULTS EXPERIMENT B

The experiment ran for a total of 18 days, from 17-05-2022 to 03-06-2022, with a total of 516 sessions.

Variant	**sessions**	**conversions**	**conversion rate**
James Choice	126	2	1.6%
Bestsellers	134	9	6.7%
Top Picks	139	14	10.1%
Trending	117	6	5.1%
TOTAL	516	31	6.0%

Table 16: Results of experiment B

The difference in conversion rate of the name James Choice compared to Research Design A is notable, but this can be explained through the fact that this experiment includes mobile and tablet users and Research Design A.2 did not include mobile and tablet users. Additionally, the nature of the traffic is different since advertising to the website went live just prior to experiment B.

To test whether there is a significant relationship between naming and conversion, a chi-square test is performed. The confidence interval is 95%, and the chi-square test can be found in tables 17 and 18. The assumption that expected value of cells should be 5 or greater in at least 80% of cells has been met.

		Conversions		
		0	**1**	**Total**
Name	Bestsellers	125	9	134
	James Choice	124	2	126
	Top Picks	125	14	139
	Trending	111	6	117
Total		485	31	516

*Table 17: Name * Conversion Crosstabulation for experiment B*

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	$8,707^a$	3	,033
Likelihood Ratio	9,774	3	,021
N of Valid Cases	516		

Table 18: Chi-square test report for experiment B. ***a:*** *0 cells (0,0%) have expected count less than 5. The minimum expected count is 7,03.*

In this case, our P-value (0.033) < alpha (0.05), so we reject the null hypothesis. There was a significant relationship between name and CTR, X^2 (3, N = 516) = 8.7, p = .033. Thus, it can be concluded that Top Picks is a better naming choice than James Choice when targeting new visitors to www.jamescooke.com. This result confirms the suspicion that visitors were not correctly estimating the value of the CTA, and that increased familiarity in names create a better estimation of the task relevance of the CTA. This result supports both the SEEV model of attention and the top down control of visual attention, namely that if a viewer has a goal in mind, they will pay less or no attention to AoI's that won't support that goal, despite the level of salience attributed to the AoI. Putting this in perspective of the conversion rate optimization framework by Soonsawad (2013), the catalyst and marketing mix were failing to convince our viewers of this conversion path. For the case of www.jamescooke.com, the recommendation is to choose the name of "top picks" for the CTA.

8. CONCLUSION & DISCUSSION

Based on experiment A, using CTR and the eye tracking results, we are unable to reject the null hypothesis, which was H0a: There is no association between design elements and click through rate. The data collected was based solely on new visitors to the website, and the click through rate overall is extremely low. This indicated that users were not following the customer journey that was expected of them. The lack of significant results suggest users who might have seen the call-to-action did not recognize it as a useful path to take. This caused the alteration of the conceptual framework with the hypothesis that users did not understand the button, and that understanding will positively influence the click through rate. This hypothesis was tested in experiment B, using several different familiar names for the button. The inclusion of the familiar naming convention of the page resulted in a significant increase in clicks to that page, confirming the hypothesis that users initially did not know where the button would take them, and that that new understanding positively affects their willingness to follow the intended

customer journey. The initial assumptions that new visitors both knew what "james' choice" means and that even eye-tracking participants would not have an intrinsic goal in mind when viewing a web shop were proven incorrect; "viewing the webshop" is, in itself, a goal. The data is in line with the theories of goal-driven attention and the SEEV-model.

This result is encouraging in the context of conversion rate optimization research, as the lack of initial significant results demonstrates that, in order to increase CTR, you need to provide a path for your users in which the benefits of following that path are plain. This indicates that doing pilot and user studies in order to become intimately familiar with the thoughts and needs of your user base in each stage of the customer decision process is highly valuable to avoid wasting time and resources. This research would have benefitted from a think-aloud experiment as a starting point, in order to discern the current state of understanding and need for the call-to-action button we are researching. Following this, experiment B (alternate names) could have preceded A (design elements), as guaranteeing user understanding could potentially increase the significance of different design elements such as placement and color. This is recommended to Wegter BV. for continued further research.

To answer the research question; "What is the impact of different design elements in call-to-action buttons on conversion rates?" For www.Jamescooke.com, a clearly communicated path (name of the button) has the strongest impact when compared to visual design elements. As noted above, further impact of visual design decisions for www.jamescooke.com require further research. In broad strokes, one can adhere to the conclusions of Hernandez and Resnick (2013), who's research found call-to-actions above the fold on the left of the page will be most attention grabbing. However, for a more specific answer, one recommendation is to run a/b-tests on a case by case basis, whilst making sure your users understand the call-to-action you are testing.

Factors that might have affected the outcome of this study include neglecting traffic on mobile and tablet devices and only testing design elements of the web version in experiment A, the inconsistency in the number of participants and length of time looking at the screen in the eye-tracking experiment, and personal assumptions about the new visitors to the website, including the assumption that the visitor knows what "james' choice" means and that an overview of top pics adds value. Additionally, the nature of the e-commerce webshop is naturally very specific, and whilst the theories can be adhered to and drawn from, the specific results are non-generalizable: "top picks" will not be the best option for every webshop. For future research to achieve more generalized conclusions about specific naming conventions and salience, similar a/b-tests should be done over a broad range of e-commerce webshops with subsequently broad range of user demographics using a replicable design test (e.g. location, contrasting color).

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APPENDIX A: Experiment A version designs

Note: these screenshots of www.jamescooke.com were taken on screens with different resolutions.

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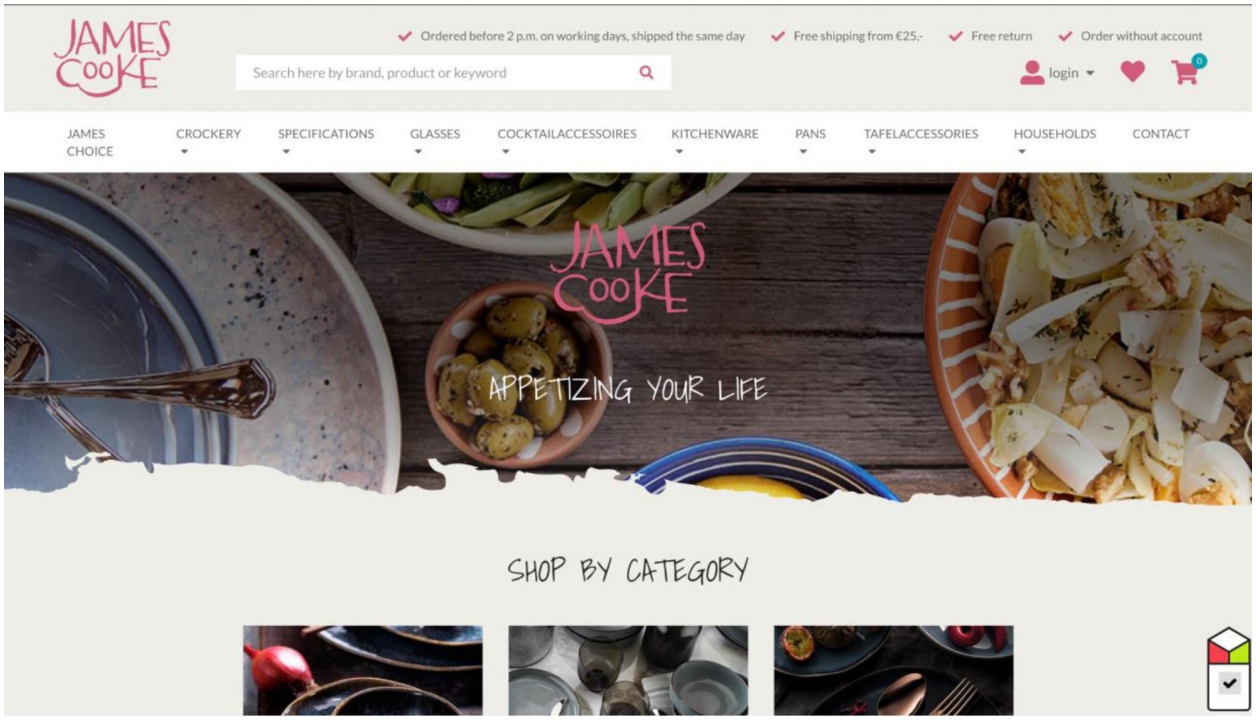

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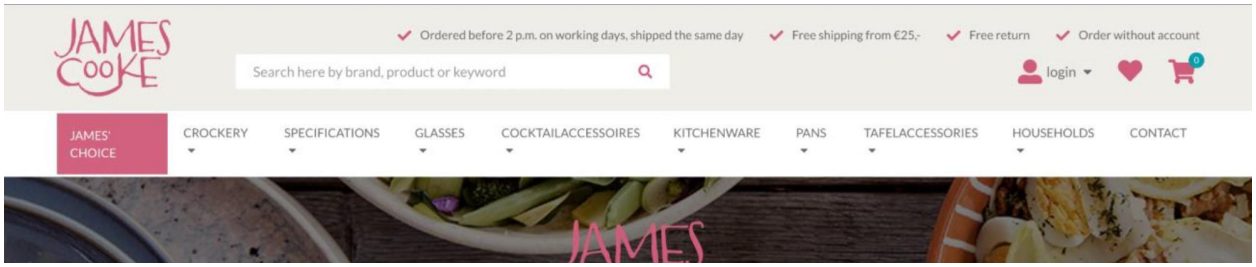

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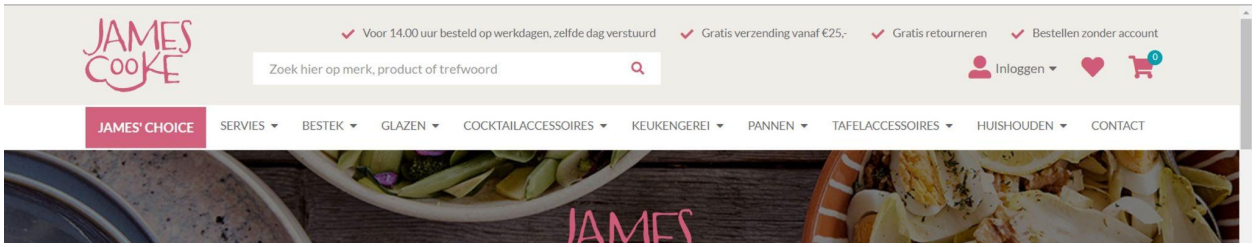

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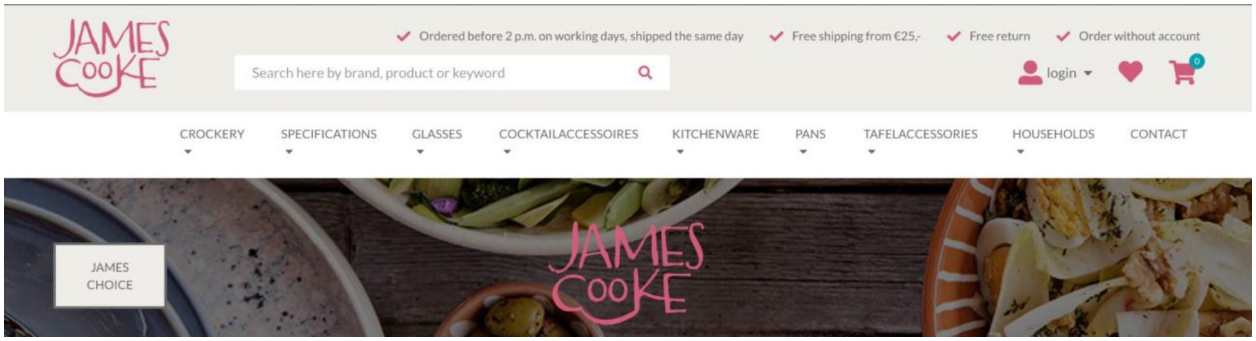

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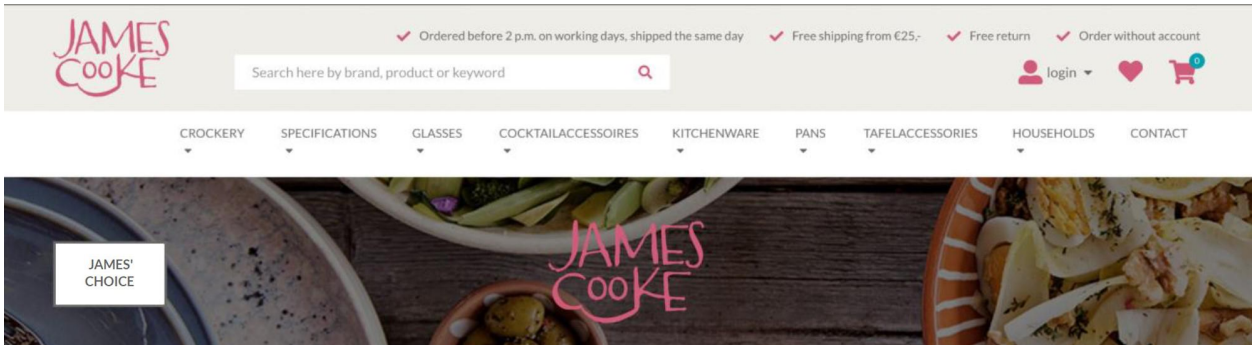

A1B1C1:


JAMES COOKE
Voor 14.00 uur besteld op werkdagen, zelfde dag verstuurd
Gratis verzending vanaf €25,-
Gratis retourneren
Bestellen zonder account
Zoek hier op merk, product of trefwoord
Inloggen
SERVIES
BESTEK
GLAZEN
COCKTAILACCESSOIRES
KEUKENGEREI
PANNEN
TAFELACCESSOIRES
HUISHOUDEN
CONTACT
JAMES' CHOICE
JAMES COOKE

APPENDIX B: Eye tracking gaze plots

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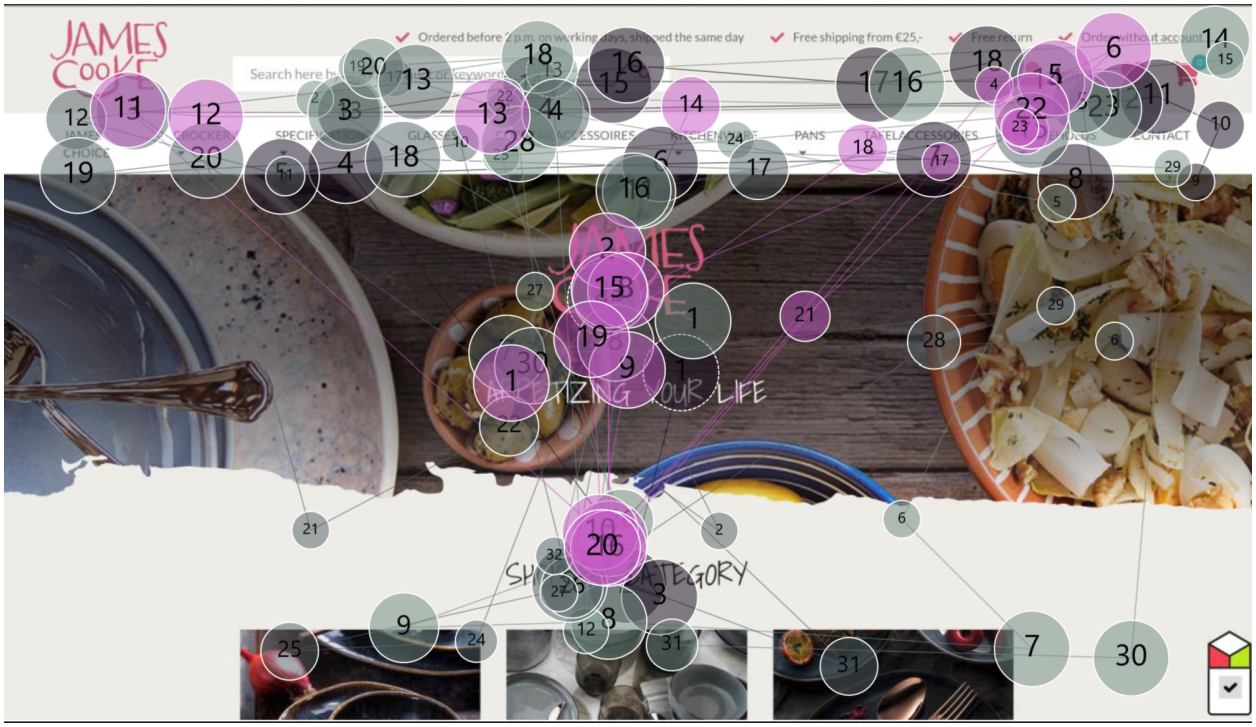

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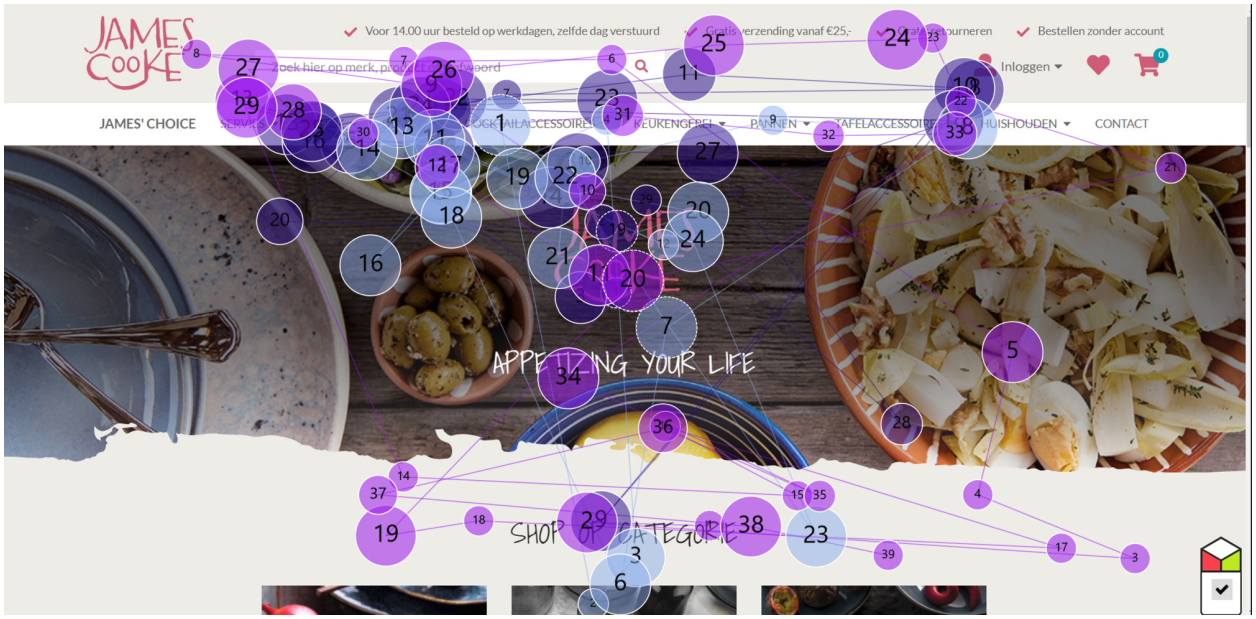

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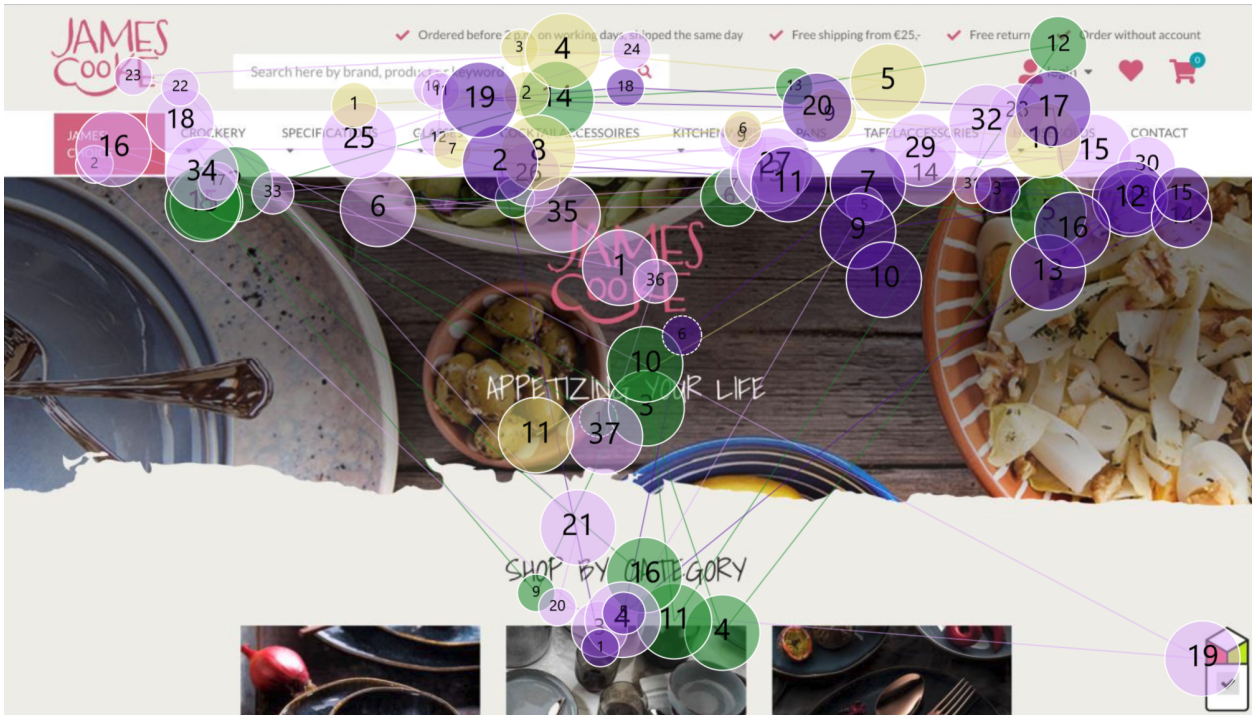

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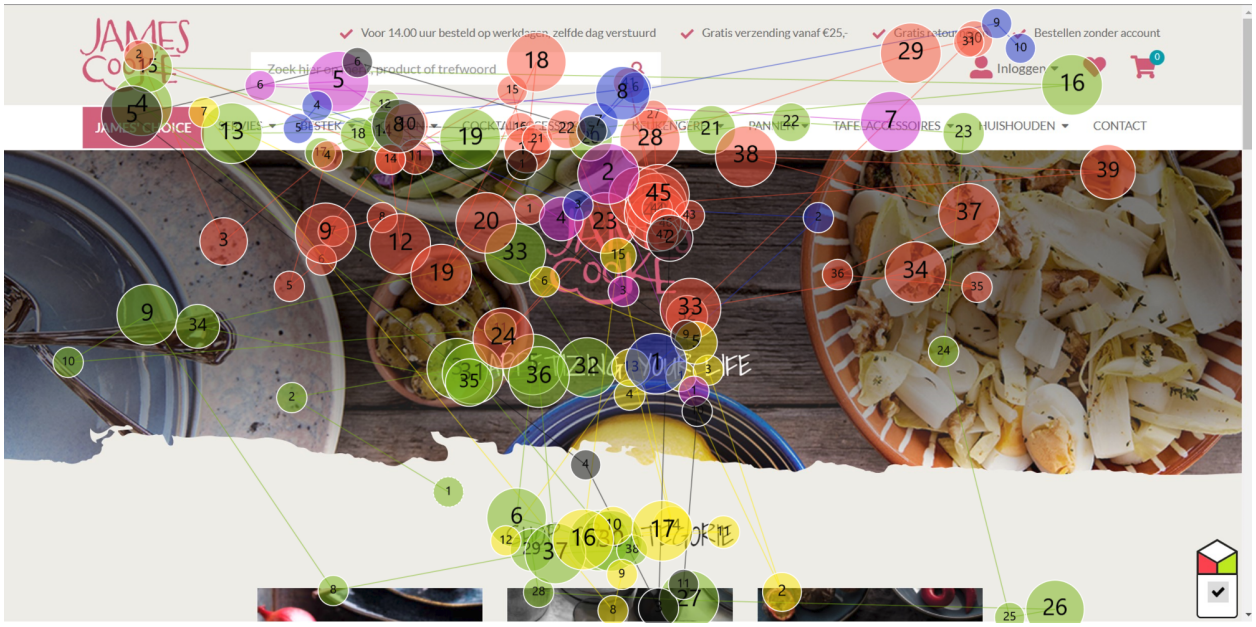

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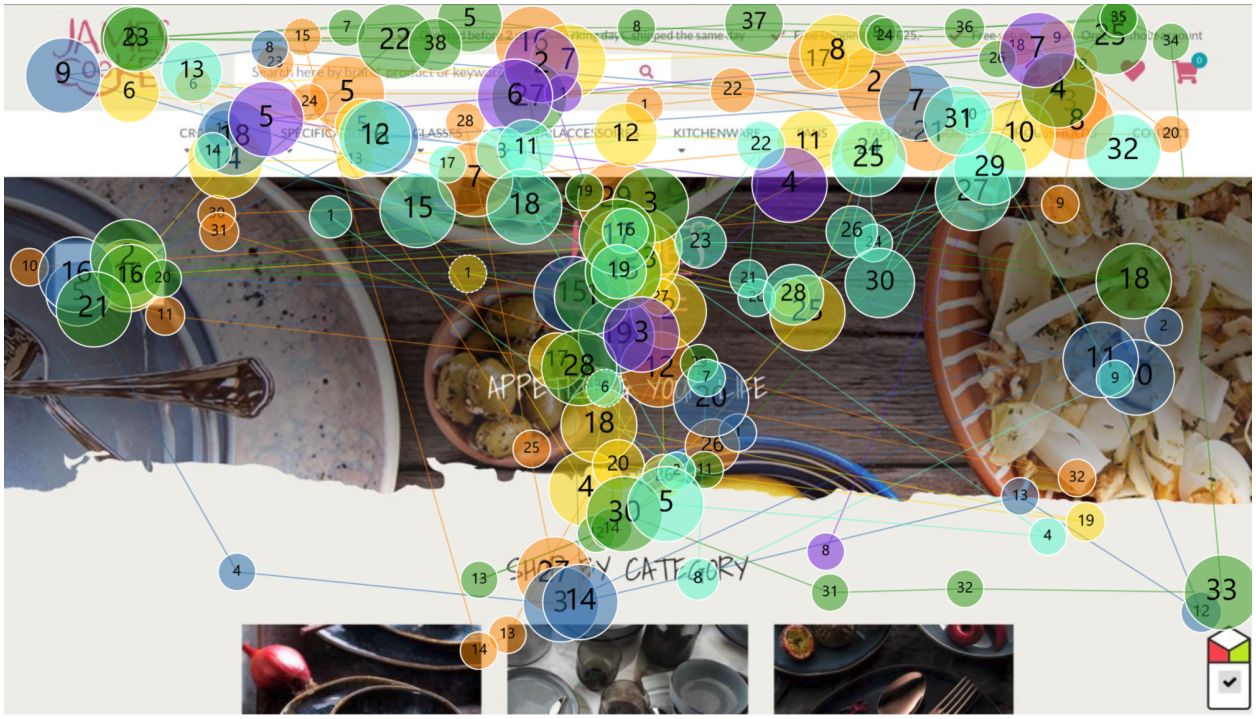

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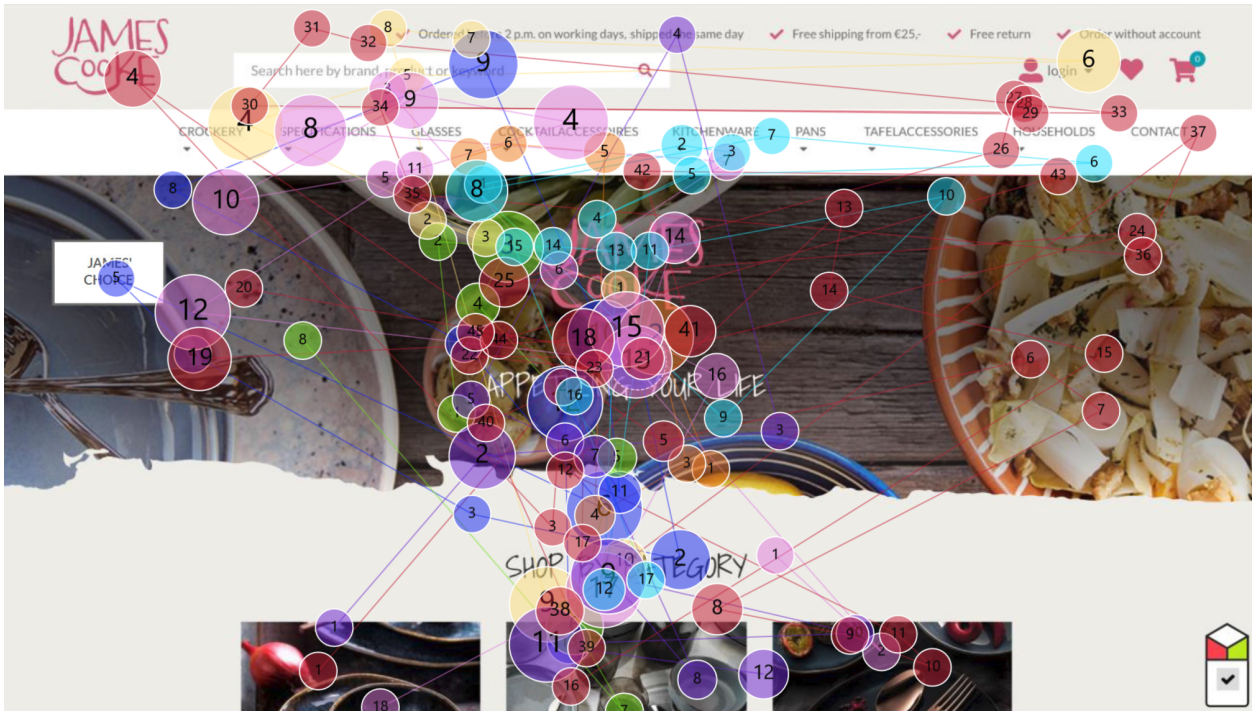

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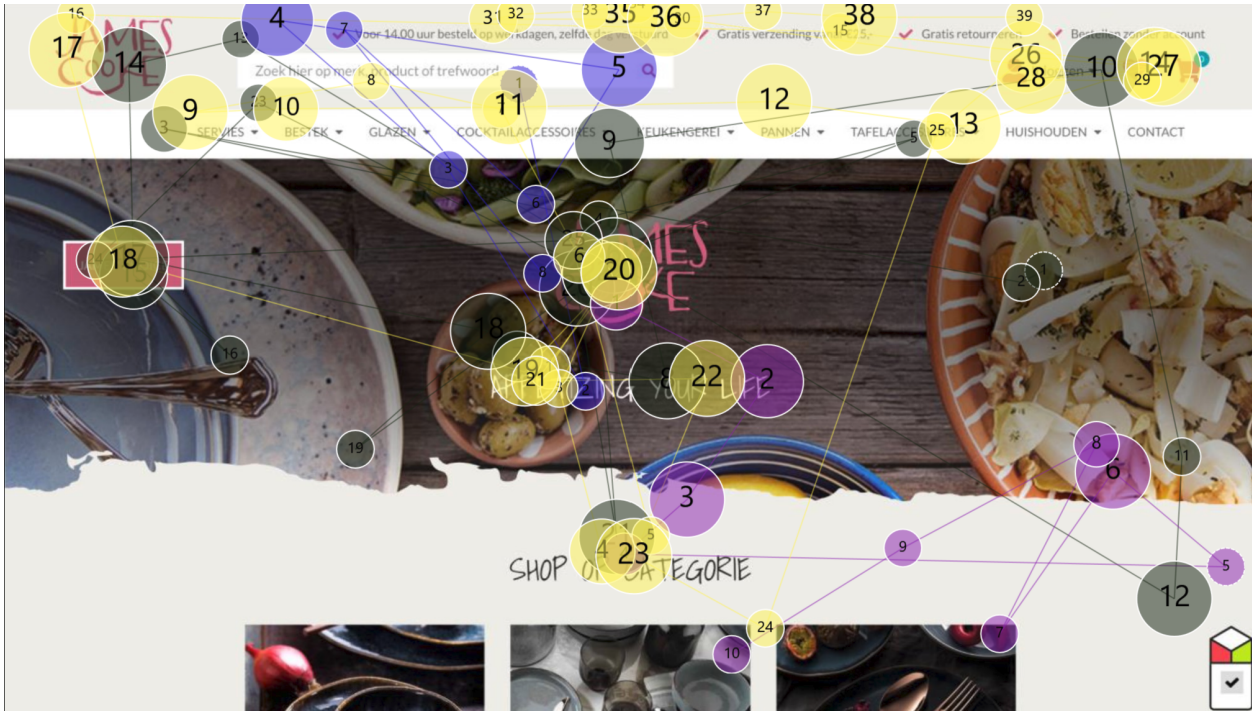

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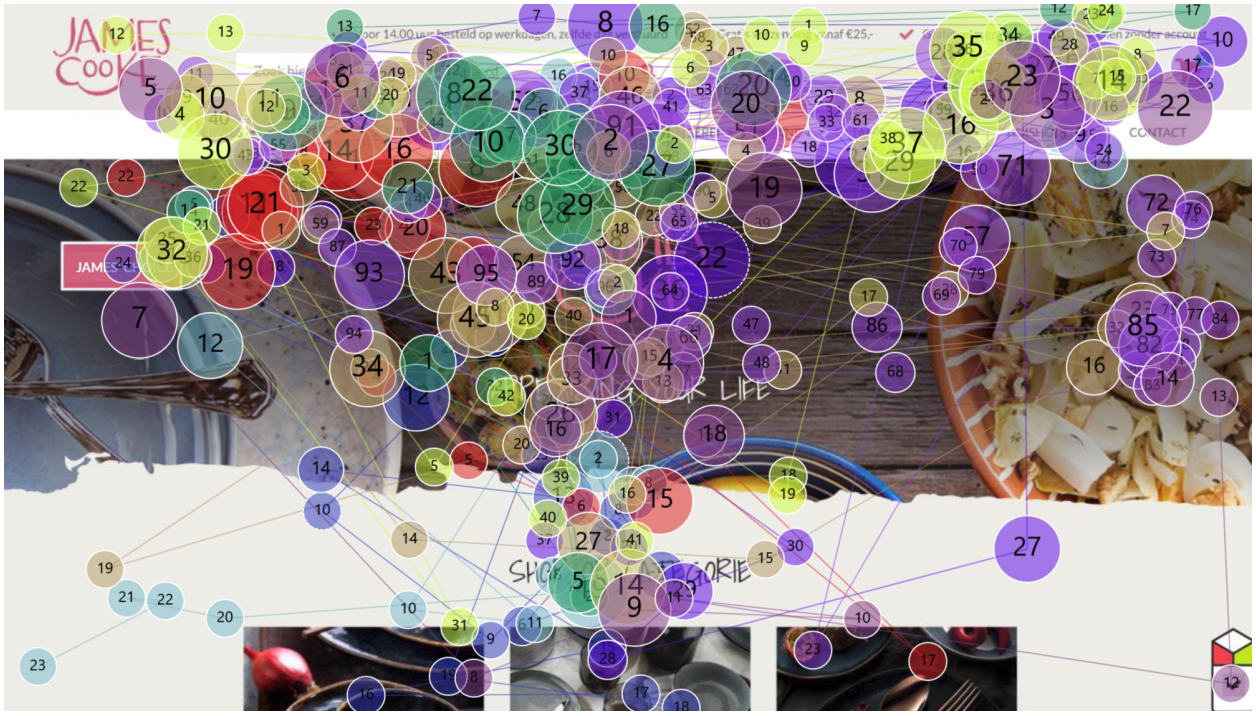
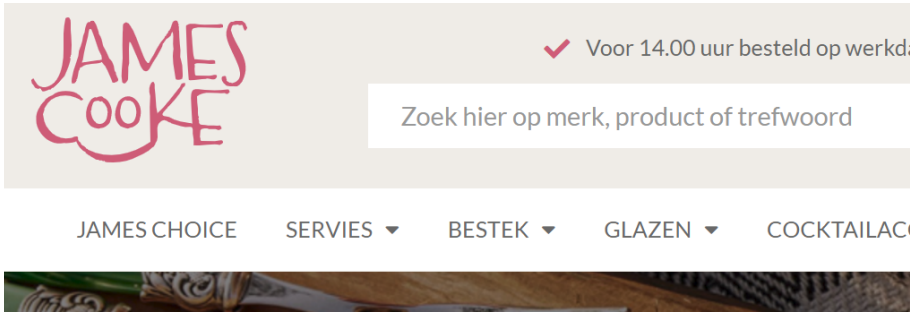
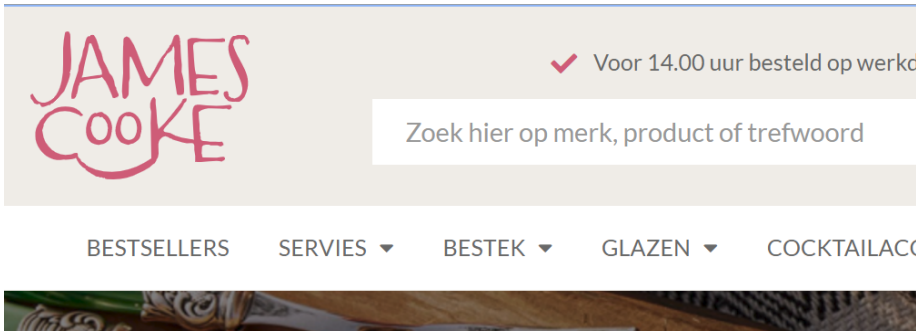


APPENDIX C: Experiment B version designs

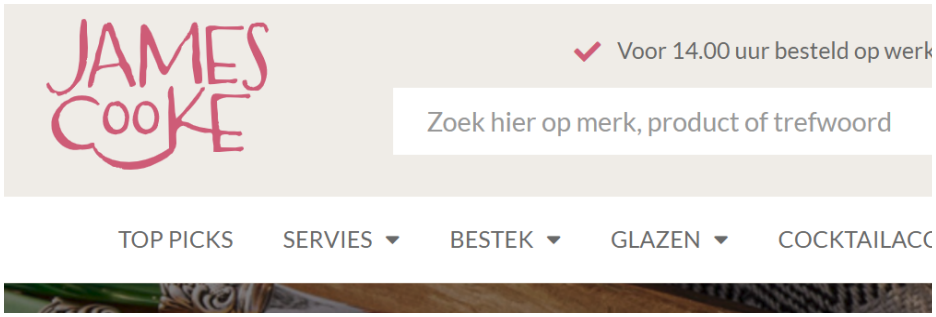
James' Choice:



Bestsellers:



Top Picks:



Trending: