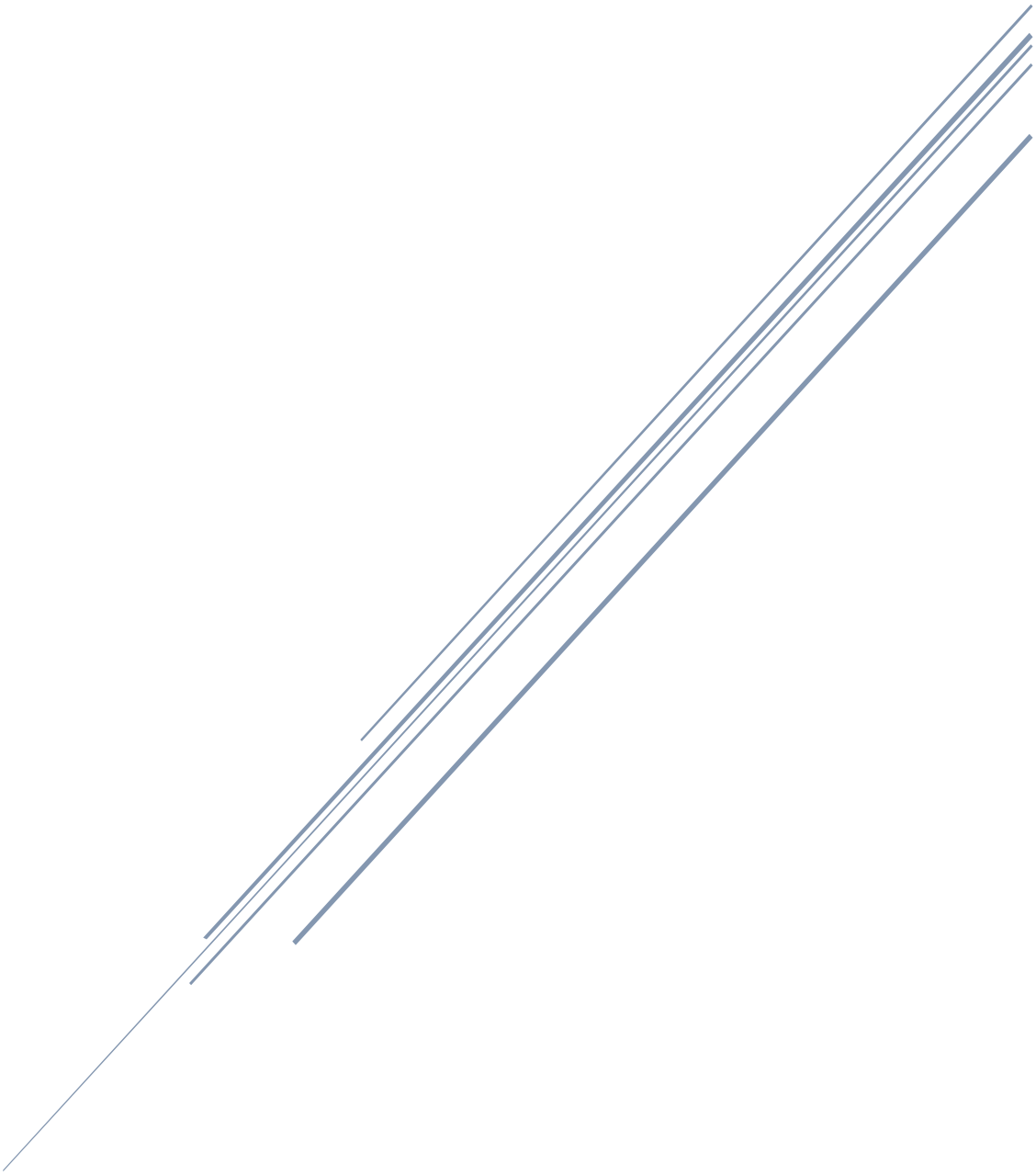
ENERGY DRINK CONSUMPTION IN CHILDREN AND YOUTH

Candidates 271, 171, 133

Group 6666



OsloMet

ADSE3200

Contents

1: Introduction

Children between the ages of 10 and 18 are consuming energy drinks at a rapidly increasing level. According to the Norwegian Institute of Public Health, Folkehelseinstituttet (FHI), the level of consumption and the number of children consuming the drink are both increasing every year. (FHI, 2023). The purpose of this report is to analyze the consumption of energy drinks among children and youth, which we will achieve by delving deeper into the patterns of energy drink consumption among the age group and trying to provide a comprehensive understanding of the current landscape among this demographic. The group chosen dataset focuses directly on the energy drink intake among children – the group chose this dataset due to its direct relevance to our topic. The dataset is also sourced from an official governmental data collection through FHI. The entire FHI report is an in-depth collection of multiple datasets, the dataset chosen for this assignment focuses on the consumption of the drink – not the gender, race, location, type of drink, or any other information about the individual participating children, which is all available in the original report.

The dataset explaining energy drink consumption among children and youth has a plethora of use cases, and the information gathered from the report could be beneficial to multiple groups of people. The dataset could be useful for research and understanding the patterns and trends of consumption – and to explain the reasons behind consumption. Knowing how common the drink is among children, and the increase of consumption every year, could be useful for policy making, as both governments and health authorities could use this data to formulate policies and guidelines – with the goal of regulating the sale and marketing of the drink to children specifically. The third group of people that could benefit from the dataset is parents, caregivers, and educators – who could be able to limit consumption in their own homes or classrooms and raise awareness of the health risks associated with energy drinks. Another utility for this dataset could be improving marketing for children, as beverage companies could use the provided information to improve their own marketing – either by changing their strategies to make the product seem healthier, or by marketing to diverse groups of people.

Parents, caregivers, and educators are often the closest relation between a child and an adult, children typically take after the adults they see in their lives, and this group of people serve as the primary influence on a child's life, often shaping their behaviors and choices through their own actions and guidance. Therefore, the target audience of our visualizations would be parents, caregivers, and educators – this is a group of people who may not typically search out the information provided in the dataset themselves but could be interested in the facts if they are visualized and made accessible to them. By visualizing the dataset, the information could potentially reach out to groups who otherwise would not care for or seek out the information themselves.

2: Data insight

The groups chosen dataset consists of objects, attributes, and different data types. In the chosen dataset the object, or objects, would be the frequency of consumption among the interviewed children and the average level of energy drink consumption or intake, divided by all the interviewed children and only those who consume energy drinks, regardless of frequency. The frequencies in our dataset are “drinks energy drinks (regardless of frequency),” “minimum once per week,” “minimum once daily,” and “multiple times per day”. The attributes in this dataset are year of collection, number of children interviewed, number of children reported at each level of frequency. Another attribute could be the increase in general consumption and consumption frequency.

Description	Data type	Object or attribute
Year information collected	Numerical/Discrete or Interval	Attribute
Number of children interviewed each year	Numerical/Discrete	Attribute
Frequency of energy drink consumption/intake	Numerical/Continuous	Object
Average level of energy drink consumption/intake	Numerical/Continuous	Object
Increase of consumption	Numerical/Continuous or Categorical/Boolean	Attribute

Figure 1: *Table of data from the groups chosen dataset.*

We can divide the data into two main categories. One is qualitative data, which is information that cannot be measured, counted, or easily expressed using numbers. On the other hand, we have quantitative data which is the value of data in the form of counts or numbers – also called numerical data. In the dataset capturing energy drink consumption among children, we do not encounter any qualitative data types – there are no descriptions of who is interviewed, what gender, age, race, location, or type of energy drink they consume is, but there are a few other data types. The first data type represented in the dataset is the year in which the information is collected, which is a numerical data type and is both discrete and interval data. The year of information collection would be considered discrete data when looking at the years as individual, separate points in time – treating each year as a distinct category and not particularly looking at the relationship or distance between the years. The year of information collection could also be considered interval data, when looking at the year as a measure of the time passed and the difference between

two years – which could be used when looking at the difference in consumption between different years.

The second data type is the number of children interviewed each year, which is discrete numerical data. Discrete data can only take certain values, as you can't have half an interview. We don't have any information about the children being interviewed each year, only their general age group of 10 to 18 years old – this data type is therefore strictly numerical. The third data type represented in the dataset is frequency of energy drink intake, expressed as a percentage of the full value. This is continuous numerical data, as it can take any value within a certain range – this data type is also the main object of the dataset, as you can't remove it without the dataset becoming useless or unreadable.

The fourth data type in the chosen dataset would be the average level of energy drink consumption, both among all participants and only among the participants who consume energy drinks, regardless of frequency. This data type represents the average quantity of energy drinks consumed and is also continuous numerical data as it can take any value within a certain range – this data type is the other object of our dataset. The final data type in our dataset is the increase in intake or consumption of energy drinks. This data would mainly be considered continuous numerical data, to represent the change in consumption over a certain period – another data type that could fit in this case is Boolean Categorical data, to represent the increase by a simple binary indication, 0 for no increase and 1 for any increase.

In examining our dataset on energy drink consumption in children, it is worth taking note that the data is almost exclusively quantitative in nature, with only one qualitative data type present. The dataset includes variables such as year of data collection, number of children interviewed each year, the frequency of energy drink intake, and the average level of energy drink consumption. However, the only qualitative data type present is the Boolean/Binary categorical data type that could fit into the increase in intake of energy drinks. The dataset lacks any other qualitative or categorical data types that could provide a more nuanced understanding of the data. There is no information about gender, location, race, type of preferred energy drink, or how many children are of each age between 10 and 18. The absence of these variables limit the depth of our analysis, as we are unable to understand and explore the trends of energy drink consumption based on these attributes. This also highlights a potential area for further data collection and research.

3: Theory and methods

When beginning the researching process for our project, members of the group had preexisting mental models, shaped by existing research on the potential health risks of energy drinks. These mental models influenced our approach to analyzing the dataset and interpreting the results of our visualizations and user testing – based on the understanding that high consumption of energy drinks could have negative effects on children's health. Our mental models going into the visualization process hypothesized that the consumption might be increasing every year, which could signal growing health risks. This mental model could also influence the results, for instance, an upward trend in consumption was seen as more than just an increase in the popularity of energy drinks, but as a public health concern. To ensure our mental models didn't lead to biased conclusions, we chose to create multiple visualizations using direct data from the chosen dataset. Our group had to remain open to the possibility that the data possibly wouldn't fit with our initial assumptions and be ready to adjust our mental models in response to the actual findings.

The visualization methods chosen to represent the frequency of energy drink intake among children are a line chart, which is a simple and powerful tool when representing both numerical data and changes over time – both of which are present in our dataset. This type of chart is beneficial when analyzing the changes in energy drink consumption over time. When creating a well-constructed line chart, there are a few principles one should follow. A line chart should be "clear, detailed, and thorough labeling should be used to defeat graphical distortion and ambiguity. Write out explanations of the data on the graphic itself. Label important events in the data." (Tufte, 1983). Our line chart follows all Tufte's criteria, providing a clear picture of the data trends without any clutter or distortion. To visualize our line chart, we have used Excel to create a simple and effective chart.

Our second visualization, a pictogram displaying how many children consume energy drinks, a pictogram is a type of chart that uses symbols to represent data, making it more engaging and easier to understand. This type of chart can be used effectively when communicating with an audience who may not be interested in more complex or less interesting chart types, such as our target audience of parents, caregivers, and educators. According to Jacques Bertin's Semiology of Graphics, the use of recognizable symbols can help in the immediate comprehension of the information being represented. (Bertin, 1983).

Our third visualization is a bubble chart displaying how many children in 2022 consume energy drinks, and the frequency of consumption. A bubble chart can be useful for visualizing data with multiple dimensions and give another perspective on the data analyzed. A bubble chart excellently uses size and position in a graphic representation to effectively convey information, principles that are described in Jacques Bertin's Semiology of Graphics (Bertin, 1983). The bubble chart visualization was created using Figma, allowing us to create an easy-to-read chart using simple visualization techniques.

The information we want to visualize from the dataset is how common and frequent children and youth consume energy drinks. Our main goal is to bring attention to an increasing problem – a large portion of young children consume energy drinks, which can be detrimental to their health and habits. By consuming large portions of caffeine and sugar at the same time, often early in the morning, children could be exposed to early heart attacks and reduced quality of life (Iversen, K. L., Arnesen, E., Meltzer, H. M., Brantsæter, A. L., 2018). According to the surveys conducted by FHI, 54% of young people between the age of 16 and 18 have experienced negative symptoms after consuming energy drinks (Abel, M. H., Iversen, K. L., Torheim, L. E., Brantsæter, A. L., 2023). The main goal of what to visualize from the dataset is to show how common it has become to consume energy drinks among children, and the rapid increase among the youngest groups.

4: Process / design phase

To visualize our chosen data, we assumed Figma and Excel to be some of the best choices for our needs. Excel is an intuitive interface for creating a wide array of diagrams and charts. The extensive selection and customization options of Excel make it a versatile tool for data visualization. Furthermore, the simplicity of the visual output makes Excel an easy-to-use and understand tool for those unfamiliar with the subject and the underlying data. Figma is a free design tool which is easy to learn and use. We chose to use Figma to achieve a more eye-catching and easy-to-understand type of visualization of the data. Both the bubble chart and pictogram were made using Figma. The reason for this was to make a visualization that is easy to read and gives the reader a better perspective of how a large portion of young people are consuming energy drinks.

The purpose of visualization methods is to make the data clearer and give the viewer a precise understanding of the data that the dataset is trying to convey. There are multiple forms for visualization, some are very straightforward, such as pictograms, line charts, bar charts - while others can be more difficult to read, a few examples are bubble charts, heatmaps, and radar charts. The visualization methods that the group has chosen to process our dataset includes a pictogram, a line chart, and a bubble chart.

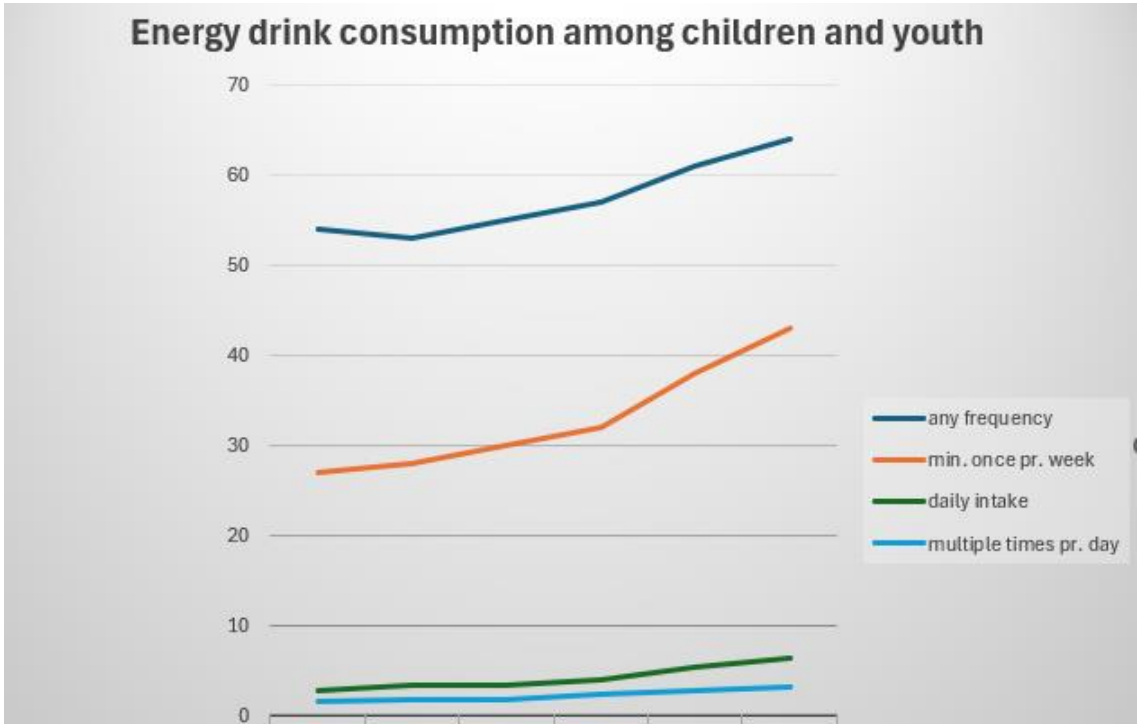


Figure 2: *The visualization shows energy drink consumption by volume among children and youth. Consumption among children is increasing every year. The figure has been visualized using Excel, based on data from FHI.*

We chose to utilize a line chart to represent the data, aiming to make it easier for the reader to understand. By plotting data points and connecting them with lines, we managed to provide a clearer visual performance for user testing. Using a line chart makes it easier for the viewer to observe the patterns within the dataset – this can be done by looking at the different lines within the chart and notice how they change over time. The line chart illustrates the variation in consumption among children over time. The line chart is an effective visualization tool for our dataset as it clearly illustrates the changes in consumption over time. (Yi, M., n.d.).

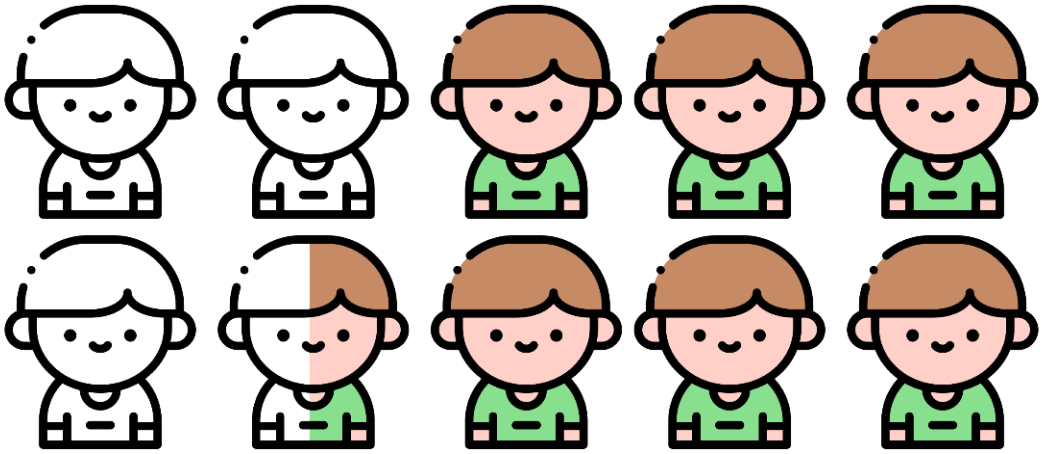


Figure 3: *The visualization shows how many children, out of ten, consumed energy drinks – regardless of frequency – in 2022. The icons used in the visualization have been sourced from Flaticon.com (Freepik), visualized using Figma, based on data from FHI.*

Our second choice of visualization was a pictogram, selected for its simplicity and readability. The pictogram offers a straightforward representation that can be easily understood by a wide audience. In our pictogram we used icons that are supposed to represent children, we started by making ten copies of the icons and only colored the chosen percentages from the dataset. In this method we chose to make a pictogram to visualize children that consume energy drinks at any frequency from the year 2022 in the dataset. (Alamargot, D., Terrier, P., Cellier, J. M., 2008, s. 17–31). However, while the pictogram excels in clarity, its simplicity sets limits for how much data it can effectively convey. Regardless of its drawback, we found that the pictogram was quite useful in representing key insight in a visually appealing manner.

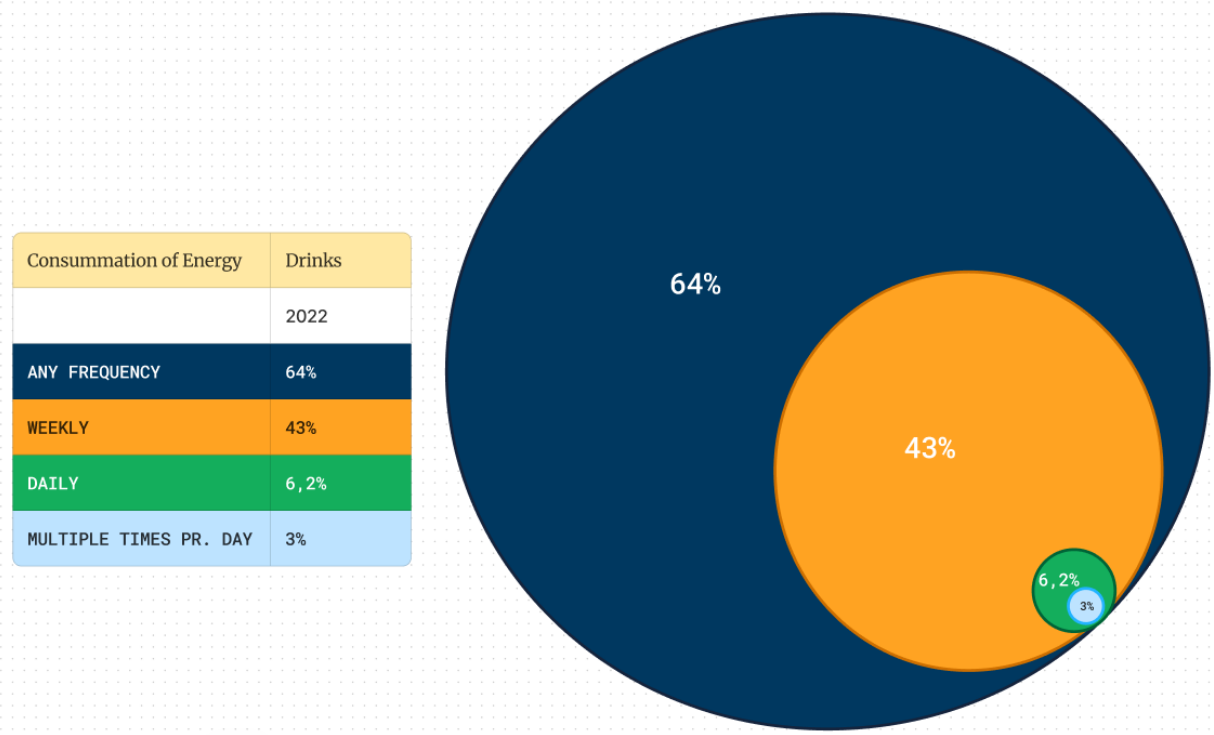


Figure 4: *The visualization shows the frequency in intake of energy drinks among children in the year 2022. The figure has been visualized using Figma, based on data from FHI.*

The decision to use a bubble chart stemmed from the need to effectively represent overlapping variables within our dataset. Our dataset primarily focuses on the energy drink consumption among children, with varying frequencies of consumption. This emphasis on consumption meant that multiple variables were overlapping, so we wanted to visualize this by using bubbles. Our bubble chart features four bubbles, each representing a specific frequency of energy drink consumption among children. The largest bubbles represent those that consume the drink at any frequency, while smaller bubbles indicate higher consumption levels. This allows for a clear visualization of the consumption habits within the children that consume energy drinks. (Yi, M., n.d.).

We decided to use an online form where we gave the users the opportunity to answer some questions about our choice of visualizations. This gives us the opportunity to receive feedback on our developments, allowing for further improvements to our visualizations.

The user testing was performed on our main target audience, parents, caregivers and educators, some responses we're outside of our target audience. In total we had ten people take the survey, and the responses to the survey exclaimed a preference for the pictogram, as it was the easiest to understand. The pictogram was also criticized for requiring a description to be read. Regarding the bubble chart, a few participants in the user test found the original design confusing, and to address the challenge of overlapping variables in the bubble chart, we decided to change the circles from a solid color to a transparent color.

The visualization method that was able to convey the message of energy drink consumption among children the best, was the line chart. Most of the participants felt that the line chart was the best out of the three to convey the message of energy drink consumption among children. Some of the recuring comments that we received about the line chart was that it was the most structured and detailed out of the three. The participants felt that it covered the most data points and gave a great insight into the increasing frequency. Although we received great reviews on the line chart, we decided to make some enhancements to it. Specifically, we added data points along the lines and included the percentage values within these points. These additions aim to provide a more detailed representation of the data and make it easier for viewers to interpret the information.

5: Results

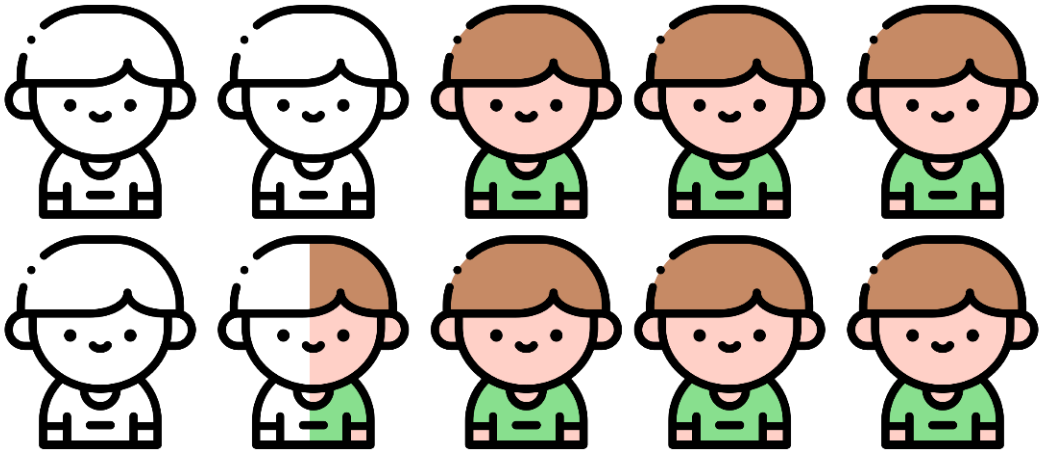


Figure 5: *The visualization shows how many children, out of ten, consume energy drinks - regardless of frequency – in 2022. The icons used in the visualization have been sourced from Flaticon.com (Freepik), visualized using Figma, based on data from FHI.*

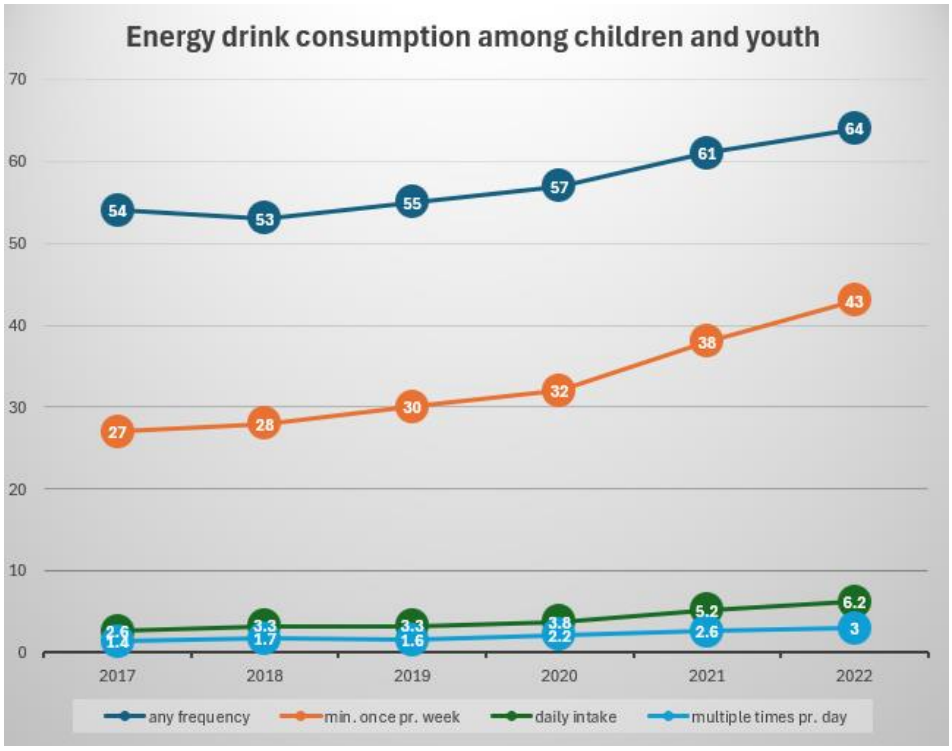


Figure 6: *The visualization shows energy drink consumption by volume among children and youth. The consummation among youngsters is increasing gradually most of the years, which is concerning. The figure has been visualized using Excel, based on data from FHI.*

In the design and creation of the line chart of visualization representing the frequency of energy drink intake among children, we applied principles outlined by Tufte. These principles, as mentioned earlier, emphasize clarity, detail, and thorough labeling. By applying these we were able to ensure that our visualization effectively communicated data trends without imposing any confusion or misrepresentation. As you can see in figure 6, we adhered to Tufte's recommendation to write out explanations of the data directly on the graphic and label important events in the data to prevent graphical confusion or misrepresentation. By incorporating these principles, our line chart provides a clear and comprehensive representation of the data.

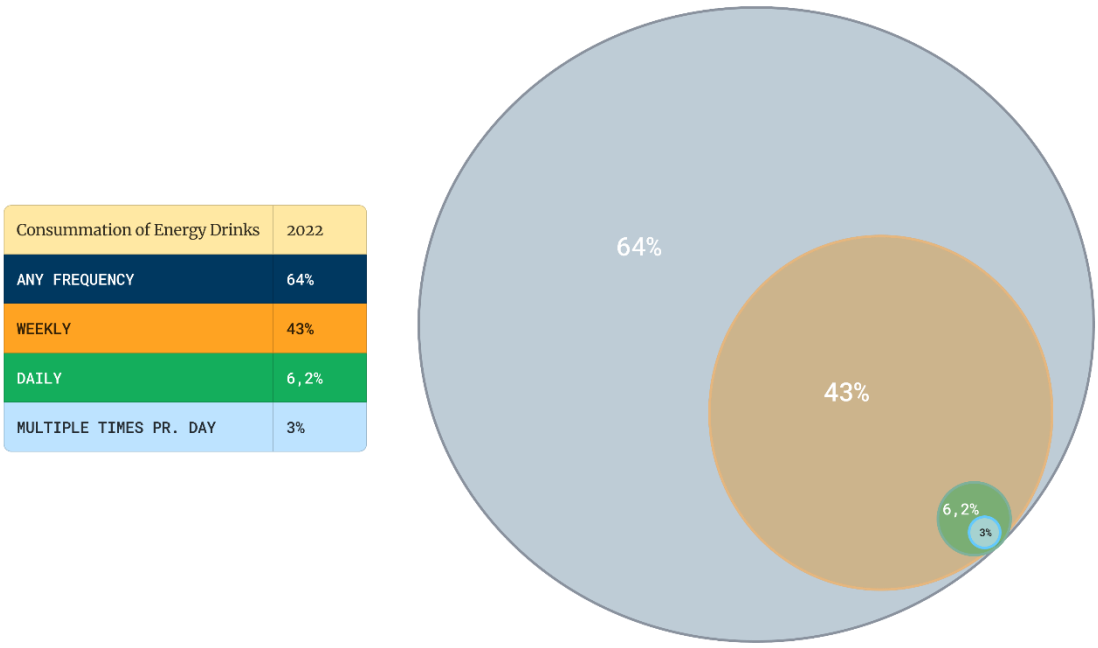


Figure 7: *The visualization shows frequency of consumption of energy drinks in the year 2022 among young people at secondary school and upper secondary school.*

Our decision to utilize a bubble chart, inspired by principles outlined in Jacques Bertin's Semiology of Graphics (Bertin, J., 1983), stemmed from the necessity to effectively illustrate overlapping variables within our dataset. Our bubble chart features four transparent bubbles, each representing a specific frequency of energy drink consumption among children in 2022. Furthermore, there's a table positioned next to the chart that offers additional context. It consists of five rows, with the first row explaining the chart's content, while the rest clarify the meaning behind the varied bubble colors.

5: Discussions

In approaching the visualization of energy drink consumption among children, our goal was to convey data accurately and effectively to our target audience of educators, parents, and caregivers. We aimed to raise awareness about the increasing consumption of energy drinks individually and highlight the potential health risks that can result from this trend. To achieve this, we utilized various visualization methods from data visualization theory.

We made several key choices throughout the process. Firstly, we selected three different visualization methods: a pictogram, a line chart, and a bubble chart. Each method was chosen based on its suitability for representing different aspects of the dataset and its potential to engage our target audience. Additionally, we conducted user testing to gather feedback on the effectiveness of each method, allowing us to make decisions about enhancing and improvement.

In designing the visualizations, we paid close attention to principles outlined by experts such as Tufte and Bertin. For example, we ensured clarity, detail and through labeling in our line chart, adhering to Tufte's recommendations to prevent graphical distortions. Similarly, in our pictogram and bubble chart, we aimed for simplicity and readability, drawing upon Bertin's principles of effective graphic representation.

Reflecting on our approach, there are areas where improvements could have been made. We could have explored additional visualization methods to offer diverse perspectives on the data. Moreover, conducting more extensive user testing or involving a broader range of stakeholders could have provided deeper insights. While our visualizations effectively conveyed overall trends in energy drink consumption for the children, we could have delved deeper into specific demographic factors such as gender, location, or economic status. This could have enhanced the nuance of our understanding by incorporating additional data or external sources.

Throughout the visualization process, we drew upon theories and principles from the field of data visualization. For example, we referenced Tufte's principles of clarity and labeling to ensure that our visualizations were informative and easy to interpret. Additionally, we applied Bertin's theories of graphic representation to guide the design and layout of our models, aiming for simplicity and effectiveness.

6: Conclusion

Data from the Norwegian Institute of Public Health (FHI) was utilized in this report to evaluate the rising trend in children's energy drink consumption. We used bubble charts, line charts, and pictograms to represent the data to make it easier for parents, caregivers, and educators to grasp. The images effectively conveyed the growing risk of children consuming energy drinks and the related health risks. While we concede that more user testing and visualization techniques may have enhanced our results, we believe our approach successfully communicated the key ideas and brought attention to a noteworthy public health issue. The project demonstrated the importance of effective data visualization in illuminating complex ideas and promoting discussions on nutrition and overall health.

Reference list

Abel, M. H., Brantsæter, A. L, Iversen, K. L., Torheim, L. E. (2023). Bruk av energidrikker i aldersgruppen 10-18 år – Resultater fra landsrepresentative spørreundersøkelser i perioden 2015-2023. *Folkehelseinstituttet.* https://www.fhi.no/publ/2023/bruk-av-energidrikker-i-aldersgruppen-10-18-ar/

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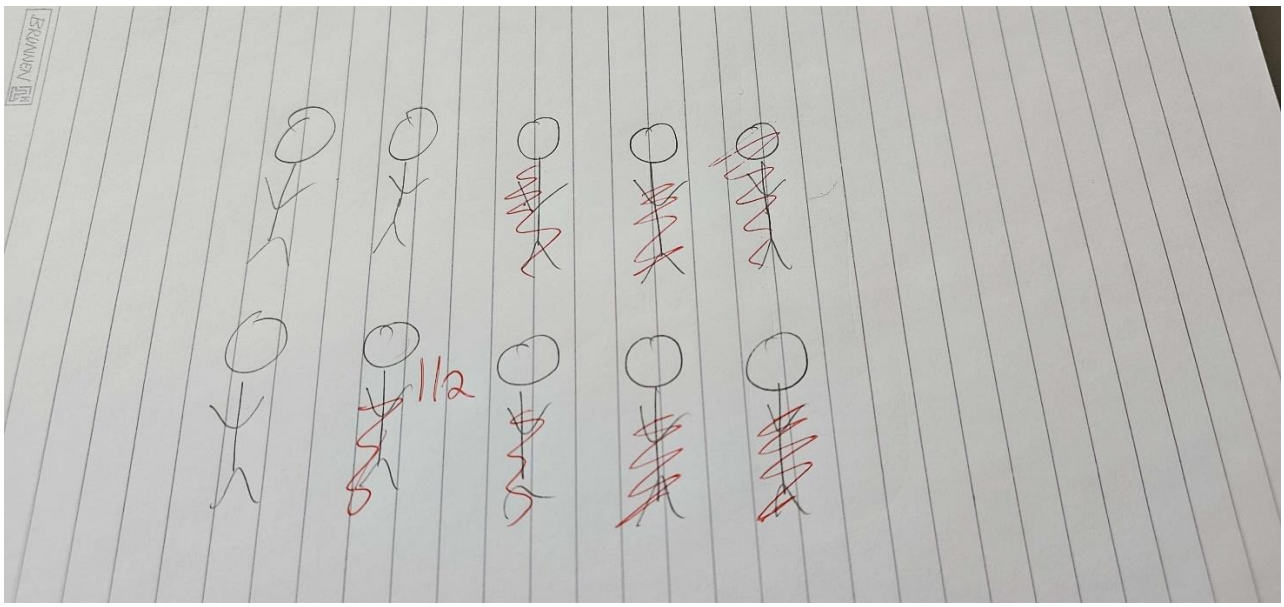
Yi, M. (n.d.). A Complete Guide to Line Charts. *Atlassian*. https://www.atlassian.com/data/charts/bubble-chart-complete-guide

Appendix

1. **First prototype of figure 3/5.**



ADSE3200

Visualization portfolio assessment

Part 2 of 3

Candidates 271, 171, 133
GROUP 6666

Contents

Prototypes:

Mobile application (prototype):

https://www.figma.com/proto/yzSdpmW7xFfPxBZAhy3GdT/Arngren-(eksamen-del-2)---mobilversjon?node-id=0-1&t=xLinJPR53kMXbghH-1

Mobile application (Figma):

https://www.figma.com/design/yzSdpmW7xFfPxBZAhy3GdT/Arngren-(eksamen-del-2)---mobilversjon?node-id=0-1&t=xLinJPR53kMXbghH-1

Desktop website (prototype):

https://www.figma.com/proto/mM73beYANVBMnRzlwjVQbh/Arngren-(eksamen-del-2)---laptop-nettside?node-id=2-3&t=ZyhGA3IkcW2fiFIu-1

Desktop website (Figma):

https://www.figma.com/design/mM73beYANVBMnRzlwjVQbh/Arngren-(eksamen-del-2)---laptop-nettside?node-id=2-3&t=ZyhGA3IkcW2fiFIu-1

1: The Case

For this group project, we chose to go with case 2, which is an online store where the owner sells mostly sells different kinds of vehicles, but also offering a diverse range of other merchandise. The owners of the web shop felt that it needed an update and wanted a more modern look to their page and to have a more user-friendly design. We believe that the web shop has a lot of room for improvement, and to redesign the website we have chosen to use a program called Figma.

Figma is a program that is a great tool for creating prototypes and designs. The program features great collaboration features which allows us our group to work together even when we are not physically together. With real-time updates on project changes, Figma ensures a smooth and efficient workflow for our group (Figma, n.d.). Additionally, Figma's prototyping capabilities enable us to create interactive mock-ups that simulate the user experience of the redesigned website. By being able to incorporate interactive elements such as clickable elements, transitions, and animations into our prototypes, we can thoroughly test and refine the user flow.

The websites seem to have several flaws. The website seems unorganized, and messy because of the different sized pictures that have been scattered throughout the page. The navigation bar has different listed categories in alphabetical order however, some of the things listed in the navigation bar are just single items instead of a category. The user may have a difficult time browsing through the navigation bar, because it is not organized. As a result, navigating through the website becomes unnecessarily difficult.

There are also some issues with the links on the website. While there is a menu where you click on different categories that will lead you the supposed category, there are also pictures on the website that will lead you to either a product or a category that is not mentioned in the menu. One of the pictures that lead you to one of the categories is the one at the bottom right of the page called "Sexy piker", that leads to a page where the figurines are listed. However, the pages of the designated categories are not structured either, which contributes to making browsing through the website a lot more difficult than it should be.

To tackle the issues we've identified, our redesign plan focuses on improving user experience through smart navigation and layout adjustments. We are set on simplifying the

website's structure, cutting out clutter, and organizing everything better to make it easier for the user to browse through the website. In addition to that, we are also giving the website a more modern look to catch eyes and keep the users interested. Adding search filters is another big move to help user find what they're looking for fast and hassle-free.

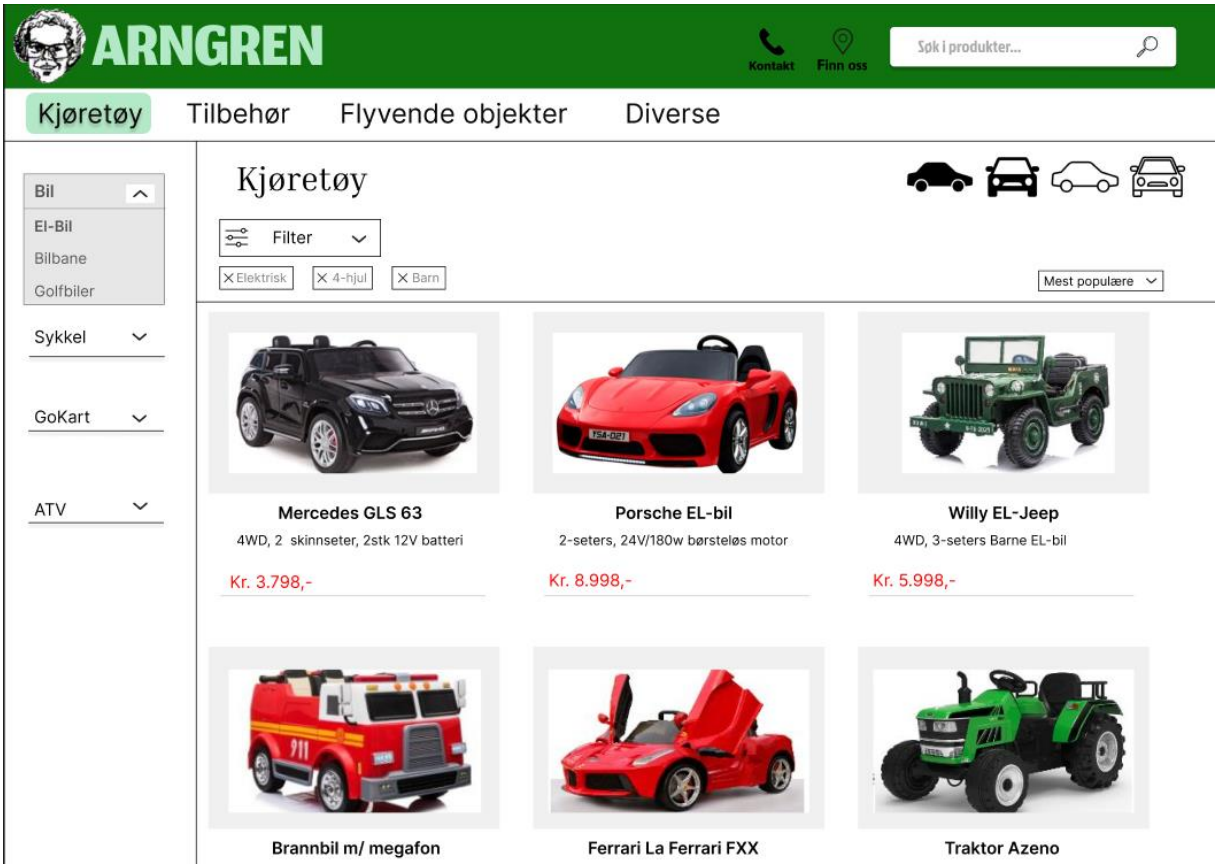


Figure 1: Our laptop website of Arngren in the "Kjøretøy"-section.

2: Data

The groups chosen website consists of many different types of data, both objects and attributes. Different kinds of data on the website could be the product categories, ranging from cars to flying vehicles, the products sold, and the product attributes, including but not limited to the price, colour, specifications, and more. The website itself could also be a kind of data, in relation to other websites, and would be considered the main object in our group's final visualization. There are many other kinds of data that exist in relation to the arngren.net website that the group will not visualize or consider, this can include the number of sales, user traffic, the increase or decrease in sales and traffic, profitability, and more kinds of data that would be considered if the case asked for it.

Description	Data type	Object/Attribute
The arngren.net website	Categorical (Nominal)	Object
Product categories	Categorical/Nominal	Object/Attribute
Products	Categorical/Nominal	Object/Attribute
Product attributes	Composite/complex	Attribute(s)

Figure 2: Table of data from the groups chosen website.

Data is generally divided into two main categories. One is qualitative or categorical data, which "information that cannot be counted, measured or easily expressed using numbers" (TechTarget, 2023) – this data can still be organized or ordered, but the order will have no natural ordering. The other type of data is quantitative or numerical data, which is the "value of data in the form of counts or numbers" (Fullstory, 2021). The website itself can be considered as a kind of data, as an object with many different types of attributes within it. The website would be categorical and nominal data, as websites don't have a natural order or ranking – "they don't have any quantitative or numeric value, and the various categories cannot be placed into any kind of meaningful order or hierarchy" (Stevens, E., 2022).

The product categories are another type of data on the website, also categorical and nominal, as the categories cannot be given any natural or meaningful order or ranking. The product categories could be both an object and an attribute of the website, depending on the perspective of the reader. If we view the product categories in relation to the website, it

would be attributes of its website object, but if we view the categories in relation to the products available on the website, the individual categories would be objects with many attributes each.

The next type of data on the website are the actual products for sale, ranging from cars to flying objects, and more. This data type would also be categorical nominal data and would include thousands of products. Again, this data type could be both an object and an attribute, as the products would be considered attributes of the product categories – this data type could also be considered an object in relation to the product attributes, including the price, colour, and more information. The product attributes are more types of data that exist on the website and would be considered a composite or complex data type, as there are limitless amounts of product attributes available for each individual product. The attributes could be common for a lot of products, such as price, colour, and size – while some products will have unique attributes, like horsepower for cars, zoom length for binoculars, or number of balls included in a pool table. This data type is considered an attribute to the products, and there are endless amounts of attributes – every product have individual types of attributes. Some examples of product attributes can be colour, which would be categorical nominal data, the size of the product could be ordinal categorical data, and measurements could be considered continuous numerical data.

In examining our data types, it is worth taking note that most of the data is almost exclusively categorical in nature, with only the product attributes deviating from the categorical nominal data types. There is no way to include and analyse every single piece of data on the website, and multiple pieces of data are also not accessible to our group through the case presented, leaving more gaps in our analyzation. Some data types that could benefit the analyzation and final visualizations could be user traffic on the website, number of sales, returning customers, and multiple other data types. The absence of some variables and the amount of data and products on the website limit the depth of our analysis and prototype, as we are unable to understand and explore the depth of the website and gain insight into every part of the user experience.

3: Design

The different types of data are represented differently in our solution of the Arngren website. Firstly, the qualitative data is used as the essence of user experiences and products. This is showed through how we have managed the visuals, categorizations, and narratives. For example, the product descriptions sum up what the item consist of and are and offering a name/label without any particular order. In this case; “Music Player USB/AUX/MP3/Bluetooth”. This is highlighting the product’s features without any form of hierarchy. Another usage of nominal data is the categorizations and navigational structure. The categories of “Kjøretøy”, “Tilbehør”, “Flyvende objekter”, and “Diverse”, only provide the users navigational without having any background of hierarchy. The order of the categories is determined by design and useability. Additionally, the images of the cars, in this case, is used to identify the products, helping the users to connect products with a visual representation. For product recognition, but also for brand recognition when it comes to marketing.

Secondly, the quantitative data is used as foundation of numerical analysis within e-commerce within pricing, specification, and filtering. The pricing has a ratio data which is crucial when it comes to e-commerce platforms. This provides the website a true zero point and differences between values. This is represented through whether the price for an electronic toy car for kids is 3.798.- NOK or 8998.- NOK. This is crucial since it provides decision-making for the user and buyer. Another use of ration or interval data is product specifications. In this case it is the battery capacity to motor power on the vehicles; “24 volt, 7Ah batteri” and “180w/24V børsteløs motor”. These attributes are involved in zero-point and value, but also decision-making with the user and buyer. We also have ordinal data which is narrowing down the users' options effectively. Categorization and filtering options are implementing a ranking or sequence for preferences or a hierarchy. (Bhat, 2023), (Stevens, 2016), (Hillier, 2023).

One of the mainly things we focused on was clarity and simplicity. The current Arngren website is all messed up and while you are scrolling and looking around, you always find something new. If the user is looking for something specific, it will take them some time to find it. Therefore, simplicity was a big part for us. Having a website that is easy to navigate is essential to be user-friendly. We managed to accomplish this by avoiding unnecessary elements which distract the user from the main objects. By implementing a hierarchy helps the users navigate the information in an easy way. For example, by using different types of size, colours, and contrast to indicate relationships and importance between objects. We also managed a consistency throughout the elements by using the same fonts and colours. Whitespace is also a phenomenal technique to use to open the website and create negative spaces. This is helpful for reducing clutter and make the important objects stand more out. We also used some colour theory to create some contrast and eye-catching look on the website. Colour theory is remarkable to combine colours to create feelings and reactions (Interaction Design Foundation, 2016).

Figure 3: Mobile Application front page

We used the screen space by having only the most important elements on the website to remove all distractions and saving the users and readers time when using the website. By using whitespace, we can move the user's focus to the main objects and elements. By implementing whitespace, the readability will increase and create breathing room around the objects. This allows the pictures and texts to stand more out against the background. This will enhance the readability. The focus on key elements will increase such as headliners, buttons, and images. It is easier for the users to process information and navigate when the objects and content are stored in chunks and areas, rather than having everything everywhere. This will also give the website a cleaner look and be visual aesthetically pleasing for the reader. Rather than not knowing where to put their eyes, there will be certain key elements in focus. Whether it is the laptop- or the mobile-version. By creating a decent amount of whitespace on the laptop version, the content remains legible on the mobile since

the empty space will be removed and create space for the smaller screen. It is important to have a navigation bar that is easy to find and use to make a user-friendly website (Gerlinger, 2023).

We solved the problem of lack of space on the screens if there is a lot of information, by compromise the information into smaller parts and determinate the most important information for the reader. For example, only showing the name and the most important specification on the cars, rather than writing all the specifications. We also used tab interfaces which organize the content into switchable sections or tabs. For example, if you want to know all the specifications of the “Porsche EL-bil", you need to click into the car and scroll down to the specifications section where all the information is written. By implementing dropdown menus, we can store a lot of information instead of filling the whole page with clickable sections.

When it comes to the option that gives the user possibilities to control what and how much information is to be displayed at the same time, we decided to add a “Read more details” under the specifications when you are on one of the car pages or any product. Instead of covering the whole page with lots of information, we concluded that adding a “read more details” dropdown menu would be clever. The reason behind this was to mainly give the user control a certain amount of control over the information, but also for the whole user experience. It is important to have a website which shows the prioritized information to make it more user-friendly compared to Arngren’s website where all the information is everywhere.

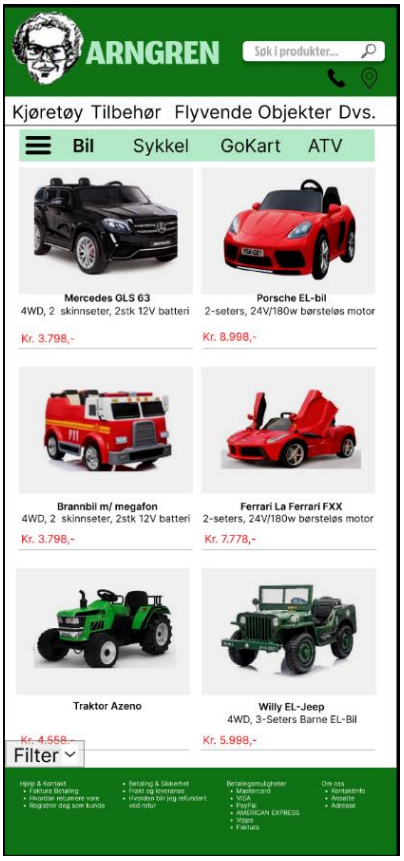


Figure 4: Mobile application

We designed the solution to ensure usability across a wide range of users by focusing mainly on clarity and simplicity. These two are big factors when it comes to usability among users and ensure that we have a user-friendly website. By having clarity and simplicity, the users can navigate and locate the information they are searching for in a small amount of time. Compared to the current Arngren website, our website solution represents an easily readable solution with the same content and information on sales in, among other things, cars, and accessories. We also followed Web Content Accessibility Guidelines (WCAG) to make the objects and website accessible to all users. Colour contrast and navigation are the two points we used from the Web Content Accessibility Guidelines. By implementing those two, we assured that we got a better readability on text and elements. (WCAG, 2022) Another solution we did to ensure usability is responsive design which we did by having the website function well on different devices and screen sizes.

During the website design process, we aimed to take steps to improve it and make the user interaction more appealing and useful. One of the things that we implemented into our design was one of Robert Cialdini's six principles of influence, which was social proof (Cialdini, 2009). We decided to add customer and product reviews, by doing so we can build trust with our new customers, and they feel safer buying a product because of other customers reviews.

In addition to implementing one of Robert Cialdini's principles, we also decided that it was important to focus on user experience. We applied some of Don Normans user experience principles, which emphasized on designing with the user in mind (Norman & Draper, 1986). Throughout the design process we performed surveys and usability test which we gathered feedback from which let us improve the website and make it more user friendly. One of the things that we got a lot of feedback on, was that the website was lacking a filter bar which would make it easier for them to find what they were looking for rather than having to scroll through all the products in a certain category. However, one of the things we got a lot of good feedback on was that we had added a navigation and search bar at the top of the page which made it easier for the user to browse through the website.

4: User testing

This user test is to acknowledge experience the users is getting and how functional they think our solutions of the Arngren website are. Our mainly goal is to get positive feedback on the information clarity, how to navigate, and general usability.

We decided to take a user test on some parents since Arngren is selling different products for kids, like electric vehicles toys. Their task or test scenario was: “Imagine you are looking for an electric vehicle toy for your child who is five years old. You are very interested in finding the best vehicle for your child that meets your requirements. Your job is to browse through our page and see our options and compare the different options. We have some tasks or guidelines to “help” you along the way.”

Our first guideline was to make them open our solution of the Arngren website and find where the electric vehicles for children are located. Our expected outcome was that the parent would find it quite straightforward to navigate from the homepage to the electric vehicles for children. Since one of our main focuses was information clarity and navigation ease, this seems like an achievable task for the parent. The actual outcome turned out to match our expectations. The user found it easy to navigate on the website and on the navigation bar, while also using previous experience from online shopping. Discovering that “children” was under the filter option seemed self-explanatory. Some of the parents were also able to narrow down the results of cars by choosing some other filters like “electric” and “4-wheels”.

Our next guideline was to make them find information about the different products and compare them to each other. We asked them to select the “Mercedes GLS 63” and the Porsche EL-bil" to compare them to each other. They need to write down both cars' specifications, such as motor power, price, and battery type. To sum it all up, we wanted them to write a short conclusion on how their experiences of finding these specifications where. Our expected outcome was that they firstly would find it very easy to navigate to the Mercedes and the Porsche. We also expect them to find it easy to find the necessary information about the specifications on the cars. The actual outcome was that some of the users choose to use our search bar to find the cars, while others used our filter options to navigate forward.

Our last guideline was to make them add their favourite vehicle to their shopping cart. This seems like a straightforward task for the users and our expected outcome is that this should be unproblematic for them. The actual outcome could not be any closer to the expected outcome. All the users found it trouble-free to navigate into their favourite car and then to the add to cart button. They found it almost self-explanatory to navigate from start to “add to shopping cart”.

In conclusion, this user test focus was to gather insights into our solution of Arngren website’s effectiveness in information clarity and functionality. Our feedback from the users was mainly positive feedback consisting of good choice in colours and contrasts, the usage of space, and how only the important information and objects are shown. They found it user-friendly and easy to navigate. “I found it easy to find exactly the kind of product I was looking for.”

5: Evaluation

The groups approach to redesign the online store arngren.net, based on the case description, relied heavily on the use of visualization techniques. The groups' main goal was to transform the website from a cluttered website to a user-friendly platform, weighing the user experience the heaviest. By selecting Figma as our tool, the case became an open and easy collaborative effort – Figma allowed us to create detailed and interactive prototypes and allowed for simulation of user experiences. By viewing our redesigned website from a user perspective, we we're able to refine the user flow and ensure that the design was both visually appealing, intuitive, and accessible.

To assess the project ahead of us, we began by defining the different data types used in the original website and choosing which core features to remain or remove. By defining and ordering the data in categories and decluttering the front page, we would allow for an easier display of information, rather than an unstructured one. When designing the new website, the user's accessibility was the most important factor, and my completely redesigning the front page the user could easier identify and locate specific items. The most important design choice was to move the search bar to the top of the website – this search bar will serve a large purpose, considering the number of products sold on the website.

We were mindful to use our visualization techniques to spotlight key information. The use of whitespace was a key part of this strategy. By creating more open space around key elements, we reduced clutter and improved the overall readability. This attention to detail made the site more user-friendly and visually appealing. Another design choice was making the website more interactive, including customer and product reviews to build trust in the products – further connecting the customer with the website. By moving the product attributes to a separate part of the product page, the website was allowed to breathe more while simultaneously giving a less cluttered display of information.

The use of visualization techniques was pivotal in decluttering the website, ultimately resulting in an enhanced user experience. The redesigned website is clear, simple, and easier to use – improving both the accessibility and user experience. When conducting user surveys, our claims were proven to be correct. Our group is confident that the use of visualization techniques let us increase the user experience on the arngren website.

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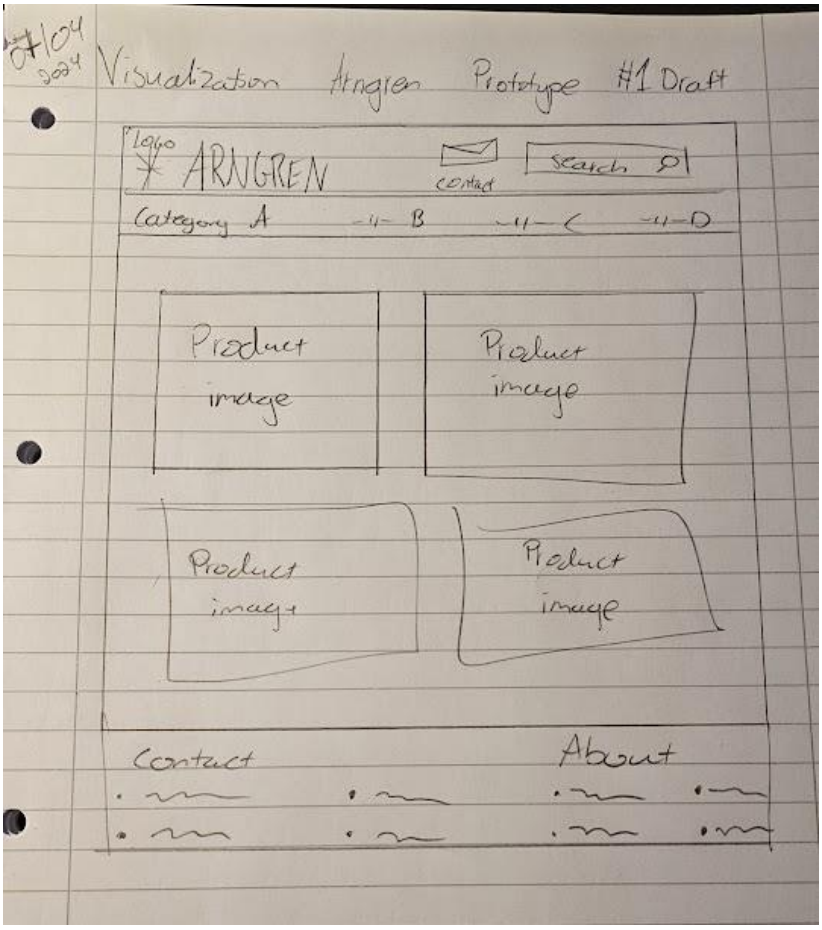
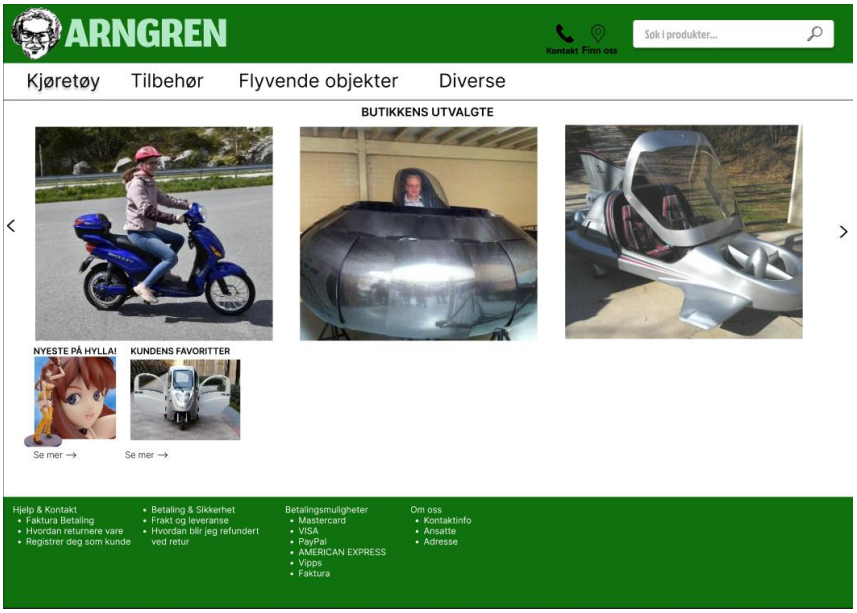
Appendix

1. **First draft, website:**

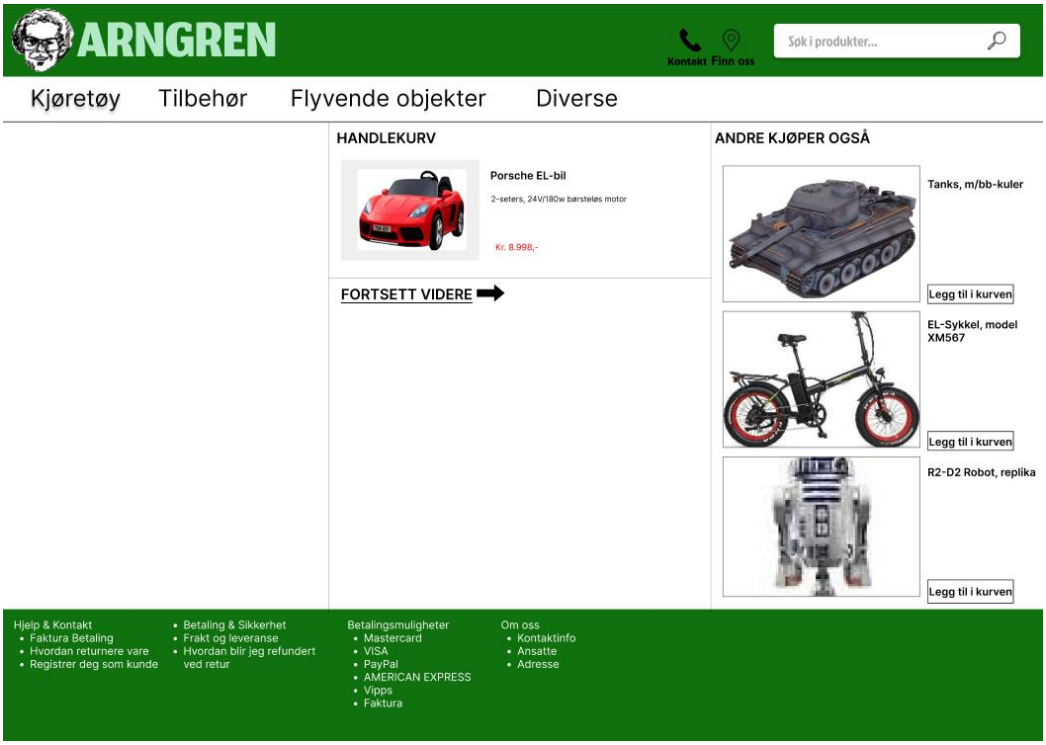


2. **Pictures of the laptop version of the website:**

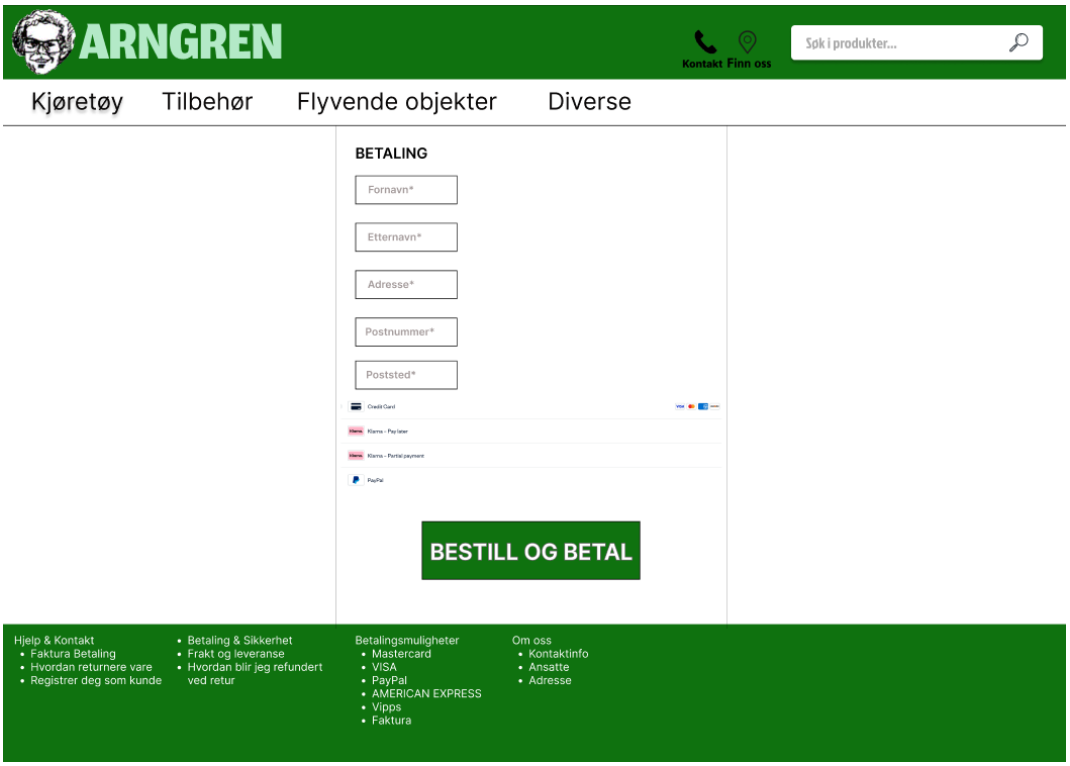


Front page

One of the cars and its page.

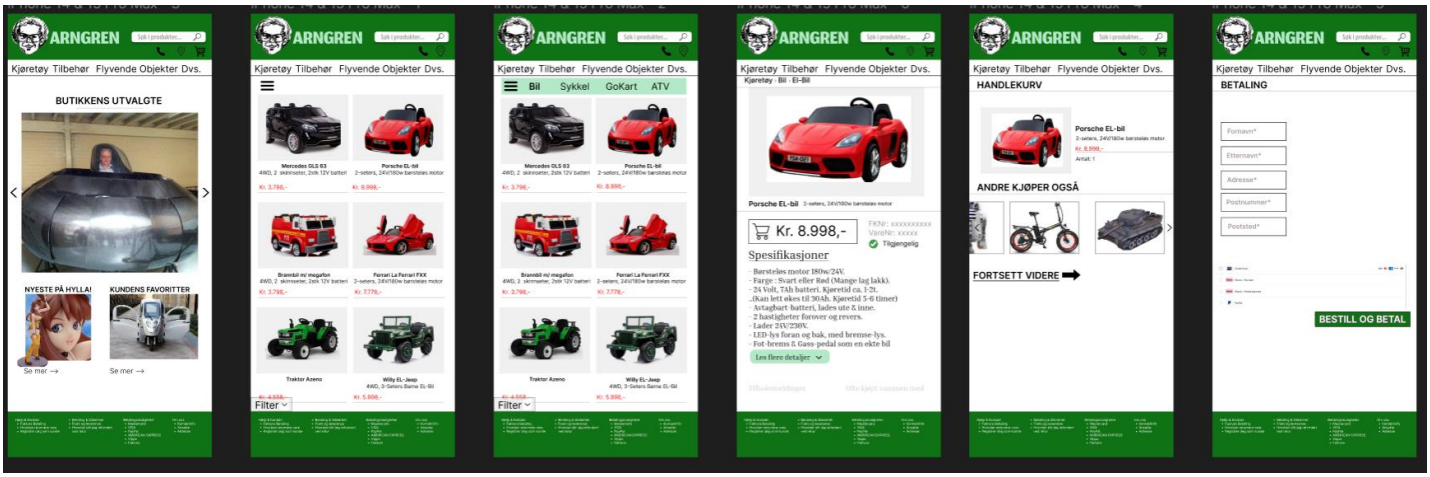


Shopping cart page



Purchase page

3. Mobile version of the website:

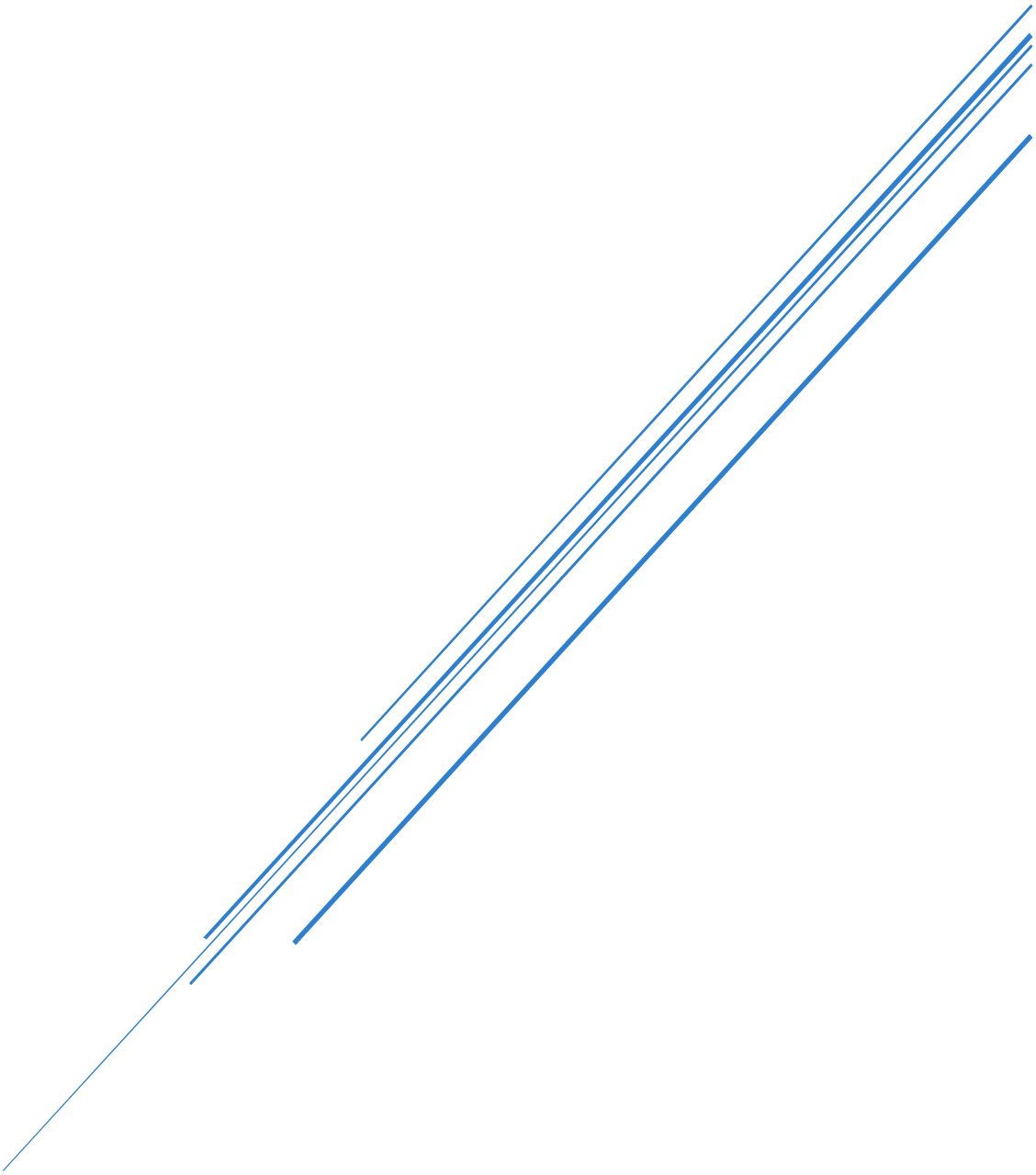


PORTFOLIO ASSESSMENT

Part 3 of 3 – The individual assignment

Kevin Olsen s354651

Word count: 757



ADSE3200 Visualization

OSLOMET – Oslo Metropolitan University

Contents

Prototype, live: https://www.figma.com/proto/yzSdpmW7xFfPxBZAhy3GdT/Arngren-(eksamen-del-2)---mobilversjon?node-id=0-1&t=GsPE8aC3AMrVCATA-1

Prototype, project: https://www.figma.com/design/yzSdpmW7xFfPxBZAhy3GdT/Arngren-(eksamen-del-2)---mobilversjon?node-id=0-1&t=GsPE8aC3AMrVCATA-1

1: Description of solution

Our group was tasked with redesigning one of two websites, using visualization techniques to create a functional prototype – for the assignment, we chose the Arngren case. The arngren website is very cluttered, unresponsive, and inaccessible. The lack of structure on the website inspired our design choices when redesigning – wanting it to be as clear and simple as possible. This issue becomes even more apparent for smaller screens, as the website does not scale to your screen, but remains the same size regardless of your chosen device. For that reason, I have chosen the small screen of the website to focus this report on, as opposed to the large screen.

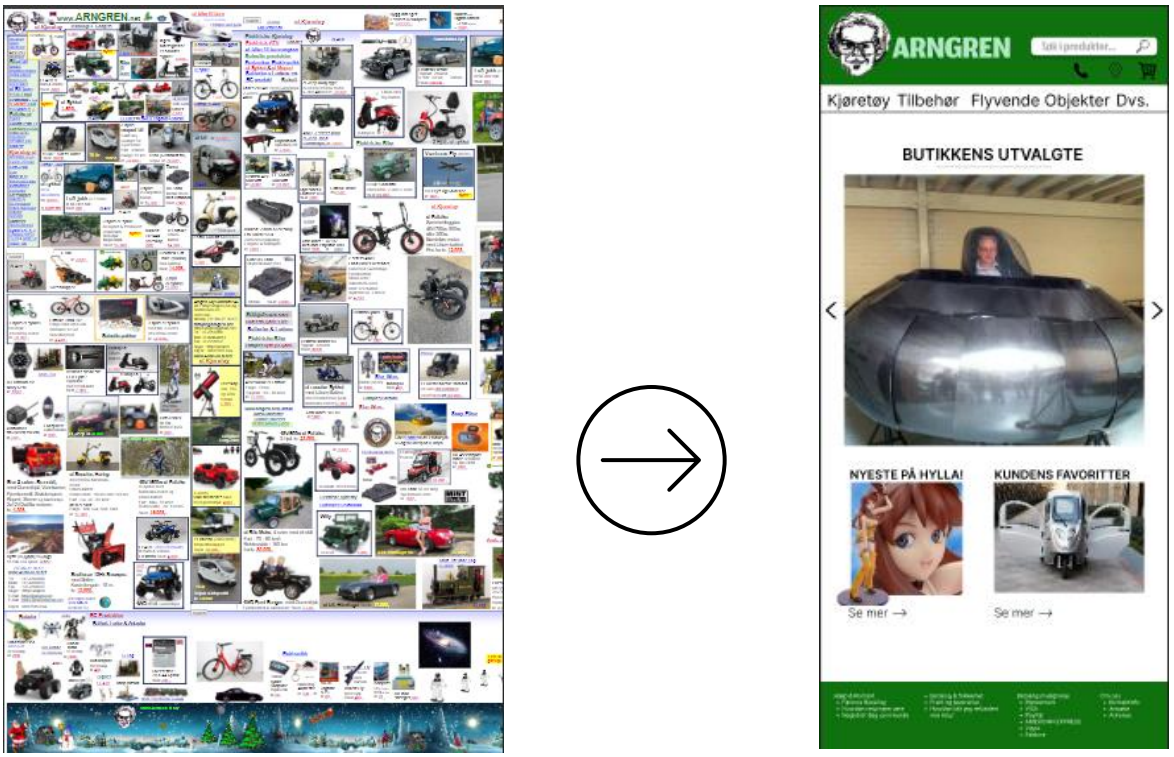


Figure 1: *The front page viewed on a small screen vs. our solution.*

In the solution, our group has chosen to remove almost everything away from the current front page and rather focus on categorizing the products, making the website feel less cramped on the smaller screen. In addition, we have made easier to use menus, switched to one single colour across all pages, and moved the search bar to the top of the screen – which will lead to customers arriving at their destination the quickest.

The most important choice in our solution was the ease of access, from the search bar getting a more accessible placement to the contact information being at the top of the

website. The solution allows for the website to be both more accessible and more efficient to use, as customers no longer need to look through hundreds of pictures or overlapping categories – everything can be found through the search bar or the categories listed at the top of the website, while the front page is reserved for additional information and a few selected products.

Once the customer finds the category they are looking for, the next website they are greeted with is another cluttered and unfriendly page. The page listing products has a completely different – but equally depressing – look and feel, the categories, search bar, and contact information are all gone and there is almost no indication that you are still on arngren.net. Our solution wanted to give a universal feel and user experience, the main menu and information remains the same from the front page to the category page, but some additional options are added, like filters.

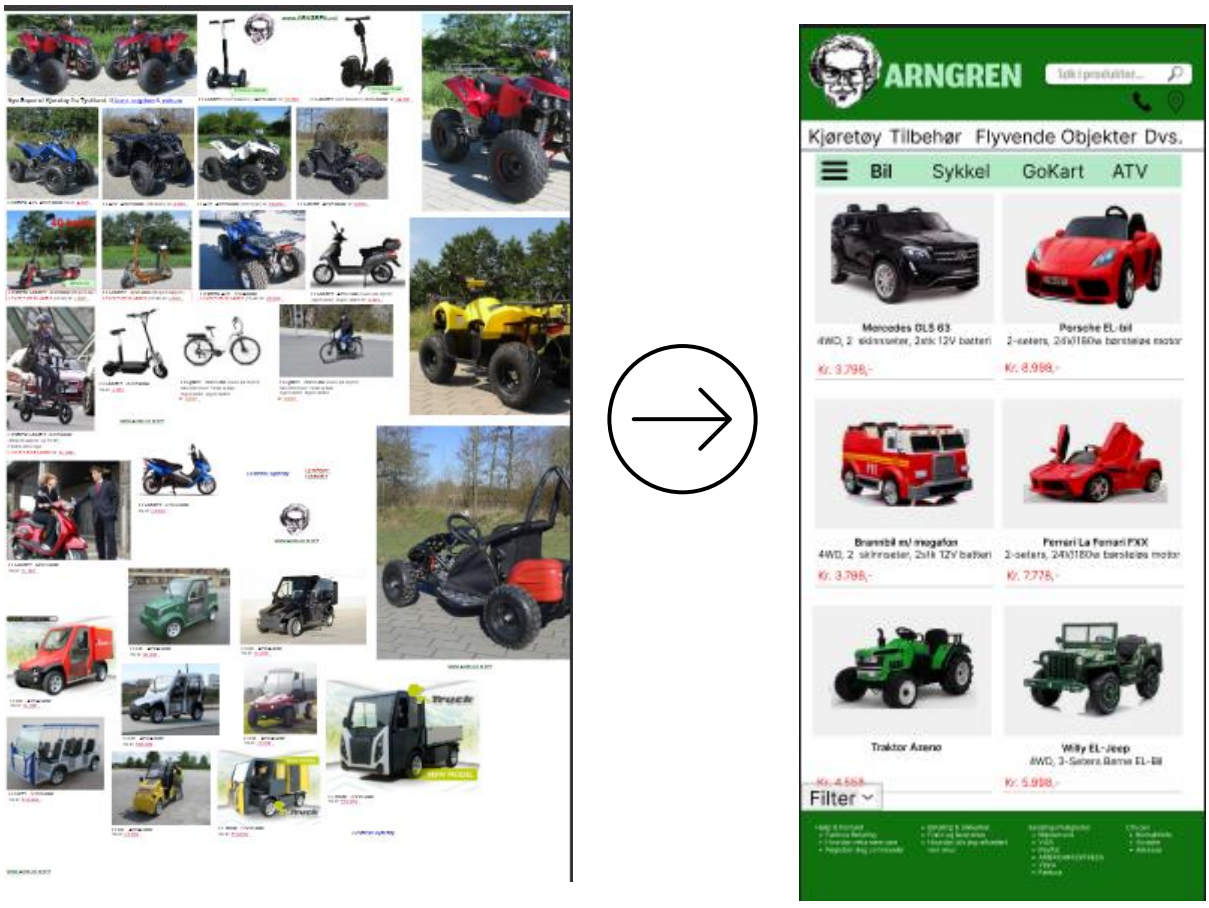


Figure 2: *The category page viewed on a small screen vs. our solution.*

The next page a customer is taken to when they want to purchase something, is yet another page that lacks a universal feel – aside from the yet again depressing and unfinished look. The web page for purchasing products also feels hollow with an unfinished payment option, with no option to pay by card, invoice, or any other normal payment option. In our solution, a big focus was making the website feel safe and inviting for customers, no one wants to spend money on a website that feels like a scam. We started by adding payment options such as Klarna, PayPal, payment cards, and invoice options – and made the payment website look and feel the same as the rest of the website.

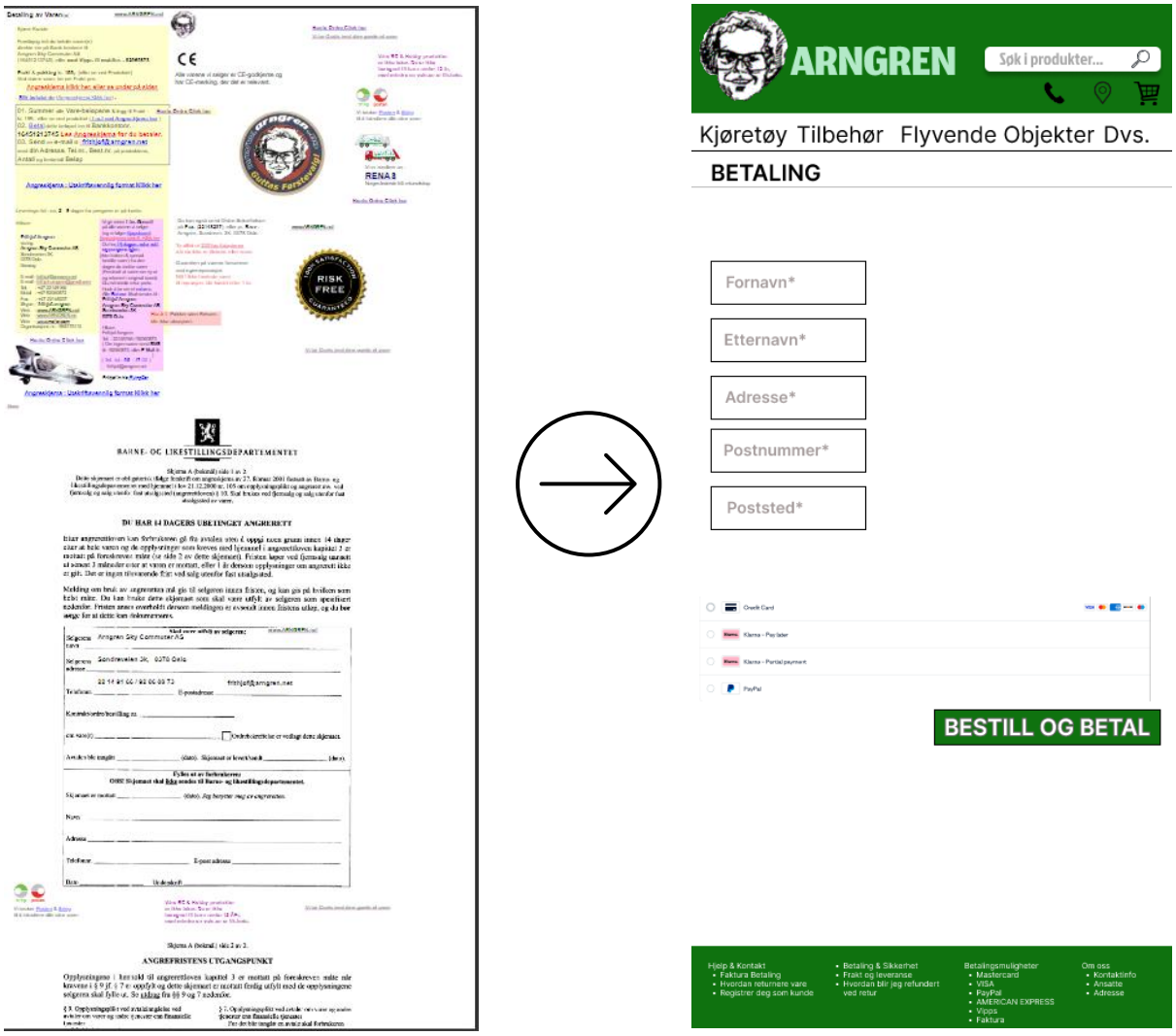


Figure 3: *The payment page viewed on a small screen vs. our solution.*

Another important factor when designing our two solutions, was having a universal and responsive design across both the small and large screen. Our website designed for larger screens was to follow the same design choices made for the smaller screen, using the same colour palette and general design aesthetic – scaled to a larger screen. By using similar design choices and strategies across our solutions, we ensure that the user experience is as easy as can be for every customer. By also keeping some characteristics from the original website, such as the arngren logo, photos, and some of the dominant colours, we were able to keep the heart and soul of the original page intact when creating a new solution, making it recognizable and familiar to the existing user base while also appealing to a broader one.

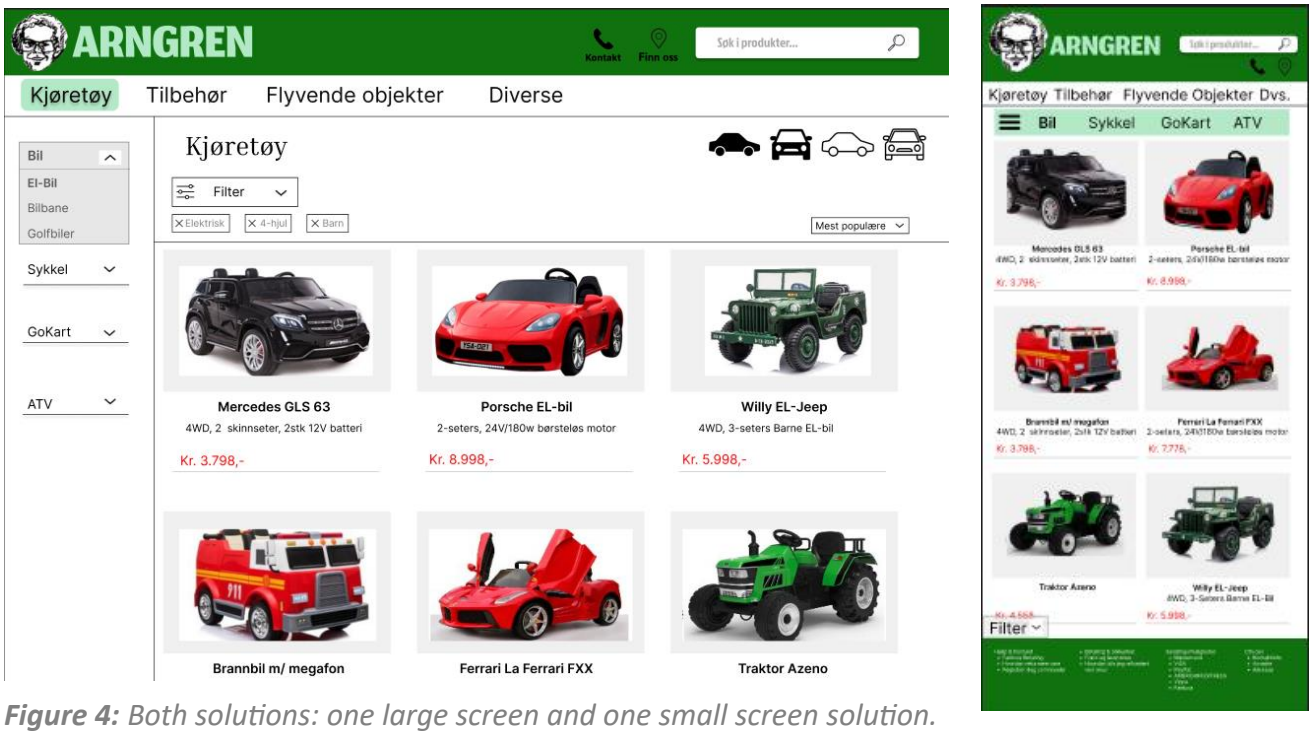


Figure 4: *Both solutions: one large screen and one small screen solution.*

2: Conclusion

Our group's redesign of the arngren website emphasized simplicity, accessibility, and clarity, especially for smaller screens. By both refreshing the cluttered and unresponsive layout and categorizing the content in an easier to use solution, we were able to enhance the user experience for every customer. In addition to the design changes, another change that was made was to the convenience of using the website – both by adding a functional search bar to the top of the page, but also by creating a simple and easy user flow from finding the product to purchasing it – adding convenient and expected payment options and choices. By keeping some of the original page's aesthetic options, we ensured familiarity for current users while still elevating the overall user experience to attract a broader audience.

Reference list

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