

Final Project: The Necktie

Introduction

The first necktie, pictured in **Figure 1.1**, dates back to the 17 century. This Croatian cravat tie was an early iteration that not only achieved a decorative effect for Croatian mercenaries, but also secured the wearer's collar, serving as a formality of their official uniform.



Figure 1.1: The first iteration of the necktie: “La Cravate”

The evolution of the design of the necktie has undergone many subtle changes since then. In the 20th century, tie manufacturers focused on placing an emphasis on the comfort, functionality, and fit of ties for the general public that was easier to mass produce, eventually leading to the necktie.

Although the necktie has gone through years of evolution and iterations to simplify usage, the traditional necktie in modern culture still remains puzzling to wear. As a result, we want to further facilitate the tying process and redesign how users interact with this product.

For this project, we chose to analyze the design of the necktie by examining the common problems wearers typically encounter with tying and wearing the traditional tie. We originally viewed the necktie as prone to causing mistakes and slips on the user's part, so we aimed to analyze these concerns to create a solution in the form of a redesign that addresses the main problems found through our interview process. Our interviews demonstrated that individuals

are susceptible to making errors when attempting to tie the traditional necktie because the process in itself is difficult to complete. Given that we were able to note numerous slips and mistakes for the necktie, we decided to look further into this space to understand how we can create prototypes, and through various iterations, create a final design that creates a better experience when using the tie.

Figures 1.1 and **1.2** below demonstrate the model tie wearer that we wanted to analyze based on factors such as tie length, knot appearance, and neck width. In an ideal tie, the length goes to right above the belt buckle and covers the tail end, or the shorter part in the back. The knot should resemble an upside-down isosceles trapezoid. Lastly, the knot should be well tightened and against the neck.



Figure 1.2: Side view of Windsor Knot

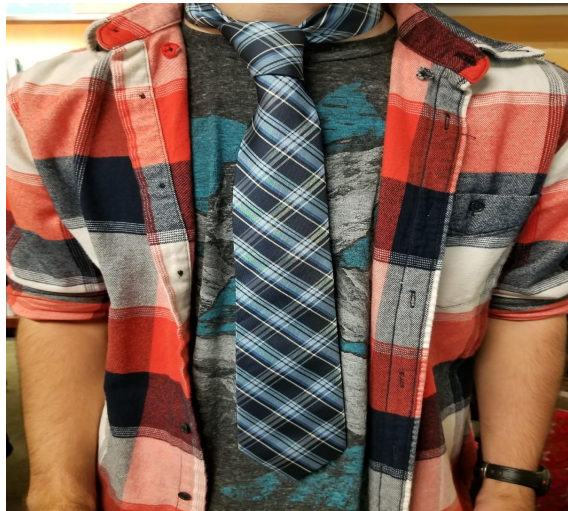


Figure 1.3: Front view of Windsor Knot

Data Collection

Within pairs, we conducted at least 3 interviews per person, for a total of 18 interviews. To conduct the interviews, we asked each individual about their past experiences with a necktie, provided the interviewee with a loose necktie to tie, and followed up with how they felt about the tying experience and what alternatives they would pursue if any. Towards the end of the process, we took a picture of the interviewee's final attempt to remember their tie wearing process. Throughout the interaction, we had the partner write notes on issues that we observed.

Who we interviewed -

Our group decided to divide into pairs (3 groups of 2 team members) to interview random individuals about their experience of using a necktie at UC San Diego. We primarily focused on reaching out to students, primarily males but we included some females as well. While we were aware that females were unlikely to know how to tie a tie, we were interested in seeing alternative perspectives and expectations. We also looked into different age demographics (e.g. Staff employees from the Bookstore), who we assumed might be more frequent tie wearers. We hoped to find interviewees with varying experiences, ranging from novice to experts, to determine common problems/trends.

What we asked -

Upon interviewing, we asked each interviewee some basic questions such as their name, college year, and major. We then provided them with a traditional necktie and asking them to demonstrate their knowledge by tying the tie. Most importantly, we encouraged the interviewee to speak their mind throughout the process so that we could record their mode of thinking and

any significant actions they they made. Afterwards, we asked them about their overall experience with the traditional necktie and any thoughts on alternatives such as the clip-on tie.

Questions:

1. What is your name, year, and college major? (Engage in light discourse.)
2. Tie a tie for us! Can you vocalize your thoughts as you do it? Please be as vocal as possible!

(After tying the tie)

3. When was the last time you wore a tie?
 - What kind of tie was it? (i.e. necktie? Bowtie? Clip-on? Type of knot?)
4. At what type of occasion do you wear ties?
5. How did you learn how to tie a tie?
6. When did you learn how to tie a tie?
7. What issues did you have during the process?
 - Note: this is so we could note the issues the interviewee found most prevalent. We also wrote down our observations of their struggles during the process.
8. What are your thoughts on the clip-on tie? Why?
 - Note: we wanted to gather opinions on an already-existing redesign of the necktie, so we could potentially apply them to make a better redesign.

Where we interviewed -

We primarily chose to conduct the interviews at UCSD Price Center, Bookstore, and Imprints. We had chosen those locations because we wanted to reach individuals who are more approachable and willing to engage us throughout the interview process. Conducting the interviews within a neutral, public area allowed us to gather data from individuals with a potentially wide range of experiences.

How we collected data -

Our means of collecting data majorly stemmed from pre-made questions that we asked the interviewee after they had engaged with the traditional tie. Through the questions and their necktie, we were able to gauge their experience level to better understand their types of errors. We also took a picture of the interviewee's final attempt at tying the tie so that we can later reflect on such data while proceeding to the redesign.

Once we were finished with our interviews, we created a spreadsheet with the data gathered. You can see our data spreadsheet [here](#).

Problems & Trends

As we attempted to cipher through our data, we came to the quick realization that our interviewees were split between novices and experts with very few falling somewhere in between. 7/18 of the participants were experts while the rest were either novices or experienced novices. This gap in skill level resulted in us finding two separate major errors for two separate groups. To better understand the issues inherent in tying a tie we looked at these two groups separately to see what their personal errors were.

"What the ****'s a Windsor??", a novice participant exclaimed when asked about the kind of tie they were going to attempt. When looking at the novice sub-category, 10/11 participants were not able to tie anything that resembled a proper tie. The single participant that was able to complete the tie had an extremely uneven knot that was also too tight and failed to unknot with ease, as it should. When looking at their final attempts, it was clear that they were simply unable to tie a tie due to the lack of knowledge they possessed on this topic: a knowledge-based error. It was quite evident that if an individual did not have the knowledge associated with this process, they would be unable to complete any sort of knot. This results

from the lack of signifiers present on a tie. It is nearly impossible for any individual to know what the required steps are without looking for some guidance from a third party source, such as WikiHow or YouTube tutorials.



Figure 3.1: A novice's attempt at tying a tie.

Although all 7 of the expert participants were able to tie a tie on their first try, only 4 were satisfied with their final product and all 7 had to readjust their tie in order to ensure that tie was exactly at the right length. One expert muttered while tying his tie, “It is all a guessing game.” Similar to the novices, the lack of signifiers posed an obstacle which caused our expert to make errors. However, the expert's errors were action-based slips rather than knowledge-based mistakes. In other words, they were aware of the necessary steps but still struggled to perform the actions exactly as intended. They fidgeted with the knot and readjusted the length but had no concrete way of knowing whether or not their tie was perfect.



Figure 3.2: An Expert's attempt at tying a tie. (Same from previous section)

The Redesign

From our interviews, data collected, and study of design space, we were able to identify the key pain points of the necktie and tying process: the knot and length of the blade end. The cloth of an untied necktie affords the twisting, turning, looping, tightening, and loosening required to produce the knots that secure it around the user's neck. However, the biggest problem with tying a tie is that there is nothing intuitive about it at all -- there are no signifiers present upon the tie to inform the user how to tie it. The technique is a learned skill; the instructions are passed to the user externally from the tie, thus making the tying process a hidden functionality. The data we collected demonstrated that 10/18 of the people interviewed knew there was a knot present on a necktie, but did not know how the process worked. Of the remaining 8/18 were experts at tying ties, 2/8 of the experts still had to undo the knot in the beginning due to a slip and had to restart. The tying process is complicated enough making it

error prone even for experts. Hence, the first aspect of the tie we focused on is the knot itself. In our redesign, the knot is pre-tied. There is a slit in the back of the knot for the tail end to be inserted through. This allows the user to tighten the necktie around their neck the same way a regular necktie is tightened. By matching the user's mental model of previous techniques of tightening, the redesigned tie feels familiar to the user and is more intuitive to use.

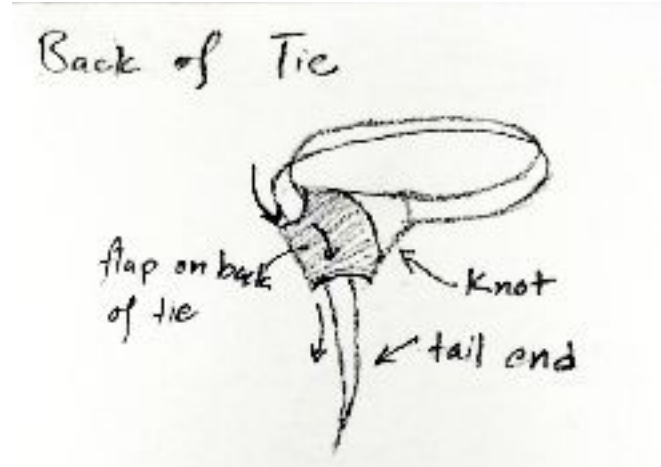


Figure 4.1: Diagram of the Flap behind the Knot

When the 2 experts had to undo the knot, they did so because they realized that had they continued, the length of the blade end would have been off. When tying a tie, the tip of the blade end should reach the user's waist / belt. This demonstrated the second pain point, if the length of the blade end is incorrect, the user must untie the knot, re-estimate lengths, and tie the knot again. This wastes a lot of time as well as frustrates novices, especially when they are not comfortable with the tying process. Our redesign to fix this problem is to make the blade end retractable. The idea is that blade end is a separate piece that is rolled up inside the knot part of the tie, and when the knot is pinched by the user, the user can pull down the blade end to the appropriate length. The knot is a facade around a mechanism that houses the rolled up blade end. When the knot is pinched, the blade end is pulled and rolled up into the knot, except when the user is pulling the blade end down. When the knot is unpinched, the length of the blade end is locked. This process saves time and does not stress out the user, as it does not require them to untie and retie any knot.

Tradeoffs of Redesign -

We aimed for the Final Redesign to be as close to the Ideal Tie as possible. However, no redesign is perfect. There are a couple of potential tradeoffs that come with our final redesign, as expected. First and foremost is the associated cost of producing the mechanics inside the knot that allow for the retractability of the blade end. The original tie is simply a long piece of cloth. In contrast, the final redesign contains springs, screws, nails, and other mechanical components which together become more costly than the traditional necktie.

Another tradeoff is that since the rolled up blade end must fit inside the knot, this severely limits the width of the tie as well as the cloth material that may be used. A wider width or slightly thicker material would get stuck in the knot, rendering the adjustability of the blade end useless. Hence during production, there is requires a smaller range of error, increasing the cost of production as there would an increased rate of manufacturing defects. There is also a possibility that overtime some component loosens or defect goes unnoticed, jamming the blade end or causing slipping, where the blade end is unable to retract back into the knot. These errors would potentially increase the frustration of the user.

It is also important to note that because our Final Redesign has a pre-made knot, it is less adjustable than the traditional necktie. (This, along with the following points, are discussed more in our Design Space section.) Ultimately, we deemed that the redesign's slightly lower adjustability was an appropriate trade-off for its much higher ease of use -- its inability to change the type of knot does not outweigh its increase of user ease. Our main goal with the redesign was to create something that was less error prone, while maintaining a high sense of professionalism, since ease and professionalism were the two main aspects explicitly mentioned by our interviewees in regards to their expectations of a tie.

Prototype

After analyzing points such as ease-of-use, professionalism, and complexity in our redesign, we came up with two potential designs for our prototype. The first thing we realized was that people did not know how to tie a tie due to infrequent use and lack of signifiers.

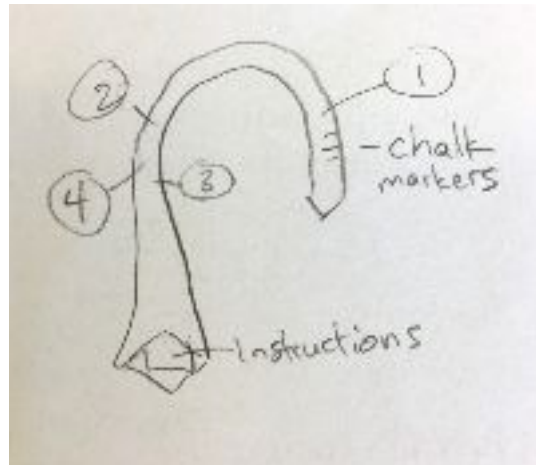


Figure 5.1: Marker and stitches located on sketch of Prototype 1

To solve these knowledge-based mistakes, our initial prototype (Prototype 1) consisted of a regular necktie with hidden numbers and instructions, which we called the “chalk tie”, as shown in **Figure 5.1**. We wanted to have a full set of instructions inside the inner tipping of the necktie. Users would be able to examine the inner flap and see four images listed, each with a corresponding number. They would find the numbers stitched around the inner side of the necktie to indicate finger positions and where to fold according to the set of instructions. As some of our interviewees stated, calculating the proper length of the blade end of the tie is “a guessing game.” As a result, we wanted to add length markers to the tail end of the tie depending on the person’s height (5’, 5’2”, 5’4”...) in either tailors chalk or stitching. We believed that with enough signifiers and built-in instructions we could teach people how to tie a tie.

One issue that arose from the chalk tie was the amount of concern interviewees had over professionalism. In both male and female studies, 12/18 of them cared about having a professional look over choosing simpler designed ties that did not. With the instructions on the back of the tie and a bunch of stitches, the tie could easily flap around and expose the redesign. Furthermore, we realized that the chalk tie did not necessarily ensure novices and expert novices could tie ties just by simply adding instructions. (This explains the mapping of Prototype 1 in our first Design Space below.) Our overall goal was to make a more convenient professional-looking tie, and if we could not guarantee a tie at the end of the process, would ruin the entire point of the redesign. To ensure that potential users ended with a well-made tie that was easy to make and still looked professional, we redesigned our prototype again, keeping in mind ways to limit the amount of possible errors.

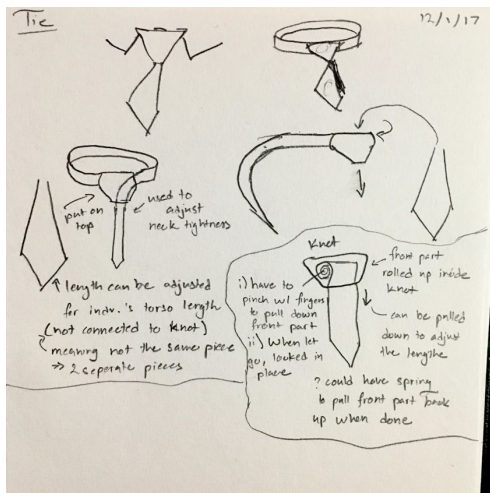


Figure 5.2: The rough sketches of Prototype 2



Figure 5.3: Final version of Prototype 2

Our second prototype (Prototype 2) is also a standard necktie but has a premade the triangular knot as mentioned in our redesign. Throughout our interviews we realized people intuitively understood there was a knot and a loop involved with the process, even if they were novices, but did not know how to form it. So we decided to make a standard half-Windsor knot

for them and leave a single frontal loop that would indicate where the tail end of the tie would slide through. While the ideal redesign includes a retractable blade end to accommodate for the height of any user, we were unable to include that into our prototype due to time and material constraints. To compensate, we instead cut a slit inside the half-Windsor knot to pass the tail end through so that it would still appear behind the blade end and serve the same purpose of tightening the neck length. Prototype 2 successfully met our concerns as it simplified the tying process, guarantees a well-made tie in two steps, and still looks as professional as the traditional necktie.

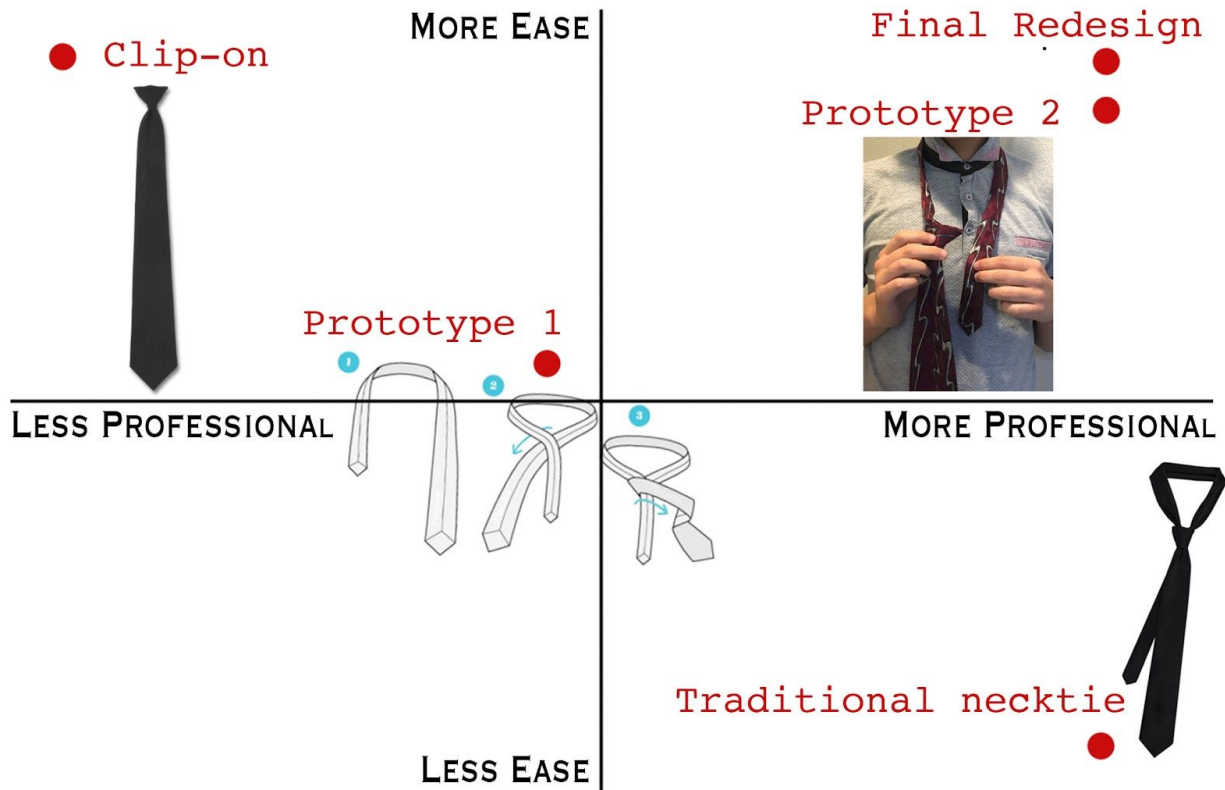
Design Space

Upon the selection of the necktie as our product for this project, we anticipated having to analyze the **errors** that would arise during the tying process. Our prior knowledge of the tie made us think that tying a tie would be met with difficulties, and our data and observations from our interviews indeed showed such difficulties. This is why we made **ease of use** our main concern when constructing our design space -- the amount of errors made, which correlates to the level of ease, is a prevalent aspect to consider when creating the ideal tie.

Ease of Use vs. Perceived Professionalism -

Through our interviews, we found that people naturally connected the necktie with the idea of **professionalism**, which stemmed from common knowledge that wearing a tie is not the convention, and is instead typically saved for special events where a professional and/or formal appearance is expected -- hence, our first design space mapping Ease of Use vs. Perceived Professionalism.

EASE OF USE VS. PERCEIVED PROFESSIONALISM



The traditional necktie falls in Quadrant IV. Due to its lack of signifiers and the resulting problems users encountered as mentioned above, we placed it on the lower end of the spectrum in regards to ease of use. Meanwhile, it is on the higher end of the professional spectrum since it is the go-to tie for our interviewees for professional settings.

Falling in Quadrant II, which describes the high ease/low professionalism products, are the clip-on necktie and our Prototype 1. The clip-on necktie, which is an already-existing redesign of the necktie, completely removes the tying process by using a clip to be attached to one's shirt collar in attempt to get rid of the difficulties encountered with the traditional necktie. However, despite its high ease of use, 12/18 interviewees expressed their concerns wearing it due to its appearance of professionalism. Some mentioned the fear of appearing either “phony,”

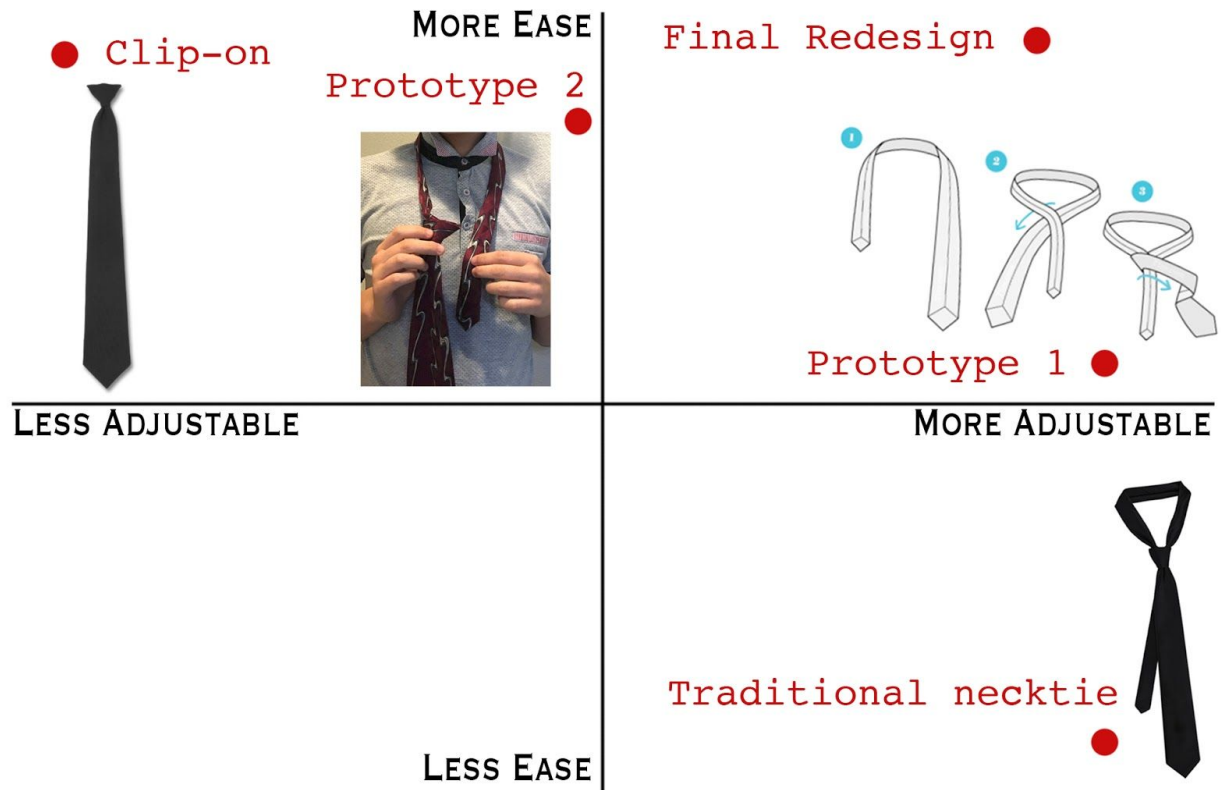
“dumb,” or “childish.” One notable quote is: “You never want to be caught with a clip-on tie in business situations.” Prototype 1’s QII qualities are explained in the Prototype subsection. Essentially, it has higher ease than the traditional tie due to its attached instructions and informative stitches, but is not too professional for the same reasons.

In the high ease/more professional Quadrant I are our Prototype 2 and Final Redesign. Prototype 2’s premade knot removes the difficult steps of the tying process while maintaining the same appearance as a traditional tie, which explains its higher ease and equal perceived professionalism compared to the traditional tie. Our Final Redesign, which is mostly similar to Prototype 2, is slightly more easy to use than P2. One of the two ways our redesign varies from P2 is that the loop is located in the back of the tie, which eliminates the need to create the knot’s slit, which is not intuitive at first.

Ease of Use vs. Adjustability -

By observing our interviewees while they attempted to tie a necktie, we found that all three levels of expertise -- novices, experienced novices, and experts -- incorporated some sort of [adjusting](#) action, whether it was *during* the tying process, or *after* the tying the process. (In the latter case, the interviewee was unsatisfied with their finished tie and attempted to tie it again.) Therefore, we decided that adjustability plays an important role in the process of tying the ideal tie -- hence our second design space mapping Ease of Use vs. Adjustability. Since this design space repeats the Ease of Use axis, we will discuss the mapped products in regards to its adjustability, as the ease of use for each is identical to the first design space.

EASE OF USE VS. ADJUSTABILITY



The traditional tie falls in Quadrant IV. Its simplicity in design, namely how it is a single piece of fabric, affords adjustability through twisting, turning, looping, tightening, and loosening. For that reason, it ranks amongst the highest along the adjustability spectrum.

Quadrant II contains the clip-on tie and Prototype 2. The “tying process” for the clip-on tie is simply clipping it on to one’s shirt collar. Both the tie’s length and knot are pre-made, and there is no option to adjust tightness, hence it being on the lowest end of the adjustability spectrum. Prototype 2, on the other hand, is closer to the middle of the adjustability axis, meaning it is not exactly unadjustable, but not completely adjustable. This is because its tightness can be adjusted, while the knot and the length of the tie cannot.

The remaining ties fall in Quadrant I. Prototype 1 affords the same amount of adjustability as the traditional tie, since this redesign iteration focuses only on adding extra instructions to aid in the tying process (more ease), which does not affect the traditional affordances (equal adjustability). Our Final Redesign is *slightly* less adjustable because the knot is pre-made, but still affords adjusting its length and tightness.

So, where does the Ideal Tie fall within our design spaces? -

For both design spaces, which map Ease of Use against (1) Perceived Professionalism and (2) Adjustability, the ideal tie would fall in Quadrant 1, which indicates high ease and high professionalism/adjustability. Having minimal difficulty, thus having higher ease, when using any product is clearly the ideal situation. In regards to adjustability, a tie's knot, length, and tightness will all vary depending on the wearer's preferences, so the ideal tie is one that accommodates for this difference by being adjustable by the user themselves. Therefore, the more adjustable, the better. As for perceived professionalism, the common idea amongst our interviewees was that ties are expected to exude a high sense of professionalism, which was shown through their reluctance to use the clip-on tie based on the fear of looking unprofessional. Therefore, the more professional, the better.

Conclusion

Through our interviews, error analysis, redesign and prototype, and design space analysis, we focused on not just the intuitiveness and user experience of the tie but also the professional aesthetic that the tie brings to the wearer. Our interviews revealed both the elusive nature of tying a necktie and the innate professionalism that our interviewees experienced when wearing self-tie necktie, as opposed to its clip-on counterpart. Our approach to the redesign of

the tie tackled both of these issues: the final redesign aims to make tying the necktie easier while still maintaining the same level of professionalism as a regular self-tie necktie. Our final redesign also aims to be as close to a one-size-fits-all type of tie, although realistically, that is not possible. For example, the retractable blade end of the tie, although fixes the issue of inconsistent length that occurs when tying a traditional necktie, does not account for wider ended neckties. Because of the gradually widening shape of the blade end of wider neckties, we found that folding and creasing to be an issue with part of the tie when being retracted into the spring mechanism. Similarly, the knot of the necktie would be restricted to a fixed size, unable to be adjusted looser or tighter. Although these issues are currently prevalent in our prototype, in the future we would like to further iterate over this product to feature customizability where users can adjust the length of the tail end of the necktie to better fit their neck size, if for some reason their neck was smaller or larger than average, the size and look of the knot, such as a larger or smaller knot or a half windsor, full windsor, or double windsor knot, and the width of the necktie, whether they want a slim, regular, or wide tie. Because different types of knots, widths, and even lengths work for different people with varying physiques, we want to make sure that we cover all our bases and accommodate for all types of people, making our redesign as close to universal as possible. In this way, we are designing with timelessness and universality in mind, possibly allowing users to purchase one tie and have it fit for all occasions. Our next steps towards achieving this would be prototyping different variation of designs for our tie and getting user feedback, whether it be through more interviews or early “beta-testers” of our product, and iterating our redesign if needed until we come up with a final design that addresses all the original issues of inconsistency, professionalism, and tying difficulty that were present in the traditional necktie. We hope to bring our necktie redesign to the market and have it be not only

affordable and accessible to the general public but also universal and ubiquitous for people of differing physiques for varying events.

Group Credits

Kirubel Girma
Christian Lay-Geng
Lee Liang
Michelle Nhi Nguyen
Kevin Sayed
Anish Sinha