Understanding Professional Fashion Stylists' Outfit Recommendation Process

A Qualitative Study

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ABSTRACT

Unused and underutilized clothing is a major contributor to the environmental impact of the apparel industry. To reduce this underutilization, we need to implement ways to maximize clothing use. Artificially intelligent decision support may help users make better purchase decisions as well as daily dressing decisions. However, learning relationships between user and garment features is challenging due to the sparsity of data and the lack of validated expert models. One way to bridge this gap and inform clothing recommender system development is to understand how professional stylists choose outfits that maximize clothing use and satisfaction of clients. The purpose of this study was to understand how professional stylists make outfit and garment decisions for clients. This study used a qualitative approach to collect data from 12 professional stylists with varying areas of specialization on their decision-making process. Data were collected through semi-structured interviews and analyzed using thematic analysis. Findings show client features, garment features and the consultation process as the main factors in decision making. Consequently these factors could be integrated in design of recommender systems that increase consumers' clothing utilization.

CCS CONCEPTS

•Information systems~Information retrieval~Retrieval tasks and goals~Recommender systems

KEYWORDS

Qualitative Study, Requirements elicitation, apparel recommenders

1 Introduction

The global rate of clothing production has doubled from 2000 to 2014, with average consumer purchase increasing by about 60% annually and the clothes being kept half as long as they were 15 years ago[12]. Globally, the average annual loss of revenue due to underutilization and non-recycling of clothing is over USD 460 billion, with some garments getting just seven to ten wears[4], and as little as 7% of the wardrobe in regular use[3]. Most of these unutilized clothes get thrown out to make room for new ones and end up being reused, recycled, or thrown in landfills. According to the United States Environmental Protection agency, 11.15 million tons of textiles ended up in landfills in 2017, this constituted over 8% of total municipal solid waste for the year[17].

One way to reduce this waste is by improving consumers' clothing utilization. Consumers buy more clothes for multiple reasons. This could be because even though they have lots of clothes in their wardrobe they may not like those clothes, or they might not fit well. However, Dunne et al. found that a tiny fraction of even the clothing that consumers liked and thought was in regular use was actually used regularly[3]. This implies that consumers may not know how to wear what they have, so they buy more in hopes of finding better outfits. This then means even more complexity in the decision of what to wear and more underutilized clothes. Finding ways to improve the utilization of clothing that consumers already own could lead to reduction in their need to purchase more clothes as they would only purchase what they need. The purchases they make

can then be fully utilized before being discarded. One solution to this problem would be to use recommender systems. Recommendations in most fields usually focus on making a single choice usually based on the user's preferences or based on how other users have rated items. In the case of recommending apparel, users may not trust their own preferences (they may want "expert" advice), and the preferences of others may not apply to their body type or aesthetics. The recommendation task is also complicated by the need to integrate each garment with other garments within the wardrobe system. Defining features for clothing recommendation (such as user features, context of use, and garment features that define clothing appropriateness) is a challenge that has not yet reached consensus.

Existing studies of apparel recommender systems each take a different focus. Some[8,10] focus on finding matches for clothing using clothing attributes or images to identify tops or bottoms and find matches for them. While this method would be applicable for finding single complete outfits, it would not find pieces that integrate well with multiple items from a wardrobe. The other limitation of this method is that it does not match an outfit to the user's features it just matches it to other garments. Studies that account for context awareness also tend to focus on a sub-set of influencing factors. The study by[11] extends outfit matching by using context aware recommendations that considers weather input from the user or obtained from weather service websites to suggest outfits that match and that are suitable for the selected weather. Another context aware system by[9] uses the occasion to make recommendations. In their work, clothing attributes were used to classify different outfits and make recommendations based on how suitable they would be for different occasions. The main limitation of these context aware systems was that while they provide suggestions for individual outfits in the context provided, they do not consider the features of the user while making suggestions. The systems by[7,16] on the other hand, integrate personal features in recommendations. These studies were on finding the right style for users given their body type, but didn't integrate other features like the context of wear or the user's wardrobe in suggestions. There have been a few studies on recommending from users' wardrobes. [6] designed a system that used RFID tagged clothing to implement a smart wardrobe with features of each garment integrated in it to track which outfits have been worn and where they were worn to. Although the system tracked what users wore and made recommendations from the wardrobe it did not use user features or contextual information for making recommendations. Although each of these recommenders focuses on different aspects, there is a need to design systems that put all of these features together for a more complex decision-making process. Although using recommender systems that integrate multiple features in purchase and styling recommendations could help simplify outfit choice and purchase decisions, it is important that the system uses enough features as well as the right combination of features to meet the user's needs. Each of these studies address crucial pieces of the recommendation task factors with slightly different variations in interpretation. Getting the perspectives of experts might be a way to standardize the inputs and models for each factor. This would help us determine what the right features are and how they should be applied in making recommendations that suggest good outfits for improved clothing utilization.

In order to design recommender systems that provide good outfit recommendations, we need to understand what good outfits are and what factors determine why an outfit is good for a user. A good source of information about what makes an outfit good in a given situation would be professional stylists who make such recommendations for clients daily. Understanding how professional stylists select outfits and make purchase decisions for clients could provide more insight into how to make recommendations for consumers on what outfits to wear or purchase. Although there seem to be numerous books, blogs, and media sources of information with style rules on how to style and what to wear, there is a lot of variation and contradiction in these sources. We would like to know how stylists navigate these conflicting or confusing advice and use them in making style decisions. The purpose of this study is to understand the factors that affect outfit choice from the perspective of professional stylists. These factors could then be used in designing recommender systems that act as automated personal stylists could help reduce waste from unutilized or underutilized clothing and reduce the impact of the fashion industry on the environment. The guiding research questions are:

1. What factors influence how professional stylists make decisions on outfit suitability and choice?

2. Do the outfit suitability and choice factors change if they are integrating the client's existing wardrobe or not?

To address the research questions, we conducted a qualitative study with professional stylists using semi-structured interviews. We sought to understand the factors they consider when making outfit choice for clients and their use and expectations from recommender systems.

2 Research Methodology

This was an exploratory study to understand the perceptions of professional stylists. The study was based on the interpretivist research paradigm of inquiry. The researcher's epistemological position for the study is that information is contained within the perceptions and experiences of professional stylists. Interaction with them, therefore, provides the opportunity to understand a complex problem with multiple themes. This study was conducted using phenomenology. Phenomenology is a qualitative research approach where you seek to understand the lived experience of participants[2]. The choice of phenomenology is appropriate here as it provides a good approach for comparison of participant responses to identify underlying themes. Semi-structured interviews were conducted to understand the decision-making process by finding out what experts think and why they make certain decisions in order to inform recommender systems design.

2.1 Interview Questions

A pilot interview was conducted with 3 colleagues to check for clarity, ambiguity, estimated length of interview and to minimize bias in the responses. The key interview questions were:

- What factors do you think are most important when choosing outfits for a client?
- Could you walk me through your typical consultation process with a first- time client?
- How do you decide what outfits to recommend to the client?
- Do you integrate the client's existing wardrobe in deciding what to recommend or just recommend new purchases?
- How do you integrate the client's existing wardrobe with new purchase recommendations?
- How would your process be different if you were integrating a client's existing wardrobe in your recommendation compared to if you are just making purchase decisions for a client?

Follow-up questions for the participants were asked to obtain clarification on issues they raised in their answers.

2.2 Participants

In this study, professional stylists were defined as anyone who had provided a minimum of 3 years of styling services to clients either as a personal stylist, wardrobe consultant, or image consultant. A total of 12 Participants were selected. The distribution of participants spanned the range of different job descriptions as shown in Table 1. Two of the participants were identified through referrals from colleagues. Four of the participants were identified by referrals from other participants and the remaining six were identified by a google search for the terms related to job descriptions in the professional styling field.

Table 1. Details of participants' area of specialization and years of experience

Participant ID	Specialization	Years	Location
QRI1	Personal shopping	10	Alabama
QRI2	Personal shopping	5	Minnesota
QRI3	Wardrobe consulting	17	Minnesota
QRI4	Author/image consulting	38	Minnesota

Participant ID	Specialization	Years	Location
QRI5	Image consulting	10	Minnesota
QRI6	Personal shopping	7	Texas
QRI7	Personal shopping/wardrobe consulting	8	Minnesota
QRI8	Image Consulting	19	Louisiana
QRI9	Wardrobe consulting	6	Minnesota
QRI10	Personal shopping/editorial stylist	4	Minnesota
QRI11	Image consulting	4	Pennsylvania
QRI12	Image consulting	20	North Carolina

2.3 Data collection

Each interview took between 30 minutes to one hour. Interviews were conducted virtually via Zoom or Skype video calls for 11 of the participants and in-person for one participant. All interviews were recorded. The in-person interview was conducted in a conference room on campus with the researcher and participant sitting across each other and a phone placed on the table between them to record the interview. The virtual interviews were recorded using the built-in software recorders and the phone voice recorder. Participants were either in their home or office during the video call. The COVID-19 social distancing restrictions and the geographic location of the participants during the interviews influenced the decision to interview most of the participants virtually. One advantage of the virtual interviews was that it allowed a more diverse set of participants to be included since geographic location was not a restriction. thus providing a richer source of data and information.

In order to focus on the participants during the interview notes were restricted to short insights or reminder words on questions that occurred to the researcher during the interview. The recordings were then played back within 30 minutes to one hour after the interviews. Notes were taken while listening to the recordings. The general impressions of the interview and context were also included in the notes.

2.4 Data analysis

Interviews were transcribed verbatim and participant information anonymized using sequential codes assigned to each participant as shown in Table 1. The interview transcripts and notes were then imported into RQDA software for further analysis. The transcripts were read through for familiarity with the main concepts. Coding began after reading through all interview transcripts. At each stage of data analysis 'memoing' was used to reflect on impressions, decisions and thinking process behind the codes used. Memos also included observations on the data.

Thematic analysis was conducted using inductive coding for the data. The first phase of coding was done using open coding from the participants own words. Codes were grouped into categories and patterns identified. The transcripts were then recoded at a higher level to identify underlying meanings, processes, concepts, and salient points. At this stage some of the initial codes from the first round of coding were merged or redefined. The resulting codes were analyzed to find patterns and code categories were generated. The code categories were analyzed to find similarities and differences in responses of participants as well as possible explanations for those differences where differences were found. The generated themes were analyzed to answer the research questions.

3 Findings

Professional stylists that participated in this study had 3 major job descriptions. Personal shoppers took clients shopping or shopped for outfits and sent them to online clients. Wardrobe consultants helped clients reorganize the clothing in their closet as well as make new purchases to balance out missing pieces from their wardrobe. Image consultants worked with clients to build their personal or professional brand, so the client could portray the image they prefer to others. There were some who performed in more than one role and some who had other roles that were quite different from the three roles mentioned, but still related to fashion

styling. Ten of the participants had both online and in-person clients, while two of the participants only had in-person clients.

From the analysis of the participant interviews three major themes were identified. These are discussed here with respect to the research questions and results of the data analysis. A separate theme on trust was also identified that was common to all participants and relevant to each of the research questions which is explained in a separate section after the research questions findings. Quotes from participants are integrated using the identification assigned to each participant as shown in Table 1.

3.1 What factors influence how professional stylists make decisions on outfit suitability and choice?

The results of the data collected showed three major themes for factors that influence decisions of the stylists on outfit suitability. These themes were the client style considerations, garment related considerations and stylist consultation process. Each theme is explained in this section and a framework for the identified themes and the relationship between them is shown if Figure 1.

3.1.1 Client considerations

Most of the responses in this theme were based on things that related directly to the client. Two subthemes emerged under this theme. They were personal features and client lifestyle.

Personal features: Participants responded that the personal features of the clients played a major role in outfit recommendations. Almost all the participants said they would first look at the body shape of the client in order to determine what would suit them. While all except one participant said body shape was important as it affected what style of clothing was appropriate for the client or if and where on the body, they could wear patterns, they were not specific about how the relationship works. This relationship will need to be investigated in more depth. Participants determined a client's body shape by visually assessing the body features of the clients during an in-person consultation or from the client's image, if it was provided, for an online client. Participants had different ways for classifying body types, but were consistent in using the difference in bust to waist to hip ratio as the main principle in their classification. Two of the participants specifically said that while it was common practice to use fruits to classify body shapes, they did not like describing women as fruits but rather just used those principles in their classification, "I don't like the 'you're a pear, you're an apple', I don't really like describing it that way. But it is true that you know, a person can be curvier on the bottom than on the top. And so things are going to fit that person differently than curvier on the top than on the bottom or being a really tall person or super petite." – QRI9. For participants who worked with clients online, they said they relied on the client to provide a description of their body features in order to try and determine their body type when they were dealing with clients online and couldn't visually assess the client. "So when I was working with people in person I can kind of just look and see like, Oh, they have a smaller waist, or they have wider hips, so this is going to work well. When it's virtual though, the way that I tell is [The Company] has another portion kind of like this where you have to input if you have narrow shoulders, average shoulders or wide shoulders and then you have to input if you have wider hips, narrow hips or average hips and so based on that you can kind of tell or they'll say like 'Oh, I have a longer torso or shorter torso, longer legs, shorter legs'." – QRI2.

Ten of the participants said they did a color analysis for their clients looking at their hair and skin tones to determine what colors of clothing works best with their coloring. The most common distinction they made was using coloring to determine if a client should wear warm or cool colors. Two of the participants said that the best colors to wear were affected more by the skin undertones of the client than the actual skin color of the client. "it has to do with your own color, your undertone. Okay, whether you're black or white. I have, and obviously I'm Black, I have clients that are Caucasian that are the same color palette as me." – QRI6. For participants who had tools they used for color analysis, their tools varied. Four said they used intuitive or trial-and-error methods, like draping fabric on the client to see which colors suited them. Three used strategies based on the color wheel while one participant said she uses a commercial color fan that has appropriate colors grouped on it based on the skin and hair color of the client.

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While body shape and color were considered as important by most participants, other factors were seen as important by fewer participants. Three participants said age was important to them as outfits they recommended had to be age appropriate. The main consideration with age was about not recommending something skimpy or with inadequate coverage for an older client. Three of the participants said that they considered the client's personal perceptions of their body issues when making choices for them. They chose outfits that emphasized body features the client like while minimizing those features that the client wanted to hide.

Lifestyle: All of the participants had an initial consultation process where they either asked questions from the client, had them fill out forms that helped them figure out the lifestyle of the clients or used a pre-filled form from the client that was provided online. For most participants, the client's lifestyle played a major role in the choice of outfits. The lifestyle factors that were mentioned included the client's profession, daily activities, budget, culture, personality, style preferences and intended results. Almost all participants felt that profession and daily activities were important lifestyle factors to consider. Three of them said the profession of the client was important when purchasing or building a work wardrobe as different fields have different dress codes. Two of them said the daily activities of the client was very important as it determined what the client would be doing while wearing whatever outfits they chose. In some cases, the profession determined some of the client's daily activities. Participants said things like: "I need to understand who they are and what they're doing today and their life and where they want to go. When I know that, then I go in and assess their closet" – QRI5, "I ask a lot of questions about where they're from originally? What do they do outside of work? Do they have family, children, grandchildren? What hobbies they do, because I'm trying to get a mental snapshot of my client as much as possible so that I'm not placing or purchasing clothes on them that don't fit who they are, where they're trying to go" – QRI12, "like what type of Personality they have, what are they actually comfortable in, you know, how are they interacting? What is their lifestyle like?" – QRI3. The client's profession also might determine the daily activities of the clients in some cases.

Eight participants said they usually considered the personality or style preferences of the client, as it could determine what the client felt comfortable wearing or just preferred wearing generally. Although, they also addressed the need to balance what a client preferred with what the stylist feels the client should be wearing to help achieve their aims. Of those participants that felt personality was important, three said they would try to balance the client's personality with what they as professionals felt was most suitable for the client. For a client who has a more flashy personality but worked in an environment that has a more traditional dress code one of the participants said "I would say, why don't you get a scarf or handbag that will complement, you know, bring up your personality, but you still wear fairly standard suit and like a shirt, colored shirt, rather than a plain white shirt."- QRI11. Participants said they would sometimes need to remind the client that they hired them for a reason and try to explain to the client the reason for the choices.

Nine of the participants felt that the budget of the client was key. It determined where the stylist could shop for the client. Five of the participants said they usually started off shopping for most of their clients at second-hand clothing stores such as consignment or thrift stores. And then, depending on their budget would move on to departmental stores or boutiques. Culture was mentioned as an important factor by two of the participants. They spoke about the cultural requirements of their client being important in the outfit choices they make as different cultures had different expectations in terms of clothing. In some cases, it meant they had to integrate head coverings in the client's wardrobe or make outfit choices that required a lot more coverage than for most other clients.

3.1.2 Garment features

Garment attributes: Analysis showed a theme of participant responses related to garment features. Some said they tried to find outfits for clients based on the garment attributes that were most appropriate for their personal features and lifestyle features identified. This meant trying to find the right fabric colors that worked for a person's skin undertones, or deciding where to put solids and patterns based on what body features they wanted to draw attention to. Some chose garments with fabrics or styles that would make them suitable for what the client was doing daily. This meant that they might recommend garments made with fabrics with a

bit of stretch or a looser fit for comfort and ease of movement when the client's activities required a lot of movement, darker colors if the daily activities meant that clothing could get soiled easily or a corporate style with darker colors for someone in a formal job. One participant in choosing clothing for a stay-at-home mom who was an online client, discussed some things she would consider "So based on that and especially knowing that she's a stay at home mom, the things I'm going to prioritize again are like her hourglass figure for things that are going to compliment that. Things that you know nip in at the waist a little bit and then also she's staying home with her kids so comfort is probably really important to her, even if she is like going out, she probably wants something that could maybe also work for just staying home" – QRI2. She also mentioned some mistakes she made in her choices for the client "it looks nice on paper but isn't likely going to work well for her in her lifestyle. So a couple of goofs that I made was, the cardigan is super light gray, almost white and she has 3 kids. So, with three kids, it's easy to get messy and so she was like yeah, that doesn't really work for me. You know, it's too light of a color. She would have preferred a darker gray as a neutral." The client's profession also could affect what features of the garment made them appropriate for the client or what colors of clothing you need, "what do you have to do? Are you going to be speaking in front of people, do you have to do presentations for work? And do you have to address your boss about a situation, all those things have to be addressed…So I used to say if you're in a meeting with a bunch of guys the last thing you want to do is show up in a pink suit." – QRI5. In this case she said a suit in a darker shade would be most appropriate for a client who wanted to be taken more seriously.

Brands: Some responses in this theme related to things like how different brands were more suitable for certain client based on their lifestyle. For body shape they said the sizing and fit of some brands' cuts for things like jeans and pants may be more suitable for curvier women while some brands might have styles that are best for a petite or taller client. They said things like: "But the more you know about where to source and know about retailers and designers and how they fit and the cut, the better and easier it is for you to dress the client."- QRI12, "I think for instance I have one client, she loves Eileen Fisher because she's a shorter, heavier person and these clothes works for her and so whenever I get some of that brand and it is especially nice, I will call her" – QRI1. The budget of the client also determined if you shop at luxury brands, departmental stores or if you used second hand stores or not.: "Like understanding the range of what your client is willing to invest in, what they're willing to buy, and that drives a lot of my decisions of what brands to recommend when they're shopping for clothing, and what places I look at when I'm making decisions for them for styling." – QRI10. Some participants also said that different brands catered to different target markets, so some brands might focus on more formal clothing for work while others might specialize in more casual clothing.

Fashion industry seasons: Some participants said that since designers released new designs in store at different seasons, their choices depended a lot on what was available in stores during the consultation. The fashion season determined the fabric or colors that were in stores. So, for some clients, even if you knew certain colors would be best for them, those colors may not be in season at the time of the consultation, "when I talk about colors all their colors are not going to be in season… I mean, really, because there's certain times of the year, you're not going to get browns. Yeah, maybe Navy's aren't in all the time." – QRI5. The material, fabric and style of the garments also affected whether they were suitable for cold or warm weather. Some participants said they start by putting together client's wardrobe and outfit choices around the season that they are currently in and then help them select outfits for other seasons. "So that I'm only focusing on that kind of style or like the materials and if they're lightweight for summer or if it's for winter, if it's like heavier, mid-weight, kind of like pull over sweaters and stuff like that." – QRI10.

Wardrobe basics: For some participants garment features determined how suitable they were as wardrobe basics for clients based on their lifestyle or needs. This meant that they had to recommend pieces that were classics. "Classics are going to be stuff that does not go out of style. Your pinstripe suit, your A-line dress, your black pumps, stuff that don't go out of style. Or you could take a pencil skirt and mix it with anything. Yeah. That's the stuff that you're going to spend the most money on." – QRI8. For some the wardrobe

essentials were independent of body type. Rather they depended on the industry the client worked in, "So it's not so much the essentials per body type, it's the essentials per industry. If I get a graphic designer or someone in the creative arts versus someone in banking, their essentials may be Chino pants and maybe a graphic T and a button-down. So it just really depends on the industry, more so than the body type." – QRI12. While for some the wardrobe basics are those garments that they felt every woman had to have in their wardrobe regardless or occupation or body type, "getting jeans that fit well because most people are wearing jeans 80% of the time. Getting one great pair of black slacks, whether it's a pair of black jeans if you're going to go that route or black dress pants. Getting some tank tops and shirts that skim the body, and getting a great blazer, like a jacket that fits well, and it curves in at the curves and that looks good. It's good at the shoulders. Those are some of the very, very basic things that I like to see all of my clients have. And that blazer can be any color, but it's just got to be a good fit and something you can use a lot" – QRI4, "I have what's called my ultimate wardrobe checklist, which is a list of garments that I feel every woman should have in her wardrobe for the most part and we go through and what's missing can also be the basis of a shopping list." – QRI6.

Clothing versatility: We found that based on the lifestyle factors of the client, some participants said they tried as much as possible to choose clothing that was versatile for clients. The versatility of the garments depended on how well the attributes of the garment translate to a different setting or occasion. Considering what the client was doing daily, they chose outfits that could be versatile enough to work in different situations with just slight modifications. This meant they might look at how the same garment might translate from day to night or from work to casual just by dressing it up differently with accessories, "so thinking about her lifestyle, I picked up pieces that would be comfortable that she could move around in but also pieces that are really versatile especially since she has that limited budget. So she can mix and match, she wants to be able to wear this during the day and then when she goes home and maybe wants to go out with a friend she can keep wearing the same thing or maybe just change the shoes and not have to put on a whole other outfit." – QRI2.

3.1.3   Stylist consultation process

Stylist specialization: We found that responses from participants were greatly affected by their area of specialization. This was most pronounced in the lifestyle factors that were emphasized by different participants. Image consultants seemed to emphasize the client's personal growth internally first then work on the outward appearance. For them they considered the style personality and the results the client wanted to achieve as being very important. Their emphasis was on the image the client was trying to project on the outside. They discussed working with clients on gaining confidence and building a brand and then designing the client's wardrobe around that brand. Personal shoppers felt that the occasion, season, body shape and lifestyle were more important. They also emphasized the need to help clients make purchases that were versatile and could be used for different events and occasions. The personal shoppers` emphasis on the versatility of clothing was understandable as most of them were not trying to work with a client's existing wardrobe, but rather helping clients to shop for new pieces for occasions or for their lifestyle. However, they said they might ask questions about what a client already owned or suggest other pieces that could be worn with what the client was purchasing. For wardrobe consultants, they usually were more concerned with things working together with existing pieces. All the wardrobe consultants said they shopped in the client's closet first by showing them what to keep or discard as well as how to wear what they already had differently. Then they would decide what new pieces needed to be purchased to improve the client's wardrobe. All stylists emphasized the need to have clients be comfortable in whatever they were choosing for them. Outfits needed to show those body parts the client wanted to emphasize and conceal those parts that the client wanted to hide. All the participants emphasized the need to teach clients and explain why they made the recommendations that they did.

Mode of interaction: The mode of client consultation was also important in the choices the participants made. This related to whether they were interacting with the client virtually or in-person. The main challenge with working with online clients for most participants was figuring out the color and body type of the client. For

online clients they relied on information provided by clients in forms or on images sent by the client, and in cases where they were having a video conference then they could try to visually assess the client's shape. When it came to identifying an online client's coloring, they had to rely on whether the client described themselves as being dark or fair, as well as on what they could see of the client for online clients, whereas, for in-person clients they could visually analyze the client or do a color analysis using some of the tools mentioned previously. Participants also mentioned differences in how they approached online and in-person clients especially when making recommendations that integrate existing wardrobe. For online clients, they usually have accessed the client's previous purchases and the data the client provided from which they could build a list of likely pieces to recommend, and if this information was not available they worked mostly off whatever information the client provided in their forms about their body shape and lifestyle. For participants working with a client in-person, they tend to rely more on feedback from the client as they are working together pulling outfits and trying them on or if they are integrating the client's wardrobe they ask what they currently have in their wardrobe or look in the client's wardrobe to see what they have.

Client's objective: The objectives of the client in seeking a professional stylist's service was also a major factor for participants in outfit choice. They all said they tend to ask questions either in person or in the forms the client fills to understand the client and their main goals or objectives. "You also want to find out what is the reason for this change? They may be going through a divorce. They may have gone through cancer. So a lot of questions you want to ask to get to know the customer." – QRI8, "I think it's important that you take into consideration, who you're working with, that person and what their actual needs are, because everybody's needs are going to be different and you have to respect that." – QRI4. Some of the information they were trying to get also included: Do they want to find clothing for their current lifestyle or just want a total change of wardrobe? Are they trying to dress to achieve a certain result e.g. to get a bank loan, get a promotion, start a new career or improve their chances of getting a promotion? Are they dressing for a specific occasion, or just trying to get a new style? For some it's because they have a baby and need to find new clothing that works with the changes to their body. The client's motive also determines whether or not the wardrobe is integrated in the recommendations that the stylist makes. They emphasized the need to balance the client's motives, personality, or preferences with the expertise of the stylist. There could sometimes be conflict between what was better for the client in the opinion of the stylist and what the client believes was best. In such cases they sometimes had to remind the client of the reason why they consulted a stylist in the first place.

Strategies & Formulas: Some of the participants said they had to educate the client during the consultation on strategies they could use to transform an outfit. These strategies included showing clients how to mix up different pieces to get more wear out of the same pieces or how to style a garment differently for work or casual. A few said they showed clients how to build up mini wardrobe clusters around one piece by mixing it with other matching pieces. In some cases they would create look books for the client, so they had something to refer to later. It was important for them to show these strategies to the clients so they could do the same thing with the garments on their own later, "oftentimes it's just putting things together in different ways. And, you know, being more creative with how you put colors together. If their goal is to be more professional, showing how you can make an outfit more professional with accessories, how to use accessories, what kinds of accessories work better for professionalism and how jackets versus sweaters can change what an outfit looks like." – QRI9. In some cases the style and design of the garment may already be versatile. As one participant said about clothes she sent to an online client, "And then for the dress I specifically picked this one because it ties at the waist. She's got an hourglass figure and its really going to flatter her, and then also it's reversible which you can't tell by the picture but you can actually flip it and it's like solid navy blue on the other side." – QRI2.

3.2 Do the outfit suitability and choice factors change if they are integrating the existing wardrobe or not?

3.2.1 Existing Wardrobe Effects

Only one participant said that wardrobe integration did not change how she made decisions or what she recommended to clients, "On paper, a lot of people would think it does look very different. But honestly, what we're doing, I think, is the exact same because if I'm just shopping with someone, I'm still teaching them the things that I would teach them in the closet, because I'm talking about styling and body type, and stuff like that the whole time and if I'm in a closet, I'm talking about the things that they need like for shopping and we follow up with the shopping list. So it's kind of the same, it's just one's in their home and one is out buying things." – QRI7

For all the other participants the factors considered in making outfit suitability decisions changed if they were integrating the existing wardrobe. The main difference was that when you were just choosing new outfits then you are looking at making recommendations for standalone outfits, but when you are choosing suitable outfits with wardrobe integration, you are making recommendations for a more complex case of new pieces needing to work well with already existing pieces. For standalone outfit recommendations they said they look mainly at the client's personal features like body type and color, then the lifestyle features such as the budget, the personality, occasion for which the outfit will be worn, they might also look at profession if the client is shopping for work wardrobe. "With someone who I'm styling some parts of their wardrobe that they already have, and I know about those pieces I can look for pieces that I can implement to mix in with those pieces. And rather than doing that with the other person ... I try to focus on what occasion, we're looking for... And I try to figure out if the individual has staples that we can mix in with those, or if they don't, if I don't have that information, then I will try to mix in an array of like bottoms, tops or outerwear" – QRI10. When shopping with wardrobe integration on the other hand, they consider the factors that were considered for standalone outfits but may not consider the occasion as much. They would also need to focus more on the garment features. They look at things like versatility to see how well the new pieces work with existing pieces and what existing pieces can be paired with the new ones to change the look of the outfit.

Participants shopping with wardrobe integration would first shop in the client's wardrobe to see what is there and how those pieces can be combined to provide different looks then identify what is missing or what might be needed by the client before going shopping based on those needed items. Whereas when they are not integrating the wardrobe, they would go straight to shopping for new things. We found that although there were differences in the factors that determined suitability, most of the factors were still the same. Participants still tried to educate clients on why they choose some outfits for them by showing them how those outfits enhanced their body or color as well as showing them other ways they could use the same outfits. Some participants said they would still ask questions about what a client already owned when they were shopping without wardrobe integration as they wouldn't want a client purchasing something too similar to something they might already have.

Participants said they had more difficulty shopping with wardrobe integration when they worked with clients online. This was mainly because of the inability to really see the clothing of the client from an image or video and so they usually relied more on the past purchase history of the client when that was available. Still they said that this does not give a full understanding of the wardrobe, as they can only likely see what the client bought online and not everything they own. In those cases, they said they tended to rely on asking clients questions about what they have and may concentrate on purchasing garments that tend to work well with a lot of other garments and then make suggestions of ways the client might wear them.
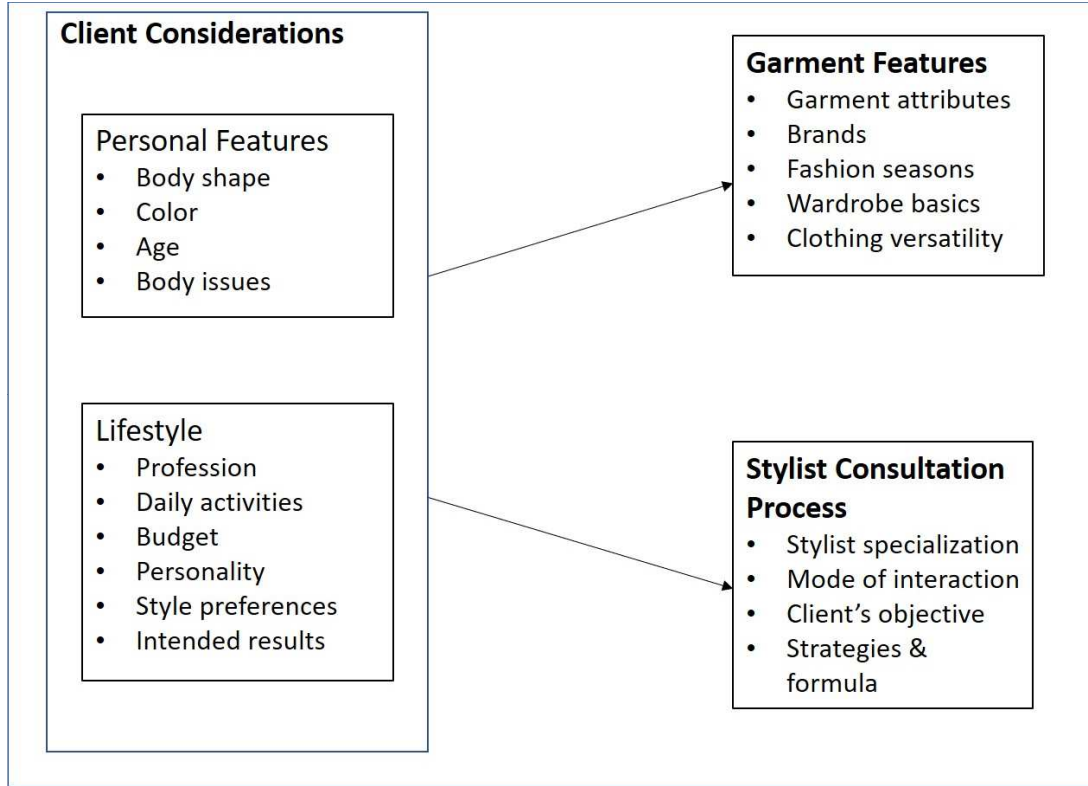
Figure 1. Conceptual model of professional stylists' outfit decision factors

4 Discussion

The purpose of this study was to understand how professional stylists make outfit choice and purchase decisions. In this section, we discuss two of the key themes identified: client considerations and garment features. We then discuss the third theme of the stylist consultation process and effects of wardrobe integration to explain the implications of this study for design of recommender systems.

4.1 Client features

Personal features were a key consideration for participants but implementing these factors in a recommender system requires a lot more research. To design systems that could automate the styling process using recommender systems, body type and color would need to be implemented in the system. One way might be to require the users to fill in their body type but that would not be accurate, as has been shown in [14]. Their study showed that only about 45.1% of respondents' description of their body shape was consistent with their SizeUSA body shape classification. Given that the system would make predictions based on the body shape entered, the predictions would likely be wrong for more than half of the users based on this study. We found that in most cases the participants mostly relied on visual assessment to determine the body shape of the client, and when they couldn't see the client in person they would ask for descriptive details as well as full body images rather than asking the client what their body type is. Clearly, to successfully implement body type identification in recommender systems, a lot more study is required on ways to clearly identify body types as this cannot be left to the users to determine themselves.

While ten of the twelve participants said that color was an important factor, the approach, and tools for classifying a client's color differed. For example, three of the participants had a draping session to see which colors worked best with a client's skin tone, while one participant used color fans. There was also differences in what participants considered as most important for coloring. Two of the participants who discussed skin undertones said they felt the undertones of the skin color were more important than the actual skin tone while

seven participants just looked at skin We can see from these findings that implementing color in recommenders, either as skin tone or undertones, is important. This could prove very complicated though, as in spite of recent advances in digital skin color identification, issues such as variation in screen representation of color and lack of standardized skin color names might make this difficult to implement. This clearly is an open area for future research.

Implementing some lifestyle features in recommenders would be easy. Budget can be easily implemented by setting limits on clothing recommended based on price or recommending from stores that provide clothing with the price range of the user. Other lifestyle features though could be more difficult to implement. Collecting accurate information on the user's physical attributes such as shape and color would require more research. Some lifestyle factors like personality, daily activities and profession might be inferred by having users answer carefully designed questionnaires that classify them but translating these inferred features into garment attributes would still be quite difficult. There is clearly a need for methods of digitally representing relationships between garment attributes and the lifestyle or user features they are suitable for. Although there are studies on using garment attributes in recommender systems [8–10], a lot more study needs to be done on how these attributes would translate in the kind of complex systems that would be needed to represent users existing wardrobe, as well as find new garments that could be added to the wardrobe to enhance it.

4.2 Garment features

Understanding the relationship between different garment attributes and how they translate to lifestyle systems is essential in building these complex systems. One reason for this is that once the issue of how garment attributes and their relationship to different lifestyle features is addressed, the system can make recommendations using attribute filtering to find suitable outfits. One approach suggested from the literature to determine suitability could be using weighted scoring functions. This approach was used by [5] to find friend suggestions using weighted scores based on similarity of music interests. In the apparel recommendation case, weights could be assigned to garment features based on the suitability of those features for client considerations such as body shape, season, profession, etc. The total scores could then be used to rank outfits or garments to provide results. Attribute filtering could also be used to design and integrate versatility in the system to show how different garment pieces could be paired with others to create a different look. Garments with attributes that make them suitable for multiple situations could be used in determining the ideal set of wardrobe basics for each user based on their personal or lifestyle features. It could also be used for matching outfits using measures of similarity of features to find good pairs. There is also the added complexity of including diversity in the system so the user is not restricted to a narrow set of very similar outfit due to overfitting. The aim is to provide highly accurate recommendations based on user features while also including high diversity of styles in the recommendation.

One other important factor here is the difference in attribute feature names from person to person. While a stylist may understand the difference between a flared or pleated skirt, other users may not. The system needs to anticipate that users might either not know what different garment features are called or may have different names for different garment styles and be able to infer the style from the name and recognize garment attributes from images. Two possible approaches to this could be using natural language processing or image recognition. Natural language processing could be used to train the system on similarity in meanings between garment features while matching those names to garment images that could help users recognize what they mean so they can find similar items in stores. This would require a large dataset of style attribute names which is currently not available. While natural language could be used for handling name variation, the problem of image recognition is more difficult. From the literature we found studies using image recognition for determining garment attributes from images [1,8]. These studies showed that the clarity of the images affected how well the system could recognize the garment attributes and even with clear images there were still limitations in performance of the systems. This would be especially important for trying to identify garments already owned by users from images.

4.3 Implications for Recommender Systems Design

All three identified themes are interrelated as shown in the conceptual model in Figure 1. The client's features determine the garment features. A client's needs and lifestyle also affect which stylist they contact and the area of specialization of the stylist. For the stylist to be successful then, their decisions need to be based on the needs of their clients which affects what factors they prioritize in their decisions. To a large extent the specialization area of the participant affected which factors they felt were important. For example image consultants were more likely to look at profession and intended results in dressing as being more important while wardrobe consultants and personal shoppers emphasized more on daily activities and style preference as being important. Looking at the job function of each of these different fields, you find that the difference in emphasis by different specializations noticed in the lifestyle factors is understandable. A client would likely engage the services of a professional stylist that focuses on areas that are closely associated with the needs of the client. The stylist then places more emphasis on those factors that would increase the chances of successfully meeting the needs of their clients. This is also true for recommender system users. Users would likely have different intensions for using the system. Users looking to reorganize their wardrobe would likely require different features than those who just want to know what type of clothing works best for their body shape or color. Some might just want to find novel outfits that they wouldn't have thought of on their own, while others might just want to find new ways to wear what they already have. To provide the best recommendations for users there are different features that need to be integrated in the system design. The system needs to adaptable to what the user intends to find recommendations for. This would require modelling the system to elicit information from the user in order to learn what the user needs are and then adapt the recommendations to suit those needs.

We found from the study that stylists tend to provide recommendations that in most instances are quite different from what the client would typically get. This speaks to the need for serendipity and diversity in new outfit recommendations. Another peculiarity of the apparel industry is that style rules and seasonal trends change constantly. Recommender systems need to evolve with changing fashion rules as well as with the changes in fashion trends and seasons. There are existing studies on models that could anticipate and predict seasonal trends[18] which could provide the basis for designing the system to evolve in its recommendations. Another method that's been shown to work for this is by having the system learn new trends from recent magazines and social media posts of fashion influencers and integrate that to provide recommendations[19]. This has the added advantage of improving diversity and serendipitous recommendations.

In cases where the existing wardrobe affected the stylists' recommendations, stylist had to suggest outfits that were suitable for the client's needs and features, while also ensuring that new items can be used with existing items in the user's wardrobe. Recommendations that integrate a user's wardrobe could be designed with hybrid models where one part handles new outfit recommendations then another scores the suggestions based on how well they will integrate with the existing wardrobe. The outfits with the highest scores could then be returned in a ranked list for suitability. This has been used for recommendation in other fields for complex system but has not typically been used in apparel recommenders.

The stylists usually provided strategies and formulas for achieving a good look during the course of consultation. They also explained to users why they felt a certain outfit worked better for the client than another. This is important for recommender systems design as it emphasizes the need to provide explainable recommendations. This requires modelling the strategies and formulas used by professionals in the system to provide recommendations that are outside the user's normal choices while giving explanations for the recommendations. Using feature-based explanation might be preferable here as users can more easily relate to this and understand the explanations. This improves the trust and acceptability of the system and helps users better understand the choices made[15]. One approach to this could be using a rule-based algorithm that extracts user features and connect them to garment features from a knowledge base of professional expert rules based on a similar approach by [13] in their study. Although their study was done for connecting product features and user relationships, the same principles can be applied here using the user features and garment features with the knowledge base of expert rules as extraction rules to provide the explanation. The limitation

of this method is that training the system to do this would require a large dataset of expert rules on body types and styles that suit them which is currently not available.

The aim of professional stylists and apparel recommender systems are the same. They need to find outfits that are ideal for the user. The only difference currently is in the level of personalization. The main difference is that professional stylists provide a more personalized experience that is tailored to the client's features and current needs while recommender system aim to do the same but in a way that scales to a larger audience so it may not be as personalized. Personalization of recommender systems for users can be improved using a threefold approach as shown in this paper. The first step is knowing which attributes of users to learn Then the system needs to learn the design-based attributes of clothing. The final step is determining what clothing attributes are suitable for which user attributes in order to make the right predictions based on expert provided rules.

This paper's main contribution is in helping to better understand which features to learn and provide suggestions on how to integrate the features in a recommender system. For some features, integration in a recommender system is a little more direct, e.g. collecting information on users' lifestyle and attributes. Requirements such as mapping of user attributes to garment features, translating context information such as profession and personality from user information into learnable models, developing datasets of expert rules for determining suitable outfits, etc. still requires more research before implementation of such complex systems can be possible. These areas provide open areas for future research.

5 Conclusions

This study was aimed at understanding how professional stylists make outfit choice and purchase decisions. Three main themes of client considerations, garment features and stylist consultation process were identified as the factors that affect how professional stylists make outfit choice decisions. Client considerations was found to have two sub-themes of personal features and lifestyle. The importance of some factors changed for most participants when existing wardrobe was integrated in the choice of outfits. While some of these factors have been implemented in existing systems, some problem areas identified provide areas for additional research in order for these factors to be fully implemented in recommender systems. Such systems would allow consumers make full use of their existing wardrobe while ensuring that new purchases are ideal for the users and integrate well with what the user already has in their wardrobe. Clearly, there are still a lot of areas that require extensive research before a fully context aware recommendation system of this can be implemented. There is also a need for research in well-defined expert styling rules and creation of rules dataset that could be used in model training for such systems.

The main limitation of this study is that the results are fundamentally the perceptions of the participants in the study, rather than the beliefs of professional stylists in general. The responses might not be generalizable as the participants are not a true representation of the professional stylist population. In spite of this limitation the findings could still provide a good basis for understanding the professional stylists' thinking process and guidance for implementing it in a recommender system.

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