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The Effect of Gender, Urban/Rural Background, and Profession on Patterns of Use of Color Terms in Jordan

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Abstract: In this study, we examined the relationship between social factors and language by focusing on color terms. We investigated patterns of color terms' use and the diversity of the color terms lexicon (CTL) among males and females belonging to different subcultures—city vs. small town or urban vs. rural—and different university majors—professionally color educated vs. others. Using an unconstrained color-naming task performed on a computer, three hundred and ninety-nine participants were asked to type in descriptions for fifteen color samples. The use of lexical items from Modern Standard Arabic (MSA) in the color descriptions was also investigated. Uni/multivariant analyses of the data were carried out in order to test the association between the patterns of color terms and the social independent variables. Females, participants with professional education in colors, and participants from the city were found to have a larger and more diversified CTL than males, participants with no professional color education, and participants from small towns.

Keywords: language and society; color terms; Jordanian Arabic; gender; quantitative; modern standard Arabic; sociolinguistics; urban and rural culture

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1. Introduction

Color is a crucial dimension of visual communication, and it can be utilized as a powerful tool to express identities, emotions, and ideas (Mylonas et al. 2010). While the human visual system can differentiate millions of colors, the size of the color terms lexicon (CTL) is subject to cultural factors such as environment, language, age, gender, and so on.

A classic debate in the discussion of the topic of language and perception revolves around the Sapir–Whorf hypothesis, also known as the linguistic relativity hypothesis, which holds that speakers of different languages dissect nature and the universe differently (Chase 1956). The investigation of the differences in color memory among people from different languages was deemed a suitable field to investigate the claims of the Sapir–Whorf hypothesis (Gerrig and Banaji 1994). Lines of research contradicting the claims of the Sapir–Whorf hypothesis emerged. Berlin and Kay (1969), in their universal basic color terms (BCTs) theory, argued that eleven basic perceptual color categories exist for all humans: white, black, red, green, yellow, blue, brown, purple, pink, orange, and grey. Individual languages differ in the number of BCTs expressed from within this pool of color categories. Moreover, Berlin and Kay stated that the identity of the BCTs categories follow a strict hierarchy that depends on the number of BCTs in a particular language. The presence of a strict hierarchy that predicts which BCTs exist in the world languages is at odds with the proposition advanced by the Sapir–Whorf hypothesis. The hierarchy suggests that speakers of different languages respond to an external reality in their description of BCTs, contrary to the Sapir–Whorf hypothesis, which postulates that the relation between reality and language is arbitrary (Gerrig and Banaji 1994).

However, speakers are not limited in their description of colors to the BCTs described by Berlin and Kay; speakers can use other description of colors that are based on basic

colors or are based on similarity to concrete objects, and specific or descriptive color terms (Simpson and Tarrant 1991). Consequently, the categories used to describe colors are different from one language or culture to another; some languages have fewer color terms to describe all colors (Heider 1972; Squillante 2013), whereas others have many more (MacLaury 1997). The differences in color lexicon do not only exist between languages, they also occur among speakers in the same language. The question of the role that nature and nurture play in accounting for these differences has been examined.

Color perception studies have examined the impact of biological differences between males and females on color lexicon (Nathans et al. 1992; Jameson et al. 2001; Jordan et al. 2010). It has been reported that females have dimorphisms of the X-chromosome genes, which are code for retinal long and middle wavelength photo-pigments that may contribute to their more nuanced color perception and the capacity to discern color differences along the red–green axis. Although Nathans et al. (1992), Jameson et al. (2001), and Jordan et al. (2010) assumed that those biological differences between males and females may have some effect on the acquisition and naming of colors, other researchers argue that different patterns of socialization promote a greater awareness of color among females (Bimler et al. 2004). The way people describe colors thus shows that there is a strong relation between language and culture (Wardhaugh 2006).

Numerous studies have demonstrated that gender differences play an important role in naming colors. Females were consistently found to have a larger and more diverse color lexicon than males; they tend to use more elaborate (fancy) words and specific color terms compared to males (Rich 1977; Greene and Malcolm 1995; Lin et al. 2001; Swaringen et al. 1978; Steckler and William 1980; Nowaczyk 1982; Frank 1990; Simpson and Tarrant 1991; Yang 2001; Arthur et al. 2007; Mylonas et al. 2014; Lindsey and Brown 2014; Fider and Komarova 2019). These studies reported an important role for gender in relation to the size of CTL. Such studies reported that while females offered more non-BCTs, males used a combination of the BCTs or BCTs with modifiers. In addition, females used more BCTs qualifiers related to hue and saturation than males (Bonnardel et al. 2002). Steckler and William (1980) reported that females used more specific color terms, while males used combinations of BCTs. Fider and Komarova (2019) showed that females had a more differentiated color categorization pattern than males. Conventionally, 'grue' refers to the collection of colors that can be described in English by either blue or green (Fider and Komarova 2019). While females were more likely to employ separate green and/or blue (grue) categories, males used more terms in the grue category for both separate hues. This grue category split could occur as a result of one gender learning or acquiring a category before the other (Fider and Komarova 2019).

Moreover, the age of the person (child, teenager, adult) and experience play an important role in naming colors (Arthur et al. 2007). Simpson and Tarrant (1992) found that vocabulary continued to increase with age; older males have more elaborate color names than younger females. Color vocabulary also increase in response to experience or color-related hobbies. Usually, females spend more time on color-related activities such as choosing clothes and accessories (Lakoff 1973). Likewise, males who deal with color in a professional context used more precise color terms that were not used by other males. Ryabina (2009) investigated the differences in color vocabulary of Udmurts. Ryabina (2009) reported that male respondents who were painters knew more color terms than the other male respondents. Kasmiran and Ena (2019) reported that males who were models, stylists, painters, and fashion designers used more specific color terms than other males. Griber (2021) compared the color description patterns of 1103 participants who were not professionally involved with colors with descriptions provided by 509 participants who were professionally involved with colors. The results indicated that those who were professionally involved with colors showed more diversified color descriptions than the other group. While the effect of being professionally engaged with colors on the size of CTL might be self-evident, we argue that knowing color terms may not necessarily lead to using them; after all, the way we speak reflects our awareness of the social norms imposed on

language use, and situates us within a certain social group with which we strive to identify. Accordingly, the question of whether participants will decide to use what they know in their descriptions of the color samples may still be a sociolinguistic question, especially in light of the reported gender differences in naming colors.

The literature on color terms in Arabic is rather limited. Al-Rasheed et al. (2011) conducted a study to establish the basic color terms of Arabic. Their paper also aimed to clarify the status of three Arabic terms for blue: [ʔzraq], [kʊħli], and [samæwi]—'blue', 'dark blue', and 'sky blue', respectively. Data came from 200 male and female participants, Arabic native speakers from Saudi Arabia, from color elicitation tasks and color naming tasks. They found that the eleven color terms (white, black, red, green, yellow, blue, brown, purple, pink, orange, and grey) "had high frequency of use and high dominance scores, and their referents were similar to the appropriate universal focus" (Al-Rasheed et al. 2011, p. 57). The same eleven BCTs system was also suggested by Al-Harahsheh and Obeidat (2017) in their study of Jordanian Arabic. Some studies focused on the connotations of Arabic color terms in Jordanian Arabic, such as Al-Adaileh (2012) and Rabab'ah and Al-Saidat (2014). One study that stands out is that of Al-Harahsheh and Obeidat (2017), who examined gender differences in color naming through data obtained from 80 participants evenly divided based on gender. Participants were asked to name as many colors on a color spectrum wheel as they could. They were also asked to categorize the colors into subcategories such as red and its values. Responses were categorized according to the theme they belonged to, such as color terms related to vegetables, fruits, oil, etc. The study found that young Jordanian females distinguish 111 color terms, values, or degrees besides the basic colors in comparison to 63 color terms by males. It is worth noting that the findings of Al-Harahsheh and Obeidat's study are based on descriptive statistics. While studies reporting gender differences based on descriptive statistics could highlight trends, they stand short of establishing correlation between gender and the use of certain linguistic forms.

Due to the sociolinguistic nature of this study and its exploration of the association of patterns of color terms' use and social variables such as gender, profession, and the cultural background of the participants, a brief summary of the main sociolinguistic research produced in Jordan is due here. Language variation and change has been one of the main themes of sociolinguistic studies in Jordan. The presence of a diglossic situation in Jordan, as in other Arab countries, adds to the complexity of the sociolinguistic situation. Three major spoken varieties exist in Jordan, of which two are of local origin, rural, and Bedouin, while the third, the urban, is a new addition to the originally local two, and reflects the rapid demographic changes in Jordan in its modern history as a kingdom. These three varieties are complemented with Modern Standard Arabic (MSA), which is used in circumscribed formal contexts such as religious sermons, the news on TV or radio, and public speaking, among others. Gender, socio-economic class, and education have been some of the well-documented social variables that predict language variation in Jordan (Abd-El-Jawad 1981, 1986; Al-Khatib 1988; Al-Wer 2007). Females have been found to be leading in the process of language change. They were reported to project prestige through adoption of forms from the urban variety, unlike males, who were found to project prestige in their use of rural and Bedouin forms, or MSA. The association between females and the urban variety, in contrast to the originally local varieties and MSA and males, developed into associating the former with femininity and softness and the latter with masculinity and toughness, as seen in Abd-El-Jawad (1981), Al-Khatib (1988) and Al-Wer and Herin (2011).

Another important topic that is relevant to the sociolinguistic research in Jordan relates to the effect of urban culture vs. traditional and more conservative rural culture on language use. Attention to geographical space or spatiality in sociolinguistic research is thoroughly addressed in Britain's (2010) study of language and space. Britain argues that space has been ignored in variationism since most sociolinguistic studies were conducted in cities where other social factors, such as class, ethnicity, gender, and occupation, among others, were deemed more pressing than geography. Yet we can see the importance of

this concept in early studies such as that of Labov's (1966) study of Martha's Vineyard, where Up-Islanders who lived in a highly rural area, used the centralized diphthongs more than people who lived in the area of Down-Island, a highly urbanized space. Likewise, Trudgill's (1974) study of Norwich addressed geographical variation in five different parts of the city; in newly established residential areas, more diphthongs were found than in other suburbs. In Arabic sociolinguistics, Miller's (2005) examination of the processes of dialectal accommodation among Upper Egyptian migrants in Cairo, Egypt confirmed that migrants' rate of accommodation was sensitive to the residential area they settled in. In the context of Syria, Habib's (2010a) examination of the variable use of the voiceless uvular stop, [q], and the glottal stop, [ʔ], among Christian rural migrants in the city of Hims showed an important role for the concept of space in explaining the linguistic behavior of the migrants. The use of the urban variant ([ʔ]) was found to be greater among those who live in the residential area of Al-Hameeddieh than those who live in the residential area of Akrama. The concepts of space and specialty were also utilized in Habib's (2016a) examination of the different linguistic behaviors of girls and boys in the village of Oyoun Al-Wadi in Syria. Boys and girls in Habib's study constructed their identities and tailored their speech behavior by reference to norms and expectations in the immediate surrounding or by reference to the greater speech community; similar results were reported by Habib (2010b, 2014, 2016b, 2017a, 2017b, 2022). The effect of urban culture on language use was demonstrated by Alzoubi (2017) in his study of the realization of emphatics in the speech of participants from rural parts vs. urban parts of Amman, Jordan. Participants from the urban parts of Amman showed more innovative forms of the emphatics than the ones from the rural or more conservative and traditional settings. Accordingly, one's surrounding environment, cultural diversity, and materially sophisticated landscape may affect the size of CTL. It has been reported that people's abilities to distinguish colors across the color spectrum becomes more important as cultural and technical developments arise (Wardhaugh 2006). The difference between urban spaces and more traditional ones may provide excellent examples for the examination of the effect of the material and cultural environment on the size of CTL.

The lexicon, according to Eckert and McConnell-Ginet (2013, p. 69) is a "repository of cultural preoccupations, and as a result the link between gender and the lexicon is deep and extensive. [It] is also the most changeable part of language and an important site for bringing in new ideas." Accordingly, it is our premise that the color terms lexicon (CTL) reflects social and gender group practices in Jordan. Our observations of color terms' use in the context of university pointed to differences among participants based on gender, university major, and whether they came from Amman, the capital of Jordan, or other traditional localities in Jordan (Irbid and its suburbs). University major was used to distinguish between those whose academic specialization involves professional training on colors, such as designers and architects, versus others. Consequently, we aimed to elicit data from participants who represent these social and academic groups. We also noticed differences based on use of MSA lexical items in color descriptions because MSA enjoys a larger lexicon for color descriptions that allows for finer and more nuanced color descriptions; females usually used some MSA lexical items in their color descriptions. We thus aimed at investigating the use of MSA in color descriptions and its relation to gender. The examination of the use of MSA in color descriptions could provide interesting results pertaining to the discussion of language (variety) choice in Jordan. As noted above, sociolinguistic studies in the context of Jordan reported males' preference for traditional forms from the rural and Bedouin varieties in Jordan or from MSA over forms from the Urban variety, which are reported to be preferred by females. Thus, the examination of the use of MSA in this specific aspect of language—color terms—could illuminate how social norms of language use could be dynamic and changeable.

The significance of our study stems from its investigation of the use of color terms in more recent sociolinguistic theorical framework such as that of community of practice. Rather than obtaining our data from a random group of males and females, part of the data

came from a group of participants who share a professional interest in colors, namely architecture and design students. This study contributes to understanding the role played by space or cultural background on language variation and norms of language use. Moreover, this study's significance lies in its exploration of the correlation between the size of CTL and the social variables examined through robust statistical tests.

Based on this review of the literature, a larger and more diversified CTL is one that does not rely heavily on BCTs. Rather than relying heavily on mono-lexemic BCTs, more complex color descriptions consist of BCTs that are modified with one or more adjectives. It also shows use of specific and descriptive color terms that are not based on BCTs. Our study thus aims to explore whether the size of CTL is dependent on the gender of participants, their professional experience with colors (represented here by their university major), and their cultural background (whether they come from an urban or rural background). Accordingly, we set forth the following hypotheses:

1. Females have larger and more diversified CTL than males.
2. Participants who are engaged with colors in a professional capacity will have a larger CTL than others.
3. Participants from the city (Amman) have larger CTL than participants from smaller towns (Irbid and its suburbs).
4. MSA is used more often in the color descriptions provided by females than males.

2. Materials and Methods

This study adopts a sociolinguistic theory in which the use of any linguistic feature that shows variation presents itself in different frequencies according to the social groups where this variation exists and with predictable distributions (Holmes 2013). Accordingly, this research paper follows a quantitative and qualitative approach to the study of color terms and its association with the social groups examined. The quantitative approach is used to examine the correlation between patterns of use of color terms and the social variables examined in the study. The qualitative approach is used in explaining the results from the quantitative part by reference to social norms. An online color naming experiment was constructed following the same rules and steps used by Mylonas et al. (2010). The experiment's procedure consisted of three stages: First, Participants were screened for possible color deficiencies by using the Ishihara Color Vision Test (Ishihara 1972). Second, the participants carried out a web-based unconstrained color-naming task (UCN). In this stage, the participants were asked to provide written color descriptors for fifteen color samples presented individually on a computer screen, as illustrated in Rich (1977), Sleight and Prinz (1982), and Lin et al. (2001). The color samples were presented individually and in random sequence. Because it is an unconstrained task, participants could provide more than one description for each color sample. Third, in order to obtain data from participants who represented the different groups as detailed under Section 2.2 below, the participants were asked to provide information about their place of birth, place of residence, major in university, academic year in their program, and gender.

2.1. Color Stimuli

Each participant was presented with a sequence of fifteen color samples chosen randomly from six hundred colors that densely sample the Munsell Color Solid under controlled lighting conditions (see Figure 1). The color stimuli were presented against a mid-neutral grey background in the sRGB color space. sRGB stands for 'Standard Red Green Blue', and is a color space, or a set of specific colors, created by HP and Microsoft in 1996 (Mylonas et al. 2010). The size of each color stimulus was 147 × 94 pixels. The detailed description of the color stimuli is found in Mylonas and MacDonald (2010). One portable computer was used for the purposes of data collection to control for screen settings.

Figure 1. The color samples used in the study.

2.2. Participants

Three hundred and ninety-nine speakers of Jordanian Arabic participated in the experiment. The participants were from Amman (the capital of Jordan) and from Irbid (a town in northern Jordan) and its suburbs. Amman is a multicultural city that is home to people of many ethnicities such as Palestinians, Iraqis, Syrians, Egyptians, Circassians, Chechens, and Armenians, in addition to expats from many countries and nationalities. Special attention was given to eliciting data only from participants living in the economically affluent parts of Amman, in this case West Amman, which are characterized by wealth, demographic and cultural diversity, and adopt western-oriented lifestyles (Ababsa 2011). This measure was important because some parts of Amman are considered some of the most conservative and traditional places in Jordan, such as refugee camps. Irbid, in contrast, is a more traditional setting and more culturally homogeneous. University major was operationalized as a variable in the study in the sense that it represented the future profession of the participants: those who deal with colors in a professional capacity vs those that do not. Half of the participants were undergraduate students majoring in architecture and design, where color education is part of the curriculum. The other half were undergraduate students from different majors without formal color education. The participants were evenly divided according to their indicated gender. The participants came from different Jordanian universities: The University of Jordan, Applied Science University, Jordan University of Science and Technology, and Princess Sumaya University for Technology. One of the researchers, the fourth author, had to travel to the different universities and approach participants individually or through a friend. None of the participants were aware of the hypotheses being tested in this study. Moreover, all participant had normal color vision, as verified by the Ishihara Color Vision Test.

2.3. Categorization of Color Terms

In order to investigate the range of color terms used by participants, we analyzed and categorized the written responses, obtained through the UCN, into seven categories following the methods of color-name categorization used by Simpson and Tarrant (1991). The seven color categories are shown in Table 1.

The first category is based on Berlin and Kay's (1969) eleven BCTs. The second, third, and fourth categories are based on the first category but differ in the type and/or number of modifiers; the second and the third categories consist of one BCT plus an adjective modifying the BCT. However, they are different in terms of the type of modifier—frequent vs. infrequent; while the second category features the use of one of the frequently used basic modifiers, [fætɪħ] 'light' and [ɣæmɪq] 'dark,' the third category features the use of one modifier based on a BCT as in [bʊnni muħmar] 'reddish brown.' Besides the difference based on frequency of use, a categorization system differentiating between the second and the third categories is important because color descriptions based on using the third category are more semantically loaded and nuanced than descriptions based on the second category; for example, (reddish brown) is more specific than (dark brown). The fourth category features color descriptions that consist of a BCT modified by two adjectives as in [aħmar mʊzraq ɣæmɪq] 'Dark bluish red'. The fifth category, named descriptive color terms, shows color terms based on similarity to known objects. The sixth category, named specific color terms, features color terms that do not share an obvious pattern for naming. Finally, failure to provide a description was categorized as 'No-response'.

Table 1. Categorization method, explanations, and examples.

Category	The Explanation of the Category	Example
BCTs	Showing the use of one of the eleven BCTs according to Berlin and Kay 1969.	[aħmar] 'red' [bʊnni] 'brown'
Modified basic	A basic color term modified by one of the basic modifiers, [fætıħ] light or [ɣæmıq] dark.	[aħmar fætıħ] 'light red' [bʊnni ɣæmıq] 'dark brown'
Compound basic:	A basic color term modified by one adjective based on another BCT.	[bʊnni muħmar] 'reddish brown' [aħmar mʊzraq] 'bluish red'
Qualified basic	A basic color term modified by two adjectives.	[aħmar mʊzraq ɣæmıq] 'Dark bluish red'
Descriptive colors (also called secondary)	Color terms based on relation to known objects.	[zaiti] 'olive' [laimuni] 'lemon'
Specific color terms	Idiosyncratic and showing no obvious pattern for naming.	[sumu] 'carnation –pink'
No response	When the participant did not provide a description of the color sample	

It is the logic of this categorization that participants who provide color descriptions that mainly depend on BCTs contrast with participants whose color descriptions feature modified basic, compound, or a qualified color term, or other descriptions that are not based on the BCTs category, such as descriptive or specific color terms. The former group of participants are assumed to have a shallower CTL than the latter group, whose descriptions are more complex and nuanced.

Further categorization was done based on the use of MSA words in color descriptions. As stated earlier, MSA enjoys a much larger lexicon, especially in relation to the semantic domain of colors. Since participants were not instructed to provide color descriptions in a specific variety, the data featured descriptions from MSA, from spoken varieties, and borrowings from other languages. Color descriptors that do not occur in the spoken Jordanian varieties and are only used in MSA were given the MSA designation. The use of MSA lexical items was only observed in the modified, compound, and qualified categories. These three categories allowed for the use of technical items that only existed in MSA with no cognates in spoken Jordanian, such as the color descriptions modified with the [mʊfʕall] pattern as in [buni muħmar] 'reddish brown.' They also featured the use of an only-MSA form, [qætım] 'dark,' over an MSA/spoken form [ɣæmıq] 'dark.' The BCTs category included lexical items that have identical cognates in spoken Jordanian and MSA; in other words, the BCTs are considered MSA/spoken, hence such comparison is inapplicable. The specific and the descriptive categories also did not show differences based on MSA/spoken because these categories did not feature MSA-only forms.

2.4. Analysis of Data

Descriptive statistics of the continuous and categorical variables in the study are presented in Tables 2 and 3, respectively. Counts of color terms by category, percentages of color terms from the total of color terms used in the study by all the participants, percentages, means and standard deviations are presented in Table 2. We treated the number of color descriptions provided by the participants for each color sample as continuous variables, as seen in Table 2, because subjects could possibly describe the fifteen color samples, in the UCN task, as belonging to one category, or provide two or more descriptions from different categories for each sample. This is well reflected in the sums of color terms under each category; while some categories recorded less than a hundred descriptions, as in the Qualified color terms category, other categories recorded hundreds or thousands. The categorical variables representing participants by gender, university major, and place of residence are presented in Table 3. Table 4 provides descriptive statistics on the use of MSA lexical items in the modified, compound, and qualified categories.

Table 2. Frequency, percentages, means and standard deviation of the continuous variables.

Variable Name	Counts	Percentages	Mean ± SD
BCTs	1844	35.258	4.7 ± 2.01
Modified BCTs	880	16.826	2.7 ± 1.50
Compound BCTs	186	3.556	1.5 ± 1.05
Qualified color terms	64	1.223	1.6 ± 0.95
Specific color terms	1302	24.894	3.3 ± 1.59
Descriptive color terms	954	18.240	2.7 ± 1.28
No response	0		
Total	5230		

Table 3. Description of categorical variables.

Gender		Major		Place of Residence	
M	**F**	**Color-Related**	**Non-Color-Related**	**Amman**	**Irbid**
198	201	201	198	195	204

Table 4. Distribution of MSA lexical items in the data.

Color Term Category	MSA Lexical Items	Percentage of MSA in Category
Modified BCTs	32	3.6%
Compound BCTs	103	55.3%
Qualified	56	86.1%

We carried out inferential statistical analysis to examine the association between the use of color terms and the different social independent variables in the study. All of the analyses were done with SAS Institute Inc.'S JMP software (SAS Institute Inc. 2020), with an alpha (significance level) of 0.05. For univariate models, a t-test was used for pairwise comparison. Then, ANOVA was used to study interactions. Pairwise comparisons were performed using Tukey HSD tests. We only examined the association between the use of MSA lexical items and gender due to time reasons. Chi-square and relative risk were used to evaluate the relationship between gender and MSA usage in the modified and the compound color terms categories. The association between gender and MSA usage in the qualified color terms category was analyzed using Fischer's exact test—one of the cell counts was less than five—and relative risk.

3. Results

In this section, we present the results from the statistical analysis of the data. Gender differences in color lexicon are presented first, along with the results on the use of MSA and its relation to gender. After that, we present the results related to the effect of university major (experience with colors in professional context) on the size of CTL. Then, we present the effect of the interaction of gender and major on the size of CTL. Finally, we present the results on living in a city vs. small towns in relation to use of color terms.

3.1. Gender-Related Differences in Naming Colors

In this section, we present the results related to the effect of gender on the use of different types of color categories. Based on our observations as community insiders, and based on the findings from the literature on color terms' use and gender, we predicted that females in Jordan would have larger and more diversified CTL than males. The results confirmed our hypothesis; the significant effects of gender on the use of color terms were

found for basic, qualified, specific, and descriptive categories. Only significant results are reported.

First, females used BCTs less frequently than males; the mean score of the number of BCTs used by females (3.92 ± 2.08) was lower than that of males' (5.19 ± 2.06). The difference was significant (p-value < 0.0001). Second, females described color samples by using qualified color terms, which consisted of a BCT and two modifying adjectives (e.g., [axdar mus̺far ɣæmɪq] 'dark yellowish green') more frequently than males. Females' mean score of qualified color terms' use (0.22 ± 0.07) was higher than males' mean score (0.09 ± 0.34). This difference was significant (p-value = 0.0235). Third, females used specific color terms (e.g., [fuʃi] 'fuchsia') more frequently than males. The mean score of specific color terms used by females (3.8 ± 1.69) was higher than the mean score of specific color terms used by males (2.7 ± 1.47). The difference between these two means was significant (p-value < 0.0001), showing the significant effect of gender. Finally, most participants (344 (86%)) chose to describe color samples through using descriptive color terms (e.g., [bat$^{\varsigma}$t$^{\varsigma}$ixi] 'watermelon'). There were differences between males and females in their usage of descriptive color terms; the mean score of females' descriptive color terms (2.7 ± 1.58) was higher than that of males' (2.3 ± 1.38). The difference was statistically significant (p-value < 0.0001).

The Association between Gender and MSA in Color Terms

As for the association between gender and the use of MSA lexical items in color terms, we found that females used MSA lexical items in modified BCTs 25 times (6%) out of 404 instances where modified BCTs were provided, in comparison to 7 times (1.5%) out of 476 provided by males. We also found that females used MSA in compound color terms 86 times (85%) out of 101 instances where compound BCTs were provided, in comparison to 17 times (20%) out of 85 provided by males. There was a significant relationship between gender and MSA usage in modified and compound color terms (p-value = 0.0002 and 0.7, respectively). Compound and modified color terms had similar relative risk values of 4; females were four times more likely than males to use MSA terms in compound and modified color term categories. As for MSA in qualified color terms, there was a significant relationship between gender and MSA usage (p-value = 0.0001). An MSA term in the qualified color terms category was almost twice as likely to be used by females (44 (100%)) than by males (12 (57%)), based on a relative risk value of 1.75.

3.2. University Major-Related Differences in Naming Colors

In this section, we present the results of the effect of students' major on the use of color terms. We predicted that being in a profession that requires knowledge of colors, here represented by architecture and design majors, would be associated with a larger CTL regardless of gender. We found significant effect of university major on the first six categories of color terms.

First, while all participants used all the BCTs of Berlin and Kay, participants' majors affected the frequency of using BCTs. The mean score of the number of BCTs used by architecture and design participants (3.88 ± 1.84) was lower than the mean score of the number of the BCTs used by other participants (5.23 ± 2.25). This difference was statistically significant (p-value = 0.0229), thus showing the significant effect of major on the size of CTL.

Second, for modified BCTs, the analysis of the data showed that participants from the two university-major groups used modified BCTs differently. The mean score of the number of modified BCTs used by the architecture and design participants (2.3 ± 1.7) was greater than the mean score of participants with other majors (2.06 ± 1.6). This difference was significant (p-value = 0.004).

Third, regarding the use of compound BCTs, the mean score of the number of compound BCTs provided by participants who studied colors (0.5 ± 1.0) was higher than the mean score of the number of compound BCTs provided by participants with other majors (0.3 ± 0.8). This difference was significant (p-value = 0.0025).

Fourth, using qualified color terms, the mean score of the number of qualified color terms used by those who studied colors (0.22 ± 0.65) was higher than the mean score of the number of qualified color terms used by participants with other majors (0.09 ± 0.4). This difference was significant (p-value < 0.0118).

Fifth, participants who studied colors used more specific color terms than those who did not study colors. The mean score of the number of specific color terms used by participants who studied colors was (3.5 ± 1.74), while for participants with other majors it was (2.9 ± 1.55). This difference was significant (p-value < 0.0001).

Finally, the mean score of the number of descriptive color terms used by participants who studied colors (2.8 ± 1.40) was higher than the mean score of the number of descriptive color terms used by participants who did not study colors (1.9 ± 1.53). This difference was statistically significant (p-value < 0.0001).

3.3. Gender-Related Differences in Relation to Major on Naming Colors

We conducted an ANOVA test to examine interactions between the variables of the study. The statistical model that contained the interaction of gender by participants' major was found to be significant (p-value < 0.0001). The interaction between gender and major was significant (p-value = 0.0296). Pairwise comparisons were performed using Tukey HSD tests. The following sets of comparisons were found to be significant, as detailed in Table 5.

Table 5. The comparison of the size of color lexicon: Gender by Major.

Level	Level	Difference	Std Err Dif	Lower CL	Upper CL	*p*-Value
F, 1	M, 2	1.273196	0.2342042	0.668941	1.877451	<0.0001
M, 1	M, 2	1.139533	0.2336326	0.536752	1.742313	<0.0001
F, 2	M, 2	0.852404	0.2336326	0.249623	1.455184	0.0017

Females who studied colors had a larger and more diversified CTL than males who did not study colors, and the difference was significant (p-value < 0.0001). Males who studied colors had a larger and more diversified CTL than males who did not study colors, and the difference was significant (p-value < 0.0001). Finally, females who did not study colors had a larger and more diversified CTL than males who did not study colors, and the difference was significant (p-value = 0.0017).

3.4. Differences in Naming Colors Related to Living in a Metropolitan City vs. Small Traditional Towns

This section reports the results on how living in a city vs. a small town could predict the size of CTL. We predicted that living in metropolitan city is associated with a demand for a larger CTL than living in small towns where life is traditional and diversity is limited. Significant results were found only for BCTs and descriptive color terms.

The analysis of the data showed that the frequency of using BCTs differed according to where the participants lived (Amman vs. Irbid and its suburbs). The mean score of the number of BCTs for city dwellers (4.30 ± 2.01) was lower than the mean score of the number of BCTs for small-town dwellers (4.79 ± 2.28). The difference was significant (p-value = 0.0114).

The analysis of the data revealed that there were differences in the use of descriptive color terms (e.g., [tuti] 'berry') among participants from Amman vs. Irbid. The mean score of the number of descriptive color terms used by city dwellers (2.7 ± 1.66) was higher than that of small-town dwellers (2.09 ± 1.33). This difference was statistically significant (p-value < 0.0001).

4. Discussion

In this section, we discuss the results obtained through the statistical analysis in light of the relevant literature. First, we discuss the results on the association between gender

and color terms along with the results on gender and use of MSA in color terms. After that, we discuss the results related to the effect of university major, the effect of gender in relation to major, and the effect of living in the city vs. living in a small town on the size of CTL.

4.1. The Association between Gender and Color Terms

Although people tend to use BCTs as a cognitive reference point for all color samples (Simpson and Tarrant 1991), males used BCTs more frequently to describe the color samples than females. Females' less frequent use of BCTs was substituted for by the use of more complex categories. Males' more frequent use of BCTs indicates their greater reliance on this category, more than females, to describe color samples. This reliance on BCTs on the part of males is indicative of a shallower and less diversified CTL in comparison to that of females', as shown below in the differences of use of color terms between the two gender groups.

Females used qualified color description more often than males, as in [asˁfar mʊxdar fætɪħ] 'light greenish yellow,' [azraq mʊxdar fætɪħ] 'light greenish blue,' and [axdar qætɪm ʕʊʃbi] 'dark grassy green.' Evidently, females possessed a more diversified CTL, allowing them to provide more detailed descriptions of color stimuli than males who, alternatively, relied on BCTs more often. The literature supports our findings: females' color terms were found to be more complex and multi-faceted, whereas males' color terms were more straightforward and conventional (Nowaczyk 1982; Swaringen et al. 1978; Pérez-Carpinell et al. 1998; Frank 1990).

Several studies have reported that females engaged more in activities with access to foods, raw materials, plants, etc., which reflects their creativity as they associate colors with related objects around them (Fider and Komarova 2019; Griber et al. 2017; and Al-Harahsheh and Obeidat 2017). In our study, we found that females' more frequent use of descriptive color terms is strongly tied to cultural norms and experiences. Females associated color sample with the color of objects that are familiar in their daily lives—as in [zaiti] 'olive', [laimuni] 'lemon,' [kʊrkʊmi] 'turmeric,' [tuti] 'berry,' and [lævɪndar] 'lavender'—more often than males, as the study demonstrated.

According to previous research, females memorize more color names than males because their social positions require interacting with colors in the selection of clothing, cosmetics, fashion, and home decorations (Nowaczyk 1982; Bimler et al. 2004; Arthur et al. 2007; Griber et al. 2017; Al-Harahsheh and Obeidat 2017). While females used more specific color terms than males, most of the specific color terms that were used by females were never used by males, such as [lazurd] 'azure,' [kaʃmir] 'cashmere,' [lailak] 'lilac,' [dʒɪnzæri] 'blue- green,' and [ʊrdʒʊwæni] 'magenta,' which are considered highly specialized and technical vocabulary.

The difference between males and females in their use of color term categories and the richness and diversity of their CTL is evidently related to patterns of socialization, types of interests, and daily activities. Females' interests in activities where color is crucial, such as home decoration and fashions, may provide a culturally specific explanation for the more diversified CTL they have than males in the context of Jordan. Thus, the cultural norms and the specific activities females and males engage in have important effects on their use of color terms and ultimately the size of the CTL.

The Use of MSA in Modified, Compound, and Qualified Color Terms and Gender

The examination of MSA in the data revolves around identifying lexical items that only occur in MSA in comparison to other lexical items that have identical cognates in both MSA and spoken Jordanian. Thus, a lexical item may only be found in MSA, such as in [fæqɪʕ] 'bright' in [asˁfar fæqɪʕ] 'bright yellow.' A lexical item may also exist in MSA and spoken Jordanian as in [fætiħ] 'light,' in [asˁfar fætiħ] 'light yellow.' In order to increase the validity of this categorization, the relevant lexical items were presented to two linguists who are native speakers of Jordanian Arabic for verification.

Although the results revealed that there was no statistically significant gender effect related to the use of modified BCTs, a thorough examination of this category of color terms revealed that females used MSA lexical items to modify BCTs as in [aħmar qætım] 'gloomy red,' and as in [ramædi bahıt] 'pale grey,' more frequently than males. The statistical analysis showed a significant relationship between gender and use of MSA in the modified BCTs category; females were four time more likely to use an MSA form in the modified BCTs category than males. Moreover, females' use of MSA in the modified BCTs category was not restricted to the two modifiers shown above; females used various technical adjectives from MSA to modify BCTs, as in [asˤfar fæqıʕ] 'bright yellow,' [zahri ʃæħıb] 'pale pink,' [asˤfar læmıʕ] 'shiny yellow,' and [azraq dækın] 'dark blue,' which did not feature in males' descriptions. It is worth noting that males' use of MSA modifiers was limited to the two lexical items [dækın] 'dark' and [qætım] 'gloomy' in comparison to 6 MSA modifiers used by females as noted in the examples above. The rest of the modified BCTs which were used by males and females featured the use of one of the BCTs modified by one of the two MSA/spoken Jordanian modifiers [fætıħ] 'light' or [ɣæmıq] 'dark' as in [azraq ɣæmıq] 'dark blue' and [asˤfar fætıħ] 'light yellow.'

Arabic is a semitic language with a root and pattern morphology. The root is a semantic abstraction consisting of two, three, or four consonants, which are used in the derivation of words through the superimposition of templatic patterns (Holes 1995). In MSA, the pattern [mʊfʕall] denotes approximation to a specific color, as in [mʊxdar] 'greenish' and [muħmar] 'reddish' (Procházka 2011). The examination of the compound color terms provided by the participants revealed that the [mʊfʕall] pattern was used more frequently in the descriptions provided by females than by those provided by males, as in [asˤfar mʊxdar] 'greenish yellow' and [buni muħmar] 'reddish brown.' The statistical analysis showed a significant relationship between gender and use of MSA; females were four times more likely to use MSA forms in the compound BCTs category than males. The rest of the instances where compound color terms were provided featured spoken Jordanian constructions where the (mʊfʕall) pattern was replaced by employing a preposition between two BCTs, as in [asˤfar ʕala axdar] 'yellowish green,' literally 'yellow on green' or meaning 'between yellow and green,' where [ʕala] is the preposition. The use of MSA lexical items in the qualified color terms category is similar to its use in the modified and compound categories above, as in [asˤfar muxdar fætiħ] 'light greenish yellow' and [ʔxdar qætim ʕuʃbi] 'dark grassy green.' Since the use of the [mʊfʕall] pattern is a feature of MSA rather than of spoken Jordanian Arabic, we argue that these findings support the observation made above regarding females' use of MSA in the modified BCTs.

The literature shows that females are more standard speakers, and they adopt more prestigious language features than males in each social class (Labov 1990; Trudgill 1974). In the case of Jordan, the prestigious spoken variety is the locally prestigious spoken variety, i.e., the urban variety (Al-Khatib 1988; Abd-El-Jawad 1981). MSA is the formal Arabic variety learnt through schooling; it is not the vernacular of any speech community in Jordan or the Levant. Moreover, MSA, as the formal standard, has been reported to be a favored variety for men, according to Abd-El-Jawad (1981) and Al-Khatib (1988); these studies indicated that males are more engaged in taking on standard forms while females are more likely to adopt linguistic features that represent the locally prestigious variety. Our study portrays a contrasting image from that of the often-reported pattern of preference, we argue that females' more frequent use of only-MSA forms in modified BCTs, compound BCTs, and qualified color term descriptions highlights the importance of focusing on concrete examples of language use in the exploration of how gender is manifested in language use. Consequently, we argue that females utilized only-MSA forms in a domain that is reserved for them wherein they find no competition from males. In other words, using only-MSA forms by females in Jordan does not put them in a position where they are indexing a masculine identity. Thus, our study demonstrated that females in Jordan employ only-MSA forms in color descriptions as a device to reflect their gender group.

The importance of exploring females' use of only-MSA forms in color descriptions is two-fold: first, it challenges the previous findings regarding the association between males and MSA and females and urban spoken forms; second, it emphasizes the idea that illuminating generalizations about gender emerge when focusing on concrete situations and events of language use (Eckert and McConnell-Ginet 2013), and this is represented in our study by focusing on one aspect of language, namely color naming.

4.2. The Association between Color Terms and University Major

The literature reports that color vocabulary grows as a result of experience and interaction with colors, as reported in Ryabina (2009), Simpson and Tarrant (1991), Maccoby and Jacklin (1974), and Griber (2021). In our study, university major was found to play an important role in expanding the CTL for participants. Architecture and design participants used BCTs less often than participants from other majors. Architecture and design participants resorted to other categories to name the color samples. Accordingly, they named color samples without heavily relying on BCTs in comparison to participants from other majors. Thus, we can argue that because the CTL of participants from other majors was not as expanded and diversified, their descriptions of the color samples featured greater reliance on BCTs than the descriptions from participants from the field of architecture and design.

Participants with professional experience with colors used compound BCTs and modified BCTs more frequently than those from other majors. As architecture and design participants are academically familiar with the color spectrum and its schemes, they combined two BCTs to provide more precise descriptions of the color samples that fell between two basic color boundaries (e.g., [asʕfar mʊxdar] 'greenish yellow'). In other words, architecture and design participants could identify where the sample appears on color schemes by specifying two adjacent colors. While color descriptions by participants from other majors did include modified and compound color descriptions, they did so less often than the color-educated group.

People who are interested in colors, according to Nowaczyk (1982), Swaringen et al. (1978), Pérez-Carpinell et al. (1998), Frank (1990), and Griber (2021), can use more than two words to describe a color sample. Our study confirmed this observation where participants who studied colors provided more qualified color descriptions—such as [axdar qætım ʕʊʃbi] 'dark grassy green'—than others with no professional experience with colors. It was also noticed that the qualified color expressions used by architecture and design participants were mostly in the 'grue' region, demonstrating the idea that the Munsell color spectrum's 'grue' region is associated with the greatest number of categorization differences (Fider and Komarova 2019). This proves that architecture and design participants possessed more heightened linguistic awareness of the color spectrum.

Architecture and design participants were also found to have greater ability to correlate color samples with the color of objects in their environment than other participants. This was shown in their more frequent use of descriptive color terms (e.g., [khardali] 'mustard') than participants from other majors.

Participants who studied colors used more specific color terms than others. It is reported that those who work with colors (painters, designers, etc.) could produce larger numbers of non-BCTs because the specific color names continue to increase with experience (Greene and Malcolm 1995; Bimler et al. 2004). Similarly, architecture and design participants deal with colors in a professional capacity on a daily basis; thus, they come across and memorize a greater number of specific color terms more often than participants from other majors.

Color lexicons continue to evolve throughout time. As societies develop more complex patterns of consumption and become more technologically advanced, the distinctions between similar colors become increasingly important in the daily lives of individuals. Moreover, new color words are often added to cover difficult-to-name color samples that have become particularly prominent and fashionable for one reason or another (Lindsey and Brown 2014). In our data, several specific color terms, used by participants who have

experience with colors, were never used by other participants, such as [mærun] 'maroon,' [bɪrgandi] 'burgundy,' and [blʌʃ] 'blush.' These findings confirm those reported in Maccoby and Jacklin (1974), Simpson and Tarrant (1991), Ryabina (2009), and Lindsey and Brown (2014).

Examining language use in communities of practice (CofP) has theoretical and practical advantages. This level of analysis "provided scholars with a way to study language-use locally and to link the micro-context to the broader socio-cultural environment and the range of practices that warrants membership to a community" (Angouri 2021). A well-cited definition of CofP is provided by Eckert and McConnell-Ginet (1992, p. 464) as "an aggregate of people who, united by a common enterprise, develop and share ways of doing things, ways of talking, beliefs, and values—in short, practices." A CofP can be any group of people who share an enterprise, such as a "choir, a gang, a secretarial pool, a family, a garage band, a friendship group, or an academic department", as per Eckert and McConnell-Ginet (1992, p. 464). Accordingly, we argue that architecture and design participants represent a CofP. They are united by a common enterprise, which is their major. We argue that patterns of color terms' use by participants who study colors represent one of the ways of talking that can index their association with this CofP. Participants who studied colors projected sophistication and detailed awareness of the color scheme as desirable attributes for professionals in their CofP. Providing detailed color descriptions by a professional in this CofP projects trustworthiness, breadth of knowledge, and specialization.

4.3. The Association between Color Terms and Gender in Relation to Major

The results from the ANOVA test confirmed the results obtained from the univariate tests on the importance of gender and major as two social variables in predicting the size of CTL. The finding that females who did not study colors had larger CTL than males who did not study colors further validates the status of color terms as a linguistic feature of the speech of females in Jordan that reflects their social roles, the activities they engage in, and their interests.

Males who had more experience with colors or were with a hobby involving color knew more color terms than other males (Simpson and Tarrant 1991; Kasmiran and Ena 2019; Ryabina 2009). Similarly, in our study, we found that males who studied colors had larger CTL than males who did not study colors. This finding confirms that participants' experience with colors in a profession or hobby plays an important role in expanding their CTL. Moreover, when males in the architecture and design profession used more nuanced color descriptions, they were abiding by the norms that govern their CofP. Their use of fine and more complex color terms signaled their breadth of knowledge in their field, and asserted their authority as expert designers.

4.4. The Association between Color Terms and Living in a Metropolitan City vs. Small Traditional Towns

City dwellers used fewer BCTs and more non-BCTs than small-town dwellers who used more BCTs and fewer non-BCTs. As city life gets more technologically advanced and culturally diverse, sophisticated lifestyles emerge, new color names are added, and the distinctions between similar colors become increasingly essential in the daily lives of city dwellers (Al-Harahsheh and Obeidat 2017). In contrast, in places where traditional culture thrives, color vocabulary is limited (Raffaelli et al. 2019). Rich (1977) reported that the color vocabulary used among Catholic nuns was found to be poorer than that of others because nuns choose clothes with limited colors. Moreover, cities are hubs for diversity and advancements, whether political, demographic, technological, or cultural. Consequently, people's ability to distinguish across the color spectrum becomes more important (Wardhaugh 2006) to cope with the culturally sophisticated and diverse lifestyles in the city and the more materially complex milieu.

City dwellers were more likely to use descriptive color terms than small-town dwellers. Cities have a more sophisticated lifestyle and enjoy diverse cultures with a diverse range

of colors. Moreover, the range of colors in cities is increased by sales and markets (Al-Harahsheh and Obeidat 2017). In contrast, small towns lack the sophistication and the diversity of cultures of cities, which in turn translates into shallower and less diversified CTL. According to Kasmiran and Ena (2019), culture, personal identity, and social roles influence the language features of the language users. Accordingly, we argue that participants who live in Amman provided color terms that associated colors with objects in their daily lives more than those who live in small towns; inhabitants of urban spaces are more up to date with fashion and are exposed to high culture, which affects their experience with colors.

5. Conclusions

We aimed to explore the size and the diversity of CTL and the patterns of use of color terms in Jordan by males and females belonging to different subcultures—city dwellers and small-town dwellers, and different university majors—those whose education involves color vs. those whose education does not. Thorough statistical analysis of the data from three hundred and ninety-nine participants revealed significant differences in the use of the various categories of color terms based on the social groups outlined above. A larger and more diversified CTL means relying less on BCTs and more on other patterns of color descriptions, such as BCTs modified with one or more adjective, or descriptive and specific color terms.

The results revealed that females had larger and more diversified CTL than males. Moreover, participants who studied colors had larger and more diversified CTL than those who did not study colors. The interaction of university major and gender showed that males who studied colors had larger CTL than males who did not study colors. Our study also revealed that patterns of use of color terms are sensitive to whether participants came from a metropolitan city vs. traditional and more conservative towns, with those coming from the city having a larger and more diversified CTL. Focusing on space as a factor that shapes our experience with language opens the door for further studies in the context of Jordan focusing on this factor. We also found a difference in use of MSA lexical items in color descriptions among males and females; while the literature on Arabic sociolinguistics shows MSA to be a feature of males' speech, in our study, we found that females used more MSA lexical items in their color descriptions than males, and did so more frequently.

Females' more elaborate and nuanced use of color terms reflects the activities they habitually are engaged in, such as fashion, food, and cosmetics, among others. It also reflects their cultural roles in decoration and arranging household furniture and artifacts. We argue that while females in general seem to be using color terms as a linguistic feature that signals their gender identity, they seem to be using MSA in their color descriptions as another linguistic means to assert their gender identity.

As for the superiority of the architecture and design group in naming colors, we argue that as a CofP, this group deals with colors in a professional context. Thus, their breadth of knowledge in color terms reflects the practice of this CofP. This technical knowledge of color terms thus asserts their authority as expert practitioners in their field. Finally, being a city dweller is associated with exposure to a more sophisticated lifestyle in the city, where cultural and technological diversity are associated with a higher demand for a diverse range of colors than those in smaller towns.

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