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"Multimodal" Fits All: Revisiting the Relevance of Perceptual Learning Styles in Higher Education Today

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***Abstract*—Teaching has been continuously evaluated in light of learning styles research. This highlights the significance of investigating learning styles that may be evolving in tandem with changes in the contemporary era. This study assumes that twenty-first-century students share characteristics not based on unimodal models of learning styles, particularly in higher education. It supports multimodality at both the learning and teaching levels since learners typically prefer and share various learning styles. It employs the field's most influential learning styles framework, Reid's (1987) perceptual learning styles instrument, to investigate the validity of that assumption. To add to and question the corpus of literature that exists in the field, we looked at Saudi university-level learning styles in relation to gender and academic major as independent variables. Participants were identified as English as a foreign language (EFL) student from various academic majors. The quantitative research design of this study revealed that neither academic major nor gender significantly affected the learners' preferences. Participants demonstrated a diversity of preferences for perceptual learning styles, with minimal overall differences. Nonetheless, they favored auditory learning over group and kinaesthetic styles. It was observed that students with an English major preferred individual learning styles. Research in the field, including the current study, found some discrepancies in PLS tendencies across different contexts and factors. With such inconsistent patterns, multimodal education is a good opportunity for teachers and educationists.**

***Index Terms*—multimodal education, perceptual learning styles, multimodal learning style preferences, English-major students, EFL classrooms**

I. Introduction

Drawing on recent research conducted in English as a Foreign Language (EFL) contexts, we argue in this paper that the learning preferences of today's learners, at least in the study context, may not differ significantly, regardless of presumed distinguishing factors. The variety of style preferences may bring together the ostensibly dissimilar learners because they mirror similar and shared lifestyles in contemporary society. To put this presumption into practice, we look at how, or more specifically, in what Perceptual Learning Styles (PLS), undergraduate students of different genders and academic majors, including English majors, learn English.

Despite the considerable amount of research on PLS in EFL contexts, including Saudi Arabia, its applicability to the current dynamic modern era remains uncertain and unreliable for drawing generalizations. Despite this, research (e.g., Annury et al., 2018) on PLS in those contexts shows "slight" differences among EFL learners.

PLS have become well-established as important components of education, particularly with the increasing adoption of learner-centered methodologies worldwide. Since the beginning of Kolb's (1984) and Reid's (1987) work, as well as the work of their contemporary scholars, this area of education research has been recognized and explored more. A key element of developing and designing instructional approaches is having a thorough understanding of how learners perceive, treat, and process knowledge. Classroom, therefore, houses groups of learners, so teachers should anticipate various learning styles in a single environment. Moreover, an individual may have multiple learning styles with equal preferences, allowing for adapting or learning through a variety of styles. Such analyses of learners should be taken into account in education, and responses should be made through ongoing changes to teaching strategies since matching the two has yielded positive outcomes. Therefore, PLS has become a crucial step in developing learner-centered classrooms, curriculum, and syllabus planning (Nunan, 2013). Multimodal approaches are the best choice once it is grasped that, even when the learners' goals are identical, they still have different learning preferences and levels of language proficiency and that this should "form the point of departure for all aspects of curriculum planning, implementation, and evaluation" (Nunan, 2013, p. 8). In other words, multimodal learning in terms of PLS may be the most practical instructional model because it can ensure coverage of and approach to the numerous different learning styles.

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It becomes obvious that the current paper, driven by the implied potential of multimodality, is dual-purpose. By thoroughly describing the PLS in the context of the study and determining whether certain specific factors are still associated with particular PLS, it aims to assess the PLS continued relevance to EFL learners today. The study addresses the question of PLS orientations, unimodal or multimodal, among higher education students as being relevant nowadays regarding learning English.

II. Literature Review

A. Learning Styles

Different perspectives seem to have accordingly created various models and classifications. For example, Griggs and Dunn's (1998) definition incorporates learners' attitudes and the methods they utilize in their learning. Similarly, Brown (2000) elaborates that LS represents the "consistent and rather enduring tendencies or preferences within an individual" (p. 113). According to Reid (1998), LSs are "internally-based characteristics, often not perceived or consciously used by learners, for the intake and comprehension of new information" (p. ix). Therefore, I have various models with different underpinnings and components. To mention a few, Keefe's (1979) model comprises cognitive, affective, and psychological behaviors as indicators of learners' perceptions, interactions, and responses to their learning environment. Another example is Dunn and Dunn's model (Dune et al., 1995), which is built on environmental, emotional, sociological, physiological, and physiological learning domains. For the macro-level purpose of the current study, i.e., investigating the validity of its assumption, Reid's (1998, 1995) PLS model, with its definitions and identifications of PLS, is adopted.

B. Perceptual Learning Styles

PLS has been acknowledged to be very relevant in foreign language learning, particularly when it is associated with identifying learners' preferences. According to Bailey et al. (2000), research in this area improves the performance of learners who seek to learn a foreign language, as it lends them the flexibility that helps them with their studying routines and behaviors. This flexibility is mainly endowed by the emphasis on sensory preferences, which contain physical and perceptual learning channels, which leads to a comfortable learning experience and atmosphere (Oxford, 2003). Such reasons have motivated several interested researchers in the field; hence approaching learning languages from the perspective of PLS has long been valid.

Definitions may focus on learners' primary senses by emphasizing their response to stimuli as a way of experiencing and processing knowledge. Most comprehensive models incorporate philosophical and theoretical aspects due to the complexity and dynamic nature of learning. Thus, Reid (1987, 1995) divided LSs into cognitive, sensory, and personality. Her sensory LS has Perceptual, Environmental, and Personality subcategories. PLS has garnered attention, including these learning styles: auditory, visual, tactile, kinaesthetic, group, and individual. Reid (1987, 1995) calls the latter two PLS categories social aspects. Reid's approach is extensive and clear, which may explain why it is widely used in language learning research.

That said, the sensory styles in Reid's PLS model have indeed been identified by other researchers, all agreeing that these are the primary sensory learning channels (e.g., Garger & Guild, 1984; Dunn, 1984; Reid, 1987; Reid, 1995; Oxford, 2003, Pritchard, 2009). Therefore, defining learners according to their sensory styles is generally as follows: Visually-oriented learners, who prefer to see things, to look at written texts or visual materials, as they depend primarily on their optics. Auditory learners depend upon oral-aural listening as the primary means of receiving information; thus, they prefer listening to lectures or audio. Tactile learners, who learn by putting their hands on the learning objects, prefer touching materials. Finally, Kinaesthetic learners move actively while learning and enjoy exercising, walking, or standing. Besides these sensory styles, Reid (1987, 1995) included two more social learning styles; Group and Individual. Group LS describes learners who prefer collaborative learning and working in groups with others, while the Individual LS represents learners who prefer working individually.

However, identifying learners' dominant or preferred styles does not necessarily mean that a certain type of learner has a single preference exclusively. In other words, receiving and processing information is a complex process that may require more than a single style. Reid (1995) explains that, in EFL settings, learning styles, although usually presented as independent from each other, can be seen as in a broad continuum. Moreover, besides one's preferred learning style, there are always learning strengths and weaknesses. Reid also indicates that no style is better than the others; i.e., they are 'value-neutral'. This discussion also contributes to the underpinning of the study's overall assumption. Learning English may not be exclusively associated with one's preferred learning style, as he or she may also show preferences for other learning styles. There may be overlap among learners of different academic specialties, including English Department students since learning the language is no longer identified by specific PLS.

The flexibility of sensory styles, in addition to the complexity and dynamic nature of learning and human nature in general, may highlight the value of multimodality in education. Aslaksen et al.'s (2020) reference to the literature on PLS as demonstrating significant heterogeneity in theoretical constructs and approaches seems to support this. In contrast to the unimodal preferences suggested by the theory of learning styles specific to particular modalities, they highlight factors in their study that point to multimodal learning preferences across learning contexts. Villanueva and

Navarro (1997) assert that students should not be assigned specific learning styles in light of this. In addition, Pashler et al. (2008) indicate that individuals may be aware of other learning styles, although they may have their own preferred PLS. Thus, having more than one or two strongly preferred PLS makes students more likely to be considered to have multiple PLS (Girón-García & Gargallo-Camarillas, 2021). In today's multimodal learning environments, Girón-García and Gargallo-Camarillas (2021) reaffirm that learners have a variety of modes of perception. According to Gargallo-Camarillas (2018), PLS for EFL are no longer constrained to just one or a few identified styles because of the multimodal contexts created by new modern technological contexts.

As such, several factors can play a significant role in variances among EFL learners in terms of their sensory preferences of PLS (Reid, 1987); for example, cultural background, generic make-up, learning experiences, or mode of instruction. Thus, PLS may differ across generations, and change as people do over time. This argument can also demonstrate how it is implausible to restrict learning English to a particularly preferred learning method.

The literature on PLS has presented a long list of factors that may influence differences and preferences, such as age, gender, academic major, proficiency, and socioeconomic status, which interested researchers have constantly examined. We only considered gender and academic major factors because we wanted to find similarities or differences in light of PLS based on whether we were approving or disputing the study's larger premise. In the following sections, we try to present some of the studies related to these two factors to highlight how they might or might not be relevant to specific PLS.

C. Perceptual Learning Styles and Gender

Linguistic differences between the two genders may not be limited to the area of spoken styles as indicated by Nunan (2013), but it may rather include an endless list of constructs and aspects that have been recurrently researched education and applied linguistics. That said, research also asserted that the two genders reveal identical performances in various aspects, including PLS, as revealed through the reviewed studies below.

In LS preferences, several former researchers have highlighted the relevance of gender as an influencing and determining factor (e.g., Dorsey & Pierson, 1984; Slater et al., 2007). Studies of this kind across various EFL contexts have not agreed on the learning styles preferred by males and females. To put it differently, the influence of gender as an indicator of learning styles has not been static across all the studies. Thus, there is not yet a determined assumption that gender is a very significant and correlational factor in identifying PLS preferences.

In her most influential study, Reid (1987) considered gender as a determining factor of PLS. She found that males were more visual and tactile learners than females. In some EFL context studies, gender was strongly associated with PLS preferences. Following the most prominent studies in the field, such as Dorsey and Pierson (1984), Yong and McIntyre (1992), Vaseghi et al. (2012), Jayanama's (2017) study, for example, on university-level students in the Thai context, found a significant relationship between tactile and kinaesthetic LSs and gender, especially among low proficiency learners. Likewise, in the context of Pakistan, Siddique et al. (2014) found differences between male and female university-level students' preferences, namely in the visual, group, and kinaesthetic learning styles. Another study by Jhaish (2010), including Palestinian undergraduate English-major students, found that females preferred visual, auditory, and individual learning more than males. It also found that males varied significantly towards group learning style than females. At the same time, both groups in this study did not show significant differences in tactile and kinaesthetic learning styles. Also, Sarabi-Asiabar et al. (2014) found a significant relationship between the gender factor and LS preference among university-level Iranian learners. Males in this latter study showed a stronger preference for the kinaesthetic learning style than females, whereas females displayed a stronger preference for the auditory learning style than males. Another study by Naserieh (2009) showed that Iranian male students preferred the individual LS, while females' LS came in contrast, as they preferred the group LS. However, males and females showed relatively equal preference levels for other styles.

Some PLS research did not reveal significant differences between the two genders, such as Tuan (2011) in the Vietnamese context, Khmakhien (2012) in the Thai context, Riazi and Mansorian (2008), and Bidabadi and Yamat (2010) in the Iranian context. Thus, research remains inconclusive in terms of gender and PLS.

Studies in the Saudi context also reported varied findings, yet, generally, they reported the influence of gender on PLS. In Yassin (2012), the PLS of 130 Saudi students, constituting 81.8% of the sample, were investigated alongside other students from the Gulf countries (five Omani, one Emirati, and 23 Kuwaiti). Gender was found to influence students' LS. The study indicated significant differences between the two genders (115 males and 44 females), with males mainly preferring the aural or auditory styles and females preferring kinaesthetic the most.

Alsafi's (2010) study that targeted sophomore medical students revealed that males preferred mainly the kinaesthetic and auditory LSs, whereas females preferred all the styles except the individual. Females in Alsafi's study seem to contradict those in Saadi's (2012) study, in which they displayed a stronger inclination for a single mode of learning, compared to males, who presented a preference for multiple learning styles.

Furthermore, other studies in the Saudi contexts included medical and dental students, by El-Aziz El Naggar (2016) and Al-Qahtani et al. (2018), respectively, asserted the significant differences in PLS based on the gender factor. In El-Aziz El Naggar (2016), males and females showed great differences in the kinaesthetic LS, followed by visual and auditory styles, towards the male participants. However, overall, both male and female students revealed various multimodal preferences. This somehow differs from the findings of Al-Qahtani et al.'s (2018) study, which revealed

that males preferred the unimodal style, unlike their female counterparts, who showed multimodal preferences. Indeed, Al-Qahtani et al. (2018) revealed significant differences between the two genders' PLS, with males preferring mainly the kinaesthetic style and females preferring the visual and aural styles. The type of preference revealed by these two studies was more towards the kinaesthetic style.

That said, although some differences between the two genders have been established, they may not necessarily be huge. That is, the degree of difference should be considered to formulate a precise picture of the matter. Furthermore, most of the research did not claim that the preferred styles were utterly dominant and that other styles were nonexistent.

D. PLS and Academic Field of Study

Since the earlier work in the field of PLS, a student's major of study has been considered when analyzing PLS. Reid (1987) included participants from six academic majors (engineering, business, humanities, computer science, hard sciences, medicine, and others) to investigate if those majors could determine participants' PLS. However, her results did not show much difference in preference related to majors, as all participants preferred kinaesthetic as their dominant LS. All of them, except Computer Science students, disfavored group LS. That said, she concluded that this latter discipline, besides Engineering, related to identifying students' PLS. However, generally, the study did not reveal significant differences among disciplines. Some other studies have revealed similar findings to Reid's study. For example, Sahragard et al. (2016) investigated the PLS of Iranian students from arts and humanities, social sciences, engineering, sciences, and English language fields and found no significant variance in their styles. Their 376 male and female participants showed equal or similar preferences for visual and tactile learning styles. However, the dominant learning style found in the study, by a wide margin, was the individual learning style.

Following Reid's work, however, several researchers asserted that different LSs could be elicited by or related to different academic majors (e.g., Fazarro & Martin, 2004; Demirbas & Demirkan, 2007). Indeed, certain related or interdisciplinary majors may sometimes be associated with certain PLS. Thus, Fazarro (2001) did not find differences between the engineering and industrial technology students, even though they were from different cultural and ethnic backgrounds.

In the same vein, students of medical fields, for example, revealed a general tendency towards the kinaesthetic LS across several studies. Like El-Aziz and El Naggar (2016), Al-Qahtani et al. (2018), Elgzar et al. (2019), and Al-Roomy (2023) investigated PLS preferences among Saudi nursing students and found that the major learning styles of those students were auditory, followed by visual and kinaesthetic, or kinaesthetic. Regarding their social factor styles, those students preferred the individual learning style.

However, there is neither a general rule nor established consistency regarding the association of certain academic fields as factors with certain PLS. Khmakhien (2012) found that the field of study had a significant relationship with PLS. His study included Thai language learner students from five different colleges; agriculture, liberal arts, engineering, education, and sports science. However, not much difference was found among the participants' preferences, as anticipated by the researcher, except for the kinaesthetic PLS. Engineering students revealed lower levels of preference for all PLS categories except for auditory and group PLS. Also, education students were less tactile and individual in comparison to others. Kinaesthetic style, however, in Khalil and Sabir (2019), was the prevalent PLS of Saudi language learners majoring in architecture, law, speech and hearing, and education. Nevertheless, education students reported auditory as their major LS, followed by the kinaesthetic LS. Also, results from architecture students showed that, besides the kinaesthetic LS, they were tactile learners. Law students reported an equal percentage of preferences for auditory, visual, and group LS, all coming directly in second place after kinaesthetic.

Taun (2011) found the field of study to be the most influencing factor in identifying PLS, and kinaesthetic in his study was also the predominant learning style for students majoring in English, banking and finance, accounting, and computer science, respectively. Computer science students, like in Reid's (1987) study, displayed a strong preference for tactile learning style, with a percentage higher than that displayed by English-major students for kinaesthetic. English-major students also strongly preferred tactile and auditory LS as their second and third preferred styles, respectively. In this respect, they are congruent to their Palestinian counterparts in Jhaish (2010), who reported kinaesthetic and tactile as their major PLS. Besides Jhaish (2010), Alkubaidi's (2014) participants included female English-major students, who revealed dominant auditory and group learning styles. Al-Hebaishi's (2012) study, however, including participants with similar characteristics, exhibited visual style as their dominant learning style. Saud (2018) also investigated Saudi female college-level students majoring in English. She found that participants preferred group and individual, i.e., social factor preferences, more than sensory styles. However, they did not show much difference in sensory style preferences, yet their PLS can be ordered as visual, tactile, kinaesthetic, and auditory.

Naserieh's (2009) study included Iranian students in social sciences and technical fields, wherein both groups showed a strong preference for kinaesthetic. However, the preference was stronger in technical fields. The tactile LS was slightly higher than the kinaesthetic in the technical fields group, which also came as the second preference for the other group. Another noticeable finding regarding the social sciences group is that they revealed individual orientation and, at the same time, low levels of group orientation style.

As with the factor of gender, many of these reported studies, although indicating that academic major is correlative, differences among participants' preferences of PLS are not necessarily huge or greatly significant. And again, in most studies, participants revealed multiple learning styles.

The current paper will investigate its assumptions using the two factors reviewed above within the study framework as presented in its objectives and questions below.

III. Research Aims and Objectives

This study is part of a larger research project examining the learning styles among non-native EFL learners in the Saudi context from different perspectives. It primarily focuses on characterizing contemporary learners as unimodal or multimodal in terms of PLS. It seeks to conclude that assumption by: 1) investigating if learning English is associated with a specific perceptual learning style preference (PLSP) among Saudi university-level students and 2) examining if differences in PLS persist when associated with specific factors, gender and academic major in this study.

IV. Methods

A. Design and Instrument

Reid's (1987, 1995) PLSPs Questionnaire (PLSPQ) is applied in this quantitative study to identify the learners' sensory and social preferred PLS, to better understand the relevance of PLS preferences to English learning. Reid used 30 items in her questionnaire to identify respondents' learning styles, with five items each for visual, auditory, kinaesthetic, tactile, group, and individual. The learning styles are not organized as categories in the questionnaire, nor are the items. Each statement must be answered on a five-point Likert scale, from 'strongly disagree' to 'strongly agree', with 'neutral' in the middle.

We translated the tool, creating two versions in Arabic, the participants' first language. We compared the translated versions to those used in previous Arab-language studies (e.g., Alkahtani, 2016). Before collecting data, another two researchers fluent in Arabic and English checked the translation to ensure its validity.

The tool's validity and reliability are claimed based on previous validation through previous studies, by the tool's designer herself, and by following researchers across different contexts. Reid (1987) stated that the questionnaire was highly reliable and validated through the correlational analysis of an original set of 60 items, specifically through "the split-half method" to determine five items for each category.

The PLS scale has good internal consistency, according to Alnujaidi (2019), with a Cronbach alpha coefficient of .92. The Cronbach alpha coefficient in the current study was .95. Several researchers believe that the reliability score should range from 0 to one; that is, when there is high covariance across all items, will approach one. In other words, the higher the coefficient, the greater the shared covariance among the items and the greater the likelihood of measuring the underlying concept (Goforth, 2015). As a result, the questionnaire's reliability was deemed acceptable.

B. Procedure

Before conducting any research in the targeted context, the researchers completed a research approval form required by the targeted organization. It took a week for experts in the field to review the research details. Following that, the researchers received feedback and a decision from the research committee. Before administering the survey, they addressed the suggestions and amendments they received. The researcher submitted the questionnaire to the research committee after all revisions were completed, which managed and facilitated the administration process. To attain this purpose, the committee published the survey on Blackboard, the official learning management system platform at the targeted university, and reached out to all relevant teachers. It was created on Google Doc Forms initially, and the link to this service was transferred to Blackboard. It was available for two weeks after administration on the students' announcement dashboard. The researchers were careful to explain to students that the questionnaire was not part of their syllabus, course content, or evaluation process. Before participating in the survey, students were briefed through the announcement section and the survey link about the study and its purpose.

C. Participants

The questionnaire was completed by 858 students. The researcher examined the dataset for outliers and verified that the assumptions underlying the statistical tests used in the study were met. Following data screening, a total of 828 students were included in the current study. The researchers classified the students from colleges under two main strands: health and medical studies and arts and humanities. A third strand was added for English major students to distinguish them from the arts and humanities students. English major students constituted 21.3% n=176 of the sample, whereas the majority of the participants (62.1%, n= 514) belonged to the College of Arts and Humanities. The lowest percentage of participants (16.7% n=141) came from medical and health sciences colleges. Female participants constitute more than half of the total number of respondents (62.2% n=515). Most participants were either at their first or second university level. All these two levels of students were studying English through intensive courses designed by the English language institute at the targeted university, 15 credit hours per level.

V. Results

Data are presented in this section as guided by the research questions and objectives. That is, it begins by presenting descriptive data on participants' PLS, then data on PLS based on their academic major, and finally, PLS based on gender. The data were analyzed using SPSS to generate descriptive data and run the relevant statistical tests, as shown below:

A. Participants', English-Major and Non-English-Major Students, PLS Orientations Through Mean Scales Scores Analysis

To identify participants' orientation against PLS, and because the focus is mainly on learning English, participants were divided into English-major and non-English-major students. Both groups of participants had PLS levels that were comparable and equal. In other words, the multimodality of their PLS was indicated by their mean scores across styles. Only the preference for individual LS by non-English-major participants was marginally lower compared to all of the means, as shown in Table 1.

Table 1
T-Test Results Comparing Non-English Major and English-Major Students on PLS

	Non-English Major			English Major						
	N	**M**	**SD**	**N**	**M**	**SD**	**t**	**df**	**Sig.**	**Eta squared**
Visual	652	18.37	3.76	176	18.07	4.19	.935	826	.350	.00106
Auditory	652	19.46	3.91	176	19.36	4.38	.313	826	.754	.00012
Kinaesthetic	652	18.88	4.16	176	18.63	4.66	.633	255.294	.527	.00048
Tactile	652	18.15	4.19	176	17.81	4.65	.875	256.812	.383	.00093
Individual	652	16.54	4.80	176	17.42	5.42	-1.969	253.987	.050	.00467
Group	652	19.15	4.82	176	18.19	5.80	2.016	243.980	.045	.00490

For further validation, an independent-sample t-test was used to determine whether one of the two groups had a dominant style. For the visual scale, there was no significant difference in scores for non-English major students (M=18.37, SD=3.76) and English major students [M=18.07, SD=4.19; t(826)= .935, p=.35]. The magnitude of the differences in the means was very small (eta squared=.00106). For the auditory scale, there was no significant difference in scores for non-English major students (M=19.46, SD=3.91) and English major students [M=19.36, SD=4.38; t(826)= .313, p=0.75]. The magnitude of the differences in the means was very small (eta squared=.00012). For the kinaesthetic scale, there was no significant difference in scores for non-English major students (M=18.88, SD=4.16) and English major students [M=18.63, SD=4.66; t(255.294)= .633, p=0.53]. The magnitude of the differences in the means was very small (eta squared=.00048). For the tactile scale, there was no significant difference in scores for non-English major students (M=18.15, SD=4.19) and English major students [M=17.81, SD=4.65; t(256.812)= .875, p=.38]. The magnitude of the differences in the means was very small (eta squared=.00093). For the individual scale, there was a significant difference in scores for non-English major students (M=16.54, SD=4.80) and English major students [M= 17.42, SD=5.42; t(253.987)= -1.969, p=.05]. The magnitude of the differences in the means was very small (eta squared.00467). For the group scale, there was a significant difference in scores for non-English major students (M=19.15, SD=4.82) and English major students [M=18.19, SD=5.80; t(243.980)= 2.016, p=0.05]. The magnitude of the differences in the means was very small (eta squared=.00490). Both groups revealed similar PLS, except in the last two LSs, i.e., the social LSs according to Reid's (1995) framework.

B. Participants' PLS According to Gender

An independent-samples t-test was used to compare the scores of the six PLS for both males and females to test the influence of gender on participants' PLS (see Table 2).

Table 2
T-Test Results Comparing Males and Females on PLS

	Female			Male					
	N	**M**	**SD**	**N**	**M**	**SD**	**t**	**df**	**Sig.**
Visual	515	18.30	3.76	313	18.33	4.01	-.116	826	.908
Auditory	515	19.50	4.02	313	19.35	3.99	.543	826	.588
Kinaesthetic	515	18.87	4.25	313	18.74	4.30	.433	826	.665
Tactile	515	18.30	4.15	313	17.70	4.50	1.919	618.294	.055
Individual	515	16.54	4.94	313	17.02	4.96	-1.342	826	.180
Group	515	18.94	4.88	313	18.97	5.34	-.081	613.603	.935

The analysis shows no significant relationship between gender and PLS. Regarding the visual scale, there was no significant difference in scores for females (M=18.30, SD=3.76) and males [M=18.33, SD=4.01; t(826)=-.116, p=.91]. The magnitude of the differences in the means was very small (eta squared=.00002). For the auditory scale, there was no significant difference in scores for females (M=19.50, SD=4.02) and males [M=19.35, SD=3.99; t(826)= .543, p=0.59]. The magnitude of the differences in the means was very small (eta squared=.0. 0004). For the kinaesthetic

scale, there was no significant difference in scores for females (M=18.87, SD=4.25) and males [M=18.74, SD=4.30; t(826)= .433, p=0 .67]. The magnitude of the differences in the means was large (eta squared=0.0002). For the tactile scale, there was no significant difference in scores for females (M=18.30, SD=4.15) and males [M=17.70, SD=4.50; t(618.294)= 1.919, p=.06]. The magnitude of the differences in the means was very small (eta squared=0.0044). For the individual scale, there was no significant difference in scores for females (M=16.54, SD=4.94) and males [M=17.02, SD=4.96; t(826)= -1.342, p=.18]. The magnitude of the differences in the means was very small (eta squared=0.0022). For the group scale, there was no significant difference in scores for females (M=18.94, SD=4.88) and males [M=18.97, SD=5.34; t(613.603)= .081, p=0 .94]. The magnitude of the differences in the means was very small (eta squared=0.000008).

C. Participants' PLS According to Academic Major

A one-way between-groups multivariate analysis of variance was carried out to investigate the major of study differences in preferred learning styles (see Table 3). The six LSs were used as dependent variables, whereas the independent variable was the participants' study major. Preliminary assumption testing was conducted to check for normality, linearity, univariate and multivariate outliers, the homogeneity of variance-covariance matrices, and multicollinearity, with no serious violations noted.

TABLE 3
RESULTS COMPARING THE THREE MAJORS' STUDENTS AND THEIR PLS

Variable	Humanities	Health	English	F	df	p	Partial squared
Visual	18.28	18.72	18.07	1.162	2	.313	.003
Auditory	19.37	19.82	19.36	.732	2	.481	.002
Kinaesthetic	18.67	19.65	18.63	3.139	2	.044	.008
Tactile	18.01	18.64	17.81	1.616	2	.199	.004
Individual	16.36	17.20	17.42	3.803	2	.023	.009
Group	19.12	19.28	18.19	2.568	2	.077	.006

The results indicated there was no difference to reach statistical significance, using a Bonferroni-adjusted alpha level of .008. In other words, the three groups reflected similar preferences of PLSs, with slight differences in the kinaesthetic, individual, and group LSs. The most preferred style, however, as reflected by the three groups, was the auditory LS. Treating each group individually, English-major students were less kinaesthetic, less tactile, and less favorable toward group LS than the other two groups. Health and medical science students were more kinaesthetic and tactile than the other groups. Comparatively, they were also more visual, auditory, and group-oriented than the others. However, these latter interpretations may indicate neither huge differences among the groups nor monomodal orientations.

VI. DISCUSSION

In light of related reviewed studies, the data are discussed in light of the research micro-level objectives that reflect of the research questions. We believe that discussing the data in relation to similar studies in the field can help visualize and understand the paper's macro-level assumptions. Researchers interested in identifying specific learners with specific PLS or advocating multimodal educational approaches would benefit from delineating PLS across different fields, contexts, or genders.

A. Type of PLS Orientations: Unimodal or Multimodal?

The analysis shows that the differences among the participants' PLS, based on the mean scores, are marginal, hence insignificant. Participants, based on that reading, can be said to reflect the multimodal orientation of PLS, as they exhibit multiple style preferences. Thus, participants in this study are like participants in El-Aziz El Naggar (2016) males, in Saadi (2012), and females in Al-Qahtani et al. (2018), who are all considered multimodal, bearing in mind that the current study does not indicate any differences between males and females.

Outlining the similarities among the participants, the auditory learning style is regarded as the most preferred for all participants, regardless of their majors or genders, a finding consistent with Khmakhien's (2012) study. In this regard, researchers concur with education-major participants in Khalil and Sabir's (2019) study. The auditory PLS has indeed been reflected through several studies, including Arab or Saudi students as their most preferred LS, starting from Reid (1987) to several following interested researchers such as Saadi (2012), Alkahtani (2016), and Saud (2018). This learning style, it can be argued, is consistent with university-level teaching systems, particularly in the Arab world, which rely heavily on lecturing.

B. PLS and Gender

Assumptions about the homogeneity of today's learners and their multimodality are further supported by the results of this study, which did not show that gender had a significant impact on participants' PLS. The tactile learning style shows a very marginal difference. Based on the magnitude scale, this difference is relatively small, making it insignificant. In other words, the participants' preferences for each learning style were equally distributed, with the visual style receiving the highest ranking, followed by the group, kinaesthetic, and auditory learning styles. The

findings are, therefore, consistent with EFL context studies, such as those by Tuan (2011) in the Vietnamese context, Khmakhien (2012) in the Thai context, Riazi and Mansorian (2008), Bidabadi and Yamat (2010), and Sahragard et al. (2016) in the Iranian context, which did not find any appreciable differences between the two genders to PLS. Only studies by Siddique et al. (2014), Jhaish (2010), and Sarabi-Asiabar et al. (2014) found gender to be a factor. However, on a more local level, the study's findings also differ from those reached by studies carried out in the Saudi context, as most of those studies found differences between males and females with notable levels of differences in their PLS preferences, such as those by Al-Qahtani et al. (2018), El-Aziz El Naggar (2016), Alsafi (2010), Saadi (2012), and Yassin (2014).

C. PLS and Academic Major

Regarding the assumption that certain fields are related to specific PLS, the preferences of students in the medical and health sciences in this study are relatively similar to those in El-Aziz El Naggar (2016), Al-Qahtani et al. (2018), and Elgzar et al. (2019). Besides that, by showing a preference for the kinaesthetic PLS, students of arts and humanities in this study are comparable to students of social sciences in Naserieh's (2009) study as well as Taun's (2011) and Khalil and Sabir's (2019) studies. However, statistical analysis of the current study reveals that the academic major as a factor had no statistically significant impact. In other words, even if there are differences in the PLS of participants according to their academic majors, they are insignificant. This further reinforces the notion that the PLS preferences of the participants are multimodal.

By identifying auditory as their top preferred in their PLS, participants with an English major are comparable to their Saudi counterparts in Alkubaidi's (2014) study. They also contrast with Saud's (2018) study, which found that English major students' preferences for auditory PLS were at the bottom of the list. The kinaesthetic style is the second preference of English majors, putting them in line with their peers in Jhaish's (2010) study in terms of this particular PLS. At the same time, they contradict their counterparts from the same later study by indicating a lower preference for tactile PLS. It can be deduced from the heterogeneity of the results of earlier and more recent studies that English majors' preference for auditory is not ubiquitous.

In conclusion, since English-major students are comparatively identical to their non-English counterparts, the academic major was not a factor in the current study, as no significant differences between the two groups were spotted. Both groups showed comparatively equal preferences for the auditory, kinaesthetic, and visual learning styles. However, if one were to look more closely at differences, participants, according to this categorization, showed very slight differences in the 'social' factor styles, namely the individual and group styles. Students majoring in English are reportedly more individualistic and less group-oriented than students majoring in other fields. They thus serve as a partial representation of the study's participants in Saud's (2018) work, which reveals preferences for both social-factor styles.

The preference for group learning was also stronger among students with other majors than among English majors. An explanation for the preference for individual PLS among English major students could be found in the activities and instruction English language learners typically receive, which call for them to work on their English independently and engage in varied target language practice in EFL contexts. In contrast to sensory PLS, showing differences in social PLS can be considered plausible because these PLS may reflect dynamic sociocultural values and behaviors. Those behaviors, however, can be learned and acquired and can influence teaching methods within the same cycle or loop.

VII. Conclusion

In this paper, we attempted to describe the situation of EFL learners, males and females, across several disciplines in terms of perceptual learning styles through a Saudi university context. By employing gender and academic majors as factors, we attempted to add rigor to the investigation, which focuses on identifying the orientation of EFL learners' perceptual learning styles preferences by delineating differences and/or similarities among them according to the employed factors. In doing so, we attempted to define those learners as unimodal or multimodal regarding PLS. Apart from the discussion of the participants' overall dominant and less-dominant learning styles, statistics showed no significant differences among participants, even according to the employed factors. Thus, in the realm of the study, we conclude that learners in this study are multimodal learners. Similarly, English is not significantly associated with certain perceptual styles. Consequently, the assumptions that form the rationale of the study are valid.

Research in the field, including the current study, revealed some discrepancies in PLS tendencies across different contexts and factors. With such inconsistent patterns, multimodal education is a good opportunity for teachers and educationists. Without a thorough understanding of the potential and preferences of the learners, teaching cannot be successfully accomplished. Therefore, teachers' practices should always be adjusted to the characteristics of their students. This can be seen in the materials they present and how they behave when managing classes.

Nonetheless, even when multimodal education is either recommended or adopted, research into learner learning styles should persist firmly across all educational fields for several valid reasons. The most relevant is that teachers following multimodal approaches could tailor their teaching styles according to priorities and analyses emerging by investigation. Besides, the rapidly changing nature of social and cultural aspects that influence people and their lives in a broader spectrum, which may bring learners to a common ground, is yet unpredictable. Learners nowadays are

influenced by several local and global factors that require constant updates and modifications by educationists and educational planners.

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