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Perception in Najdi Arabic: Sensory Lexicon and Constructions Denoting the Five Senses

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***Abstract*—This qualitative study investigates how sense and perception are expressed through language. Senses vary in their degree of expression across languages and within the same language, as some senses proved to have elaborate lexicon and others have very limited vocabulary. This paper investigates sensory language in Najdi Arabic. The study concluded sensory lexicon In Najdi Arabic is variable including verbs of perception, sensory nouns and adjectives. Speakers often use a variety of constructions to denote sensory experiences. Sense modalities are encoded using abstract terms, evaluative adjectives, and source-based nouns. Sensory adjectives that describe intrinsic properties of sense modalities are variable in Najdi Arabic, with vision, taste, and touch having a rich vocabulary of abstract terms for these properties. Synesthetic adjectives from the vision modality are used in other sensory domains for subjective evaluation, to indicate pleasantness or unpleasantness. Tactile-related terms are also used to describe sounds. Extended meanings of perception verbs in Najdi Arabic are cognition, understanding, anticipation, disobedience and past experiences.**

***Index Terms*—sense modality, sensory language, synesthesia, perception, Najdi Arabic**

I. Introduction

Sensory linguistics is "the study of how language relates to the senses" (Winter, 2019, p. 1). Words are used to denote sense and perception. The way senses are encoded in words is variable, since some sensory modalities and perceptual qualities are found easier to talk about than other sensory modalities. Senses vary in their degree of expression across languages and within the same language, as some senses proved to have elaborate lexicon and others have very limited vocabulary (Levinson & Majid, 2014; Martina, 2022). Levinson and Majid (2014) define ineffability as "the difficulty of putting certain experiences into words" (p. 408).

Perceptual qualities that can only be experienced through a single sensory modality are called proper sensibles. Common sensibles are properties that are perceived through multiple sensory modalities (Marks, 1978). Spatial properties which can be perceived through vision, touch, and sound are considered common sensibles. Because common sensibles are experienced through multiple senses, they are generally easier to express in language. Nevertheless, this multisensorial nature of common sensibles complicates the measurement of ineffability because it can be unclear which sensory modality a word primarily relates to (Winter, 2019).

Ineffability of sense modalities

Sense modalities are divided into: proximal senses: touch, taste and smell; and distal senses which are sight and sound. Slobin (1971) found that in English there is a limited lexicon for proximity senses compared to distal senses. Sight is considered the most codable sense, since the number of words for visual concepts is relatively high compared to other senses. This is supported by observations that visual concepts such as colors are more readily codified in language and are processed more quickly (San Roque et al., 2015; Connell & Lynott, 2014). Sight is codable in English because it has "more distinct perceptual qualities that are codable", while "descriptive characteristics of smell are not encoded in English" (Winter, 2019, p. 34).

Smell is called the muted sense because it is ineffable and has restricted vocabulary (Lorig, 1999). In addition, olfactory lexicon is subjective as it is based on individual experiences. It is also linked to cultural preferences, and biological differences. Due to this subjectivity, it is difficult to find a universal dedicated language for smell. Hence, olfactory lexicon cannot give a full image of the smell experiences (Martina, 2022).

Olfaction domain has restricted lexical items and is a weaker source domain for extended metaphorical meaning in comparison with other sensual modalities in languages such as English (Sweetser, 1990; Viberg, 1983). However, some languages have rich elaborate olfactory lexicon such as Maniq and Jahai (Burenhult & Majid, 2011; Majid & Burenhult, 2014; Wunk & Majid, 2014). To overcome limited olfactory lexicon, some languages refer to synesthetic terms, or use evaluated terms to characterize smells as good or bad. Sensory domains are considered codable (Majid & Burenhult, 2014) if they follow the criteria below:

(1) length of utterance: a sensory domain is more efficiently codable if it is expressed in short words.

(2) degree of intersubjective agreement: a sensory domain is codable if the same labels are used to denote such domain across speakers of the same language.

(3) type of description: a sensory domain is considered codable if it can be described in a specific manner.

Winter (2019) indicates that there is a huge gap between what can be perceived and how it is linguistically encoded. Speakers use a few basic terms to represent hundreds of color concepts (Fahle, 2007). Humans can distinguish thousands of different smells, but the olfactory lexicon is limited. Hence, linguistic labels for sensory concepts must be fuzzy to accommodate for such concepts.

Ineffability can also be found in specific perceptual qualities of a certain sense modality. For instance, visually describing shapes is easier than describing faces; and describing texture is easier than pain within tactile modality (Levinson & Majid, 2014).

II. Review of Literature

A. Previous Studies

Martina (2022) proposed an account of how English speakers talk about olfaction. It is either in comparison with other smells, similarity with other senses or with reference to the source of the smell. In addition, smell can be denoted by abstract adjectives explaining the property of the smell. According to Majid and Burenhult (2014), olfactory naming strategies can be categorized into three types: basic abstract terms that denote odors directly, evaluative terms that express judgments about odors (e.g., pleasant or unpleasant), and source-based terms that reference the origin of the smell and show similarity to the characteristic smells of the source of smell (e.g., "like roses"). In general, olfactory lexicon is limited rather than providing an intrinsic description of the smell itself. As for encoding gustatory modality, Winter (2019) indicated that taste is denoted through the use of basic tastes such as sour, sweet, bitter, and salty; or through source-based words such as oniony, nutty, etc.

Vanhove and Ahmed (2021) investigated olfactory, gustatory, and tactile lexicon in Beja, a Cushitic language spoken in Sudan. Sensory lexicon in Beja is limited; yet, olfaction has a more elaborate lexicon compared to the other two senses. Beja showed a prevalence of words of unpleasant odors over pleasant ones, a tendency found in several languages. As for metaphorical extensions, the tactile domain shows richer variety. San Roque et al. (2015) studied the universality and culture-specificity of perceptual language in 13 languages. The study supported the proposal that vision is the most dominant sense.

Hartman and Paradis (2023) studied auditory language and found that speakers, when talking about sound, describe their listening experiences, sound properties, or the events that caused the sound. Event description was the most frequent one in the study data. Sound is described through space (close, far, foreground, background, etc.), time (intermittent or continuous) and in connection with tactile modality. Within sound modality, speakers use touch-related vocabulary to describe sounds (rough, harsh, abrasive smooth). They concluded that there is no designated language for sound.

B. Verbs of Perception

Viberg (1983) states that perception is divided into the 5 sense modalities in various languages. He argues that perception verbs have two arguments: the experiencer of the perception (E) and the stimulus/ object of perception (S). He classified perception verbs into: experiencer-based and phenomenon-based. Whitt (2010) claims that experiencer-based perception verbs are subject-oriented, whereas phenomenon-based perception verbs are object-oriented.

The perceiver is omitted in phenomenon-based such as (It tastes bad). This type of copulative perception typically involves verbs that link a subject to a state or quality.

Experiencer-based perception verbs are transitive and take the two arguments E and S. E is the subject and S is the object. The subjects of experiencer-based perception verbs are classified into agentive and experiencer based on how subjects actively engage with or experience an action or state. In this framework, verbs convey a sense of agency or involvement. Agentive subjects perform perception intentionally. It is a process that is controlled by the perceiver such as the verbs (look at) and (listen). Experiencer subjects are exposed to the stimulus. It is a state that is not controlled by the perceiver such as the verbs (see) and (hear). It indicates the subject's involvement in an event or action, often without the same degree of agency as in active constructions. It highlights the subject's perception or reception of an experience. Based on that, sensory language can be lexicalized in several ways (Viberg, 1983; Winter, 2019; Ibarretxe-Antuñano, 1999; Lupyan & Winter, 2018).

C. Metaphor in Sensory Language

Metaphorical extensions of senses can be universal as vision is associated with knowledge, and hearing with obedience (Ibarretxe-Antunanu, 1999; Sweetser, 1990; Winter, 2019). Hearing can be metaphorically extended to mental states such as understanding and knowing (Evans & Wilkins, 2000; Vanhove, 2008). Nevertheless, literature shows that this does not apply to all languages. San Roque et al. (2018) conducted a crosslinguistic study to analyse non-literal extended meanings of verbs of perception. Extended meanings of perception verbs across 13 languages include cognition, attention, socializing, trying, and co-identification. Vision constituted the majority of the study data. Some meanings were shared across languages, while others were culture-specific.

Sweetser (1990) argues that visual modality is associated with knowledge whereas olfactory modality is associated with disobedience, “bad character, dislikeable mental characteristics, and the detection of such characteristics” (p. 38). She added that tactile modality is linked to emotions, and taste with personal preferences.

Ibarretxe-Antunanu (1999) investigated polysemy of perception verbs in English, Spanish, and Basque, a language spoken in Southwest Europe. Metaphorical meanings of vision included intellect, cognition and understanding, hearing included obedience, knowledge, attention, and understanding. Smell extended meanings are suspicion, investigation, and guessing, and taste means experiences.

Proos (2020) studied the polysemy of the perception verb (to feel) in Estonian. Estonian tactile verbs are frequent and polysemous compared to other perception verbs. The meanings of the verb are: physical experiences, emotions, and cognition. The study concluded that the Estonian verb of (feel) is a general proximal perception verb rather than a tactile perception verb.

Ibarretxe-Antunanu (2006) conducted a cross-linguistic study on the metaphorical meanings of tactile verbs in Spanish, English, and Basque. Tactile modality is linked to the domain of emotions. Polysemy of tactile verbs included affecting physically and metaphorically, reaching, and dealing with a certain situation.

Ibarretxe-Antunanu (2021) researched smell nouns in Basque. The physical meanings are the smell itself which can be good, bad, or neutral; the object that gives smell; the source of the smell; the sense of smell; and the action of smell. Extended meanings of copulative smell perception verb are feelings and characteristics, whereas the extended metaphorical meanings of experience smell perception verbs are cognition, suspicion, and information.

Erk Emeksiz and Rentzsch (2024) conducted a corpus-based study on the extended meanings of the verbs of visual domain in Old Anatolian Turkish. They found that mental and emotive states are conceptualized through visual perception. As found in previous literature, "the vision verbs can take many more distinct noncentral meanings that can verb referents of the other four modalities" (Cooper, 1974, p. 8). Vision is related to human intellect and cognition, as cross-linguistic research showed it has the highest number of meaning extension (Erk Emeksiz & Rentzsch, 2024; San Roque et al., 2018).

D. Synesthetic Metaphors

Meaning extensions can be classified into: intra-field and transfield extensions. Intra-field extension is the mapping from one sensory modality to another sensory modality. Transfield metaphorical extension is the mapping from one sensory domain to a different semantic domain such as the mental domain (Erk Emeksiz & Rentzsch, 2024).

Synesthesia is the metaphoric transfer of a certain sensory modality to another modality; for instance, *smooth voice* and *sweet smell*. The adjective *smooth* is associated with tactile modality, but its meaning is extended to auditory modality. In the second instance, the adjective *sweet* is associated with taste modality, but extended to olfactory modality. Such expressions are called synesthetic metaphors. Tactile and taste modalities in the examples above are the source domain, whereas sound and olfactory modalities are the target domain (Winter, 2019; Zhao et al., 2018). Werning et al. (2006) differentiated between "strong" and "weak" synesthetic metaphors. In weak synesthetic metaphors, the source is perceptual and the target is abstract such as *warm feelings*, whereas in strong synesthetic metaphors both the source and the target are perceptual such as *sharp smell*.

Winter (2019) states that synesthetic metaphors are different from conceptual metaphors since the source and the target domains in the first are sensory. Yet, the source domain in conceptual metaphors is concrete and the target domain is abstract. Winter (2019) suggested that synesthetic metaphors can be linked to conceptual metonymy. In conceptual metonymy, the source and the target belong to the same domain. In synesthetic metaphors, the source and the target, sense modalities, belong to the same semantic domain.

Weijer et al. (2023) studied pairs of antonymic multi-sensory adjectives in sensory modalities. They found that adjectives used with sight can be used with touch, adjectives used with smell can be used with taste, and adjectives used with sight and touch can be used with taste and hearing but not vice versa. Tactile modality lexicon is used to describe sounds (Hartman & Paradis, 2023).

E. Summary

To conclude, sensory language differs across languages. Though visual modality is considered more elaborate than the other sense modalities, and smell modality is limited, some studies found contradicting conclusions. Ineffability of sense modalities led to the use of different techniques to overcome the constricted sensory lexicon. Synaesthesia is one of the tools to enhance perceptual language. As seen in previous literature, further research is needed to investigate the sensory lexicon in more languages. The research aims to investigate sensory language in Najdi Arabic as there is no previous research tackled perception in Najdi Arabic to the best of the researcher's knowledge.

III. Methodology

The study aims to investigate sensory language in Najdi Arabic, an Arabic dialect named after the Arabian plateau *Najd*. It is a dialect of Arabic spoken in Najd, the central region of Saudi Arabia with approximately 6 million population (GASTAT, n.d.). Najdi Arabic is an Arabic dialect that received little attention in language research. It is defined as the "dialect spoken in the central region of Saudi Arabia, which is bounded by Hijaz on the west, Yemen and Oman on the south, the Gulf states on the east, and Iraq and Jordan on the north" (Prochazka, 1988, p. 7). Najdi Arabic is divided into: Urban Najdi and Bedouin Najdi. Urban Najdi is also subdivided into the sub-dialects of Al-Arid, ancient name of Riyadh city and the towns around it, and Al-Qasim. Bedouin Najdi includes the dialects of the Arab tribes in Najd such as Utaibah, Gah'tan, Onaizah, Shammar, etc (Ingham, 1994, pp. 1-2).

A. Research Questions

The paper aims to answer the following questions:

1- How sense modalities are lexicalized in Najdi Arabic?

2- What are the extended meanings of sensory language in Najdi Arabic?

B. Data Collection

The study data was collected through online survey, online corpus, dictionaries, and other language references. Respondents to the survey were asked to list all the words used in Najdi Arabic to express the senses of vision, taste, touch, smell, and hearing. In addition, the researcher, as a native Najdi speaker, listed the words denoting sense modalities and perception introspectively. Later, such words were looked up in dictionaries, references, and an online corpus for their detailed meanings. As a result, the dataset of the study is indicated in Table 1 and Table 2 below.

TABLE 1
PERCEPTION VERBS IN NAJDI ARABIC

Sense Modality	Experience-based verb		Phenomenon-based verb
	Activity/agentive	Experiencer	Copulative
Smell	shamsham	sham	fa:H
Touch	limas - lammas	Has	----
Taste	dha:g	dha:g	----
Hearing	simaʕ - *tisammaʕ*	simaʕ	----
Sight	na:DHar - Ta:laʕ	sha:f	----

TABLE 2
PERCEPTION-RELATED NOUNS IN NAJDI ARABIC

Sense Modality	Perception-Related Nouns					
Smell	*ri:Hah*	*ri:H*	*ʕiTir*	*Ti:b*	*Sna:n*	*khannah*
Touch	*malmas*					
Taste	*Taʕam*	*nak'hah*				
Hearing	*So:t*	Human voices and sounds			Animal sounds	
Sight	*sho:f*	*sho:fah*	*naDHrah*	*manDHar*	*shakil*	

C. Corpus of the Study

Gumar corpus is the study corpus since it is, as far the researcher knows, the only online corpus of Najdi Arabic dialect (Habash et al., 2018; Khalifa et al., 2016; Khalifa et al., 2017; Khalifa et al., 2018). Gumar corpus was created by the Computational Approaches to Modelling Languages CAMEL lab at New York University in Abu Dhabi. The corpus includes other Arabic Gulf dialects; i.e., "the Arabic variety spoken by the indigenous populations residing in the six countries of the Gulf Cooperation Council: Bahrain, Kuwait, Oman, UAE, Qatar, and Saudi Arabia" (Khalifa et al., 2016, p. 4283). Arabic Gulf dialects include the linguistic varieties on the western coast of the Arabian Gulf, in Bahrain, UAE, Kuwait, Qatar, Oman, and Saudi Arabia such as Hijazi, Najdi, and Baharnah dialects (Habash et al., 2018; Khalifa et al., 2018; Khalifa et al., 2016). The corpus is a large-scale morphologically annotated corpus which consists of more than 112 million words. It can be accessed through an online interface that creates a concordancer of the searched item; i.e., word token, lemma, or stem form. The concordancer shows KWIC, POS, English translation, lemmatization, and dialectal variety (Habash et al., 2018; Khalifa et al., 2018; Khalifa et al., 2016).

D. Data Analysis

The study analysis went through three phases:

1- Syntactic analysis: The words were divided based on their part of speech (verbs of perceptions and perception-related nouns). Viberg's (1983) classification of perception verbs was implemented on the study data.

2- Semantic analysis: Words' meanings were given and the constructions used in Najdi to denote sense modalities and sense perception were highlighted.

3- Metaphorical analysis: Extended meanings of sensory lexicon were presented.

IV. RESULTS

In the following, each sense modality is investigated in a separate section. Each section is divided into three parts. The first part is dedicated to analysing the verbs of perception of a specific sense modality. The second part of the analysis tackles perception-related nouns and their relevant constructions. The third part of the analysis presents the metaphorical and extended meanings of such sense modality.

A. The Sense of Smell

(a). Perception Verbs

Najdi Arabic has three verbs of olfaction. *sham* is an experience-based verb that indicates the act of smelling, *fa:H* is a copulative verb of smell, and *shamsham* is an action verb that means to sniff.

The verb *sham* is an involuntary verb [- control] that denotes the act of smelling. It indicates that the odor travels from its source to the smelling organ, the nose. While it signifies olfactory modality, it does not necessarily imply the ability to distinguish between different smells. The sentence structure involves an animate subject performing the action followed by the perception verb and the object of perception, which is the source of the smell.

(1) *ʔshim ri:Hat gahwa*
I smell a scent of coffee

The verb *shamsham* is a voluntary verb [+ control] where the person actively searches for the source of the smell or tries to distinguish it. It is done with the intention to detect the source of the smell and investigate the smell. The subject is the person performing the action followed by the verb of perception and the object of perception.

(2) ilkalb yshamshim ilmika:n
The dog is sniffing all around the place.

The verb *fa:H* is a phenomenon-based copulative verb which indicates a state of having a smell where the smell itself or the source of the smell is the subject. No person is actively smelling; rather, it shows that a smell exists, regardless of who perceives it. Olfactory modality is the only sense modality in Najdi Arabic that has a copulative perception verb.

(3) *khannat ilbukhu:r tfu:H bkil mika:n*
The aroma of the incense wafts all around the place

(b). Perception-Related Nouns

The feminine noun *ri:Hah*, meaning scent or odor, is more commonly used than the masculine noun *ri:H*, also meaning scent or odor; yet, there is no difference in their usage across all types of smells, whether pleasant, unpleasant, or neutral. *ri:Hah* and *ri:H* are followed by either of the following:

1- The abstract name of the smell: Few instances were found in the dataset such as the *ʕiTir* and *Ti:b* meaning perfume and fragrance and *Sna:n* which means a bad sweaty body odor.

(4) ri:Hat Ti:b
Perfume scent

2- The source of the smell: This is the most common case in denoting olfaction in Najdi Arabic. If the smell is not linguistically encoded, the speaker uses the source of the smell as a reference to the smell.

(5) *fi:h ri:Hat gahwa*
There is a scent of coffee

(6) *ʔshim ri:H baSal*
I am smelling the smell of onions (literal)
I can smell onions

3- Evaluative adjectives: Description of smells is either pleasant, neutral, or unpleasant such as *Hilwah* meaning "sweet", *ze:nah*, “good - pretty (*lit*)”, *gharibah*, “strange”, and *kha:ysah* meaning "rotten".

(7) *ri:Htah she:nah*
Its smell is ugly. (literal)
It has a bad smell

Another noun that is used to indicate olfactory modality is *khannah* which refers to the scent of oriental incense, Saudi coffee and other sources of aromatic scents. This noun is followed by the source of the smell.

(8) *khannat bukhu:r*
incense aroma.

(c). Extended Meanings of the Sense of Smell

Smell can be used in several metaphorical mappings in Najdi Arabic. The verb of perception *sham* showed one extended meaning. According to Ibarretxe-Antunanu’s Property Selection Procedure (1999), [distance] is one of the properties of smell. Smell is a sense that is perceived from a distance as smells can travel through air to reach the nose. Things are unnecessarily smelled from closeness. The impossibility of reaching a distant goal is portrayed as the inability to smell a distant odor.

(9) *ma ra:H tishim ri:Htah*
You will never smell its smell. (literal)
You will never reach this goal

The verb *shamsham* can be used figuratively to describe a person who is actively trying to gather information, often in a manner that is intrusive or nosy. The metaphor draws on the idea of a dog sniffing around, as dogs are known for using their sense of smell to investigate their surroundings. Similarly, a person who is "sniffing around" might be persistently seeking out details, gossip, or updates, sometimes without being invited to do so.

(10) *t’shamshim ilakhba:r*
She is sniffing around for news

The verb fa:H accompanied with the noun *ri:Hah* can metaphorically imply someone's hidden actions, wrongdoings, or secrets are revealed to others. The expression means previously concealed bad behaviour or private matters are becoming evident like an odor that can't be contained.

(11) *fa:Hat ri:Hat’hum*

their smell wafts (literal)
Their ugly hidden secret is revealed.

B. The Sense of Touch

(a). Perception Verbs

There are three verbs in Najdi Arabic that indicate tactile modality: *Has*, to feel, *limas*, to feel or to touch, and *lammas*, to touch and feel repeatedly to examine tangible items.

Has is an experiencer verb that is preceded by the subject, the perceiver, and followed by the object of perception and an adjective that describes one of the properties of the object.

(12) *ʔHis ilkirsi mablu:l*
I feel the chair is wet

limas is an activity verb which means to intentionally touch the item to feel it. It is preceded by the subject, the perceiver, and followed by the object of perception.

(13) *ilmisi ilgma:sh*
touch the fabric (literal)
feel the fabric

lammas is an activity verb which is followed by the object of perception. It means to intentionally touch and feel the item repeatedly for inspection and observation.

(b). Perception-Related Nouns

There is one noun in Najdi Arabic that indicates texture and feeling; i.e., *malmas*, texture. It is followed by one of the following:

1- One of the descriptive properties of the material such as:
Texture: (*na:ʕim* - soft), (*khashin* - rough), (*layyin* - soft), (*ga:si* - hard), (*Tari* - tender)
Moisture: (*na:shif* - dry), (*raTib* - wet)
Temperature: (*Ha:r* - hot), (*ba:rid* - cold), (*da:fi* - warm)

(14) *malmasah khashin*
Its texture is rough.

2- Source of the Material: The noun *malmas* can also be followed by terms indicating the material's source or composition. Common examples include: (*giTin* - cotton), (*Hari:r* - silk), (*Su:f* - wool)

(15) *malmasah Hari:r*
It has a silky texture.

3- Evaluation: While less common, *malmas* can be followed by adjectives that provide a subjective evaluation of the material's texture such as (*Hilw* -sweet (*lit*) - nice), (*she:n* -ugly (*lit*) - bad)

(16) *malmasah Hilw*
Its texture is sweet. (literal)
It has a nice texture

4- Comparison of Texture: In some cases, the texture may be compared to another known texture, often for illustrative purposes.

(17) *malmasah zay ilgiTin*
Its texture is like cotton

(c). Extended Meanings of the Sense of Touch

The verb (*Has*) can metaphorically extend to mean intangible emotions and feelings such joy, sadness, anger, etc. It may also denote feelings in the sense of anticipation or expectation, shifting from a sensory action to a mental one.

(18) *ʔHis shay she:n beSyer*
I feel something bad will happen.

C. The Sense of Taste

(a). Perception Verbs

The perception verb of taste modality in Najdi Arabic is *dha:g*, to taste. It can function as an activity verb or an experiencer verb. It is preceded by the subject, the person performing the action, and followed by the object of perception, the item being tasted.

(19) *dhugi issalaTah*
taste the salad
try the salad

(20) *lamma kint mariDHah, ma kint agdar adhu:g ilakil*
When I was sick, I could not taste food.

(b). Perception-Related Nouns

The nouns denoting taste in Najdi Arabic are *Taʕam*, meaning taste, and *nak'hah*, meaning flavor. They are followed by the object of perception, food or other edible items, either to identify the flavor or compare it to another known flavor.

(21) fi:ha nak'hat he:l
It has a flavor of cardamom

The adjectives that co-occur with the nouns *Taʕam* and *nak'hah* can be classified into:

1- Intrinsic Taste Properties: They are followed by adjectives that provide description of one of the qualities of food such as (*Ha:li* - sweet), (*ma:liH* - salty), (*Ha:miDH* - sour), (*kha:nis* - lacking salt), (*mur* - bitter). It can be noticed that taste modality in Najdi Arabic has a variety of abstract adjectives that describe intrinsic taste properties.

(22) *Taʕam ilbiTaTis ma:liH*
the potatoes taste salty

2- Personal Evaluations: They are followed by adjectives that provide subjective evaluation of the food such as (*Hilw* sweet (*lit*) - nice), (*ladhi:dh* - delicious), (*yihabil* - amazing), (*she:n* - ugly (*lit*) - bad), (*muqrif* - disgusting)

(23) *nak'hitah ladhi:dhah*
It has a delicious flavour.

(c). Extended Meanings of the Sense of Taste

The metaphorical extension of the verb *dhag* is experiences whether bitter, difficult experiences or pleasant ones (24).

(24) *dhigt ilmur*
I tasted the bitter (literal)
I went through a bitter experience

D. The Sense of Hearing

(a). Perception Verbs

The perception verbs that denote the sense of hearing are *simaʕ* (to hear or to listen) and *tisammaʕ* (listen or earsdrop). *tisammaʕ* is an activity verb in which the listener focuses on recognizing, distinguishing, and understanding the sound. The verb *simaʕ* can function as an activity verb and an experiencer verb. The verb is followed by the object of perception.

(25) ʔsmaʕ Sajah
I hear noises

(b). Perception-Related Nouns

Najdi Arabic has a variety of nouns denoting sound modality. The primary noun for sound is *So:t* (sound or voice), It can refer to human or animal voices, or any other sound. Sound is perceived as a property that can be measured as it collocates with verbs such as *gaSSir* (lower), *waTTi* (lower), *irfaʕ* (raise), *ʕalli* (raise).

(26) waTTi So:tik
Lower your voice

A sound can be described by its source, its properties, or its effect on the hearer/listener. Hence, Najdi Arabic has a wide range of sound names, such as:

1- Speech and other human voices and sounds, including:(*so:t* voice) (*kala:m* - speech), (*Sra:kh* - yelling), (*Sarkha* - scream), (*khna:g* - fight), (*hwa:sh* - quarrel), (*hams* - whisper), (*zʕa:g* - shouting), (*izʕa:j* - noise) (*Sajah* - noise).

(27) *So:t'ha mo wa:DHiH*
Her voice is not clear.

(28) *tismiʕi:n Sra:kh*
Do you hear a scream?

2- Animal sounds, for instance: *nbaH* (dog's barking), *SyaH* (rooster's crow)

(29) nba:H ilkalb
Dog's barking

Perception-related nouns are followed by adjectives that indicate:

1- Qualities of sound: Descriptive adjectives for sound quality include: (*ʕa:li*- loud), (*wa:Ti* - low), (*mabHu:H* - hoarse) (*wa:DHiH* - clear), *(ha:di* - calm). Touch-related adjectives are also used to describe sounds such as (*na:ʕim* - soft), (*khashin* - rough).

(30) So:tah mabHu:H
He has a hoarse voice.

2- Personal evaluations of sound may include (*Hilw* – sweet (*lit*) -nice), (*she:n* – ugly (*lit*) - bad), (*ghari:b* - strange), (*ʕa:di* - ordinary),

(30) So:t ilmoghani Hilw
The singer's voice is sweet.

(c). Extended Meanings of the Sense of Sound

The sense of hearing can also metaphorically extend to meanings such as disobedience, misunderstanding, and ignoring.

(31) ma yismaʕ *i*lkala:m
He does not hear the talk (literal)

He is disobedient
(32) simaʕt wish agul
Did you hear what I said? (literal)
Do you understand what I have said?

E. The Sense of Sight

(a). Perception Verbs

There are several verbs that denote the sense of sight such as *sha:f*, *limaH*, *na:DHar*, and *Ta:laʕ*. The verbs *na:DHar*, and *Ta:laʕ* are activity verbs that mean both (to watch), and (to look at). They are done with the intention of the perceiver. They are followed by the object of perception.

(33) *yna:DHir ilba:b.*
He is looking at the door.

sha:f and *limaH* which mean (to see) and (to glimpse) respectively, are experience verbs that are done without any control from the perceiver. The grammatical subject is the perceiver and the grammatical object is the object of perception.

(34) *shiftiha?*
Did you see her?

(b). Perception-Related Nouns

The nouns of visual modality are *sho:f, sho:fah, naDHrah, manDHar* and *shakil.* Words that collocate with sight lexicon are related to appearance and physical properties such as size, shape, distance, color, beauty, clarity, etc. In addition, evaluative adjectives can be used to denote visual modality.

(35) *shaklik Hilw ilyo:m*
You look pretty today

(c). Extended Meanings of the Sense of Sight

Visual modality can metaphorically denote cognition, opinion, understanding, arrogance, and past experiences.

(36) illy tshu:f
Whatever you see (literal)
Whatever you think
(37) shift ilwe:l
I saw the horror (literal)
I went through a horrible experience

V. Discussion

Sensory lexicon in Najdi Arabic consists of verbs of perceptions, sensory nouns and adjectives. Verbs of perception found in Najdi Arabic are experiencer-based. Only olfaction has a phenomenon-based copulative verb. Sensory nouns are limited in number; hence, Najdi speakers compensate for this by using several constructions. Sense modalities are encoded through abstract terms, evaluative words, mainly adjectives, and source-based terms; i.e. nouns (Martina, 2022; Majid & Burenhult, 2014). Evaluative expressions are divided into objective and subjective evaluation. Sensory adjectives denoting intrinsic properties of sense modalities are variable in Najdi Arabic. Vision, taste, hearing, and touch modalities are rich in abstract terms denoting intrinsic properties of sense modalities (Winter, 2019). In addition, sounds are seen as measurable object that can be raised and lowered. With regards to synesthesia, some vision and taste adjectives are used in other modalities for subjective evaluation. *Hilw* (sweet) *ze:n* (pretty) and *she:n* (ugly) are vision-related and taste-related adjectives that are mapped to other modalities to indicate pleasantness and unpleasantness. They are extended to mean “good” and “bad”. Sound modality uses touch-related terms to describe sounds. Extended meanings of verbs of perception in Najdi Arabic such as cognition, understanding, anticipation, disobedience, and past experiences are shared with other languages (Ibarretxe-Antunanu, 1999; Sweetser, 1990; Evans & Wilkins, 2000; Vanhove, 2008; San Roque et al., 2018; Proos, 2020).

VI. Conclusion

Sensory lexicon of Najdi Arabic encompasses perception verbs, sensory nouns, and adjectives. The perception verbs in Najdi Arabic are mainly experiencer-based, as olfaction is the only sense that has a phenomenon-based copulative verb. Sensory nouns are relatively few, prompting speakers to use various constructions to express sensory experiences. The encoding of sense modalities is achieved through abstract terms, evaluative adjectives, and source-based nouns. Evaluative expressions are categorized into objective and subjective evaluations. Sensory adjectives, especially those describing intrinsic properties, are variable in Najdi Arabic, with vision, taste, sound, and touch having rich abstract terms. Some vision and taste adjectives are used in other sensory modalities to express subjective evaluations. Additionally, touch-related terms are employed to describe sounds. Finally, the extended meanings of perception verbs in Najdi Arabic,

covering areas like cognition, understanding, anticipation, disobedience, and past experiences, align with similar uses in other languages.

APPENDIX TRANSLITERATION TABLE

Arabic script	Phonetic symbol	Arabic script	Phonetic symbol
Consonants		ع	ʕ
أ	ʔ	غ	gh
ب	b	ف	f
ت	t	ق	g
ث	th	ك	k
ج	j	ل	l
ح	H	م	m
خ	kh	ن	n
د	d	هـ	h
ذ	dh	و	w
ر	r	ي	y
ز	z	**Vowels**	
س	s	ا	a:
ش	sh	ي	i: e:
ص	S	و	u: o:
ض	D	ـَ	a
ط	T	ـِ	i
ظ	DH	ـُ	u

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