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# Standard Guide for Two Sensory Descriptive Analysis Approaches for Skin Creams and Lotions<sup>1</sup>

This standard is issued under the fixed designation E1490; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

## 1. Scope

1.1 The objective of this guide is to provide procedures for two different descriptive analysis approaches that may be used to qualitatively describe the sensory attributes of skin creams and lotions and quantitatively measure their intensity, similarities, and differences over time. Descriptive analysis can be used to define the sensory experience of skin care products that can then be used to provide direction in product formulation, competitive assessment, ingredient substitutions, research guidance, and advertising claim substantiation.

1.2 Guidelines are provided to assist the reader in determining which approach best meets their research objectives, either the (1) technical assessor or (2) consumer behavior approach to language development and evaluation.

1.3 Guidelines are provided for the selection and training of assessors, defining sensory attributes, measuring intensities on rating scales, developing procedures for the manipulation of the product alone and the product on the skin, product handling, and evaluation of skin condition before testing.

1.4 *Units*—The values stated in inch-pound units are to be regarded as the standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

1.5 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.6 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

<sup>1</sup> This guide is under the jurisdiction of ASTM Committee E18 on Sensory Evaluation and is the direct responsibility of Subcommittee E18.07 on Personal Care and Household Evaluation.

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## 2. Referenced Documents

2.1 *ASTM Standards*:<sup>2</sup>

E253 Terminology Relating to Sensory Evaluation of Materials and Products

MNL 13 Manual on Descriptive Analysis Testing for Sensory Evaluation

MNL 26 Sensory Testing Methods: Second Edition

## 3. Terminology

3.1 Terms used in this guide are in accordance with Terminology E253.

3.2 *Definitions*:

3.2.1 *application, n*—process of applying the skin care product.

3.2.2 *delivery, n*—stage during which the product is discharged onto the finger(s) or skin.

3.2.3 *panel leader/moderator, n*—person who is responsible for conducting descriptive panels, protocols, and panel maintenance.

3.2.4 *pick-up, n*—stage during which the product is manipulated between the fingers, as it might be after the product is dispensed onto the finger or lifted from a jar.

3.2.5 *reference anchors, n*—products that are used to define intensities of a specific attribute.

3.2.6 *rub-out, n*—stage during which the product is rubbed onto the skin.

## 4. Summary of Guide

4.1 *Overview*—This guide describes two approaches to the descriptive analysis of skin care products; technical assessor and consumer behavior approaches. The appropriate approaches for identifying, selecting, and training of assessors to evaluate the intensity and duration of sensory characteristics for skin care products are discussed. See Table 1.

4.1.1 *Technical Assessor Approach*—The technical assessor approach for descriptive analysis is based in the training of

<sup>2</sup> For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

**TABLE 1 Overview of Technical Assessor and Consumer Behavior Approaches**

	Technical Assessor Approach	Consumer Behavior Approach
Target panel size	Ten to fifteen assessors	Twelve to fifteen assessors
Pre-recruiting and screening	Up to 60 candidates are recruited from the local community or internal company resources, screened and selected based on sensory acuity, ability to articulate, availability and long term interest (see Figs. 1-16).	Approximately 30 candidates who are likers and users of the product category are recruited, screened, and selected for their sensory acuity and articulation ability, in addition to availability.
Sensory acuity screening	Initial screening will include as many as 10 initial tests and a personal interview (see Figs. 1-16).	Up to 30 trials; repeated measurement; discrimination method, tests represent differences expected in product set and category of interest.
Panel leader/Panel moderator	Qualified panel leader serves as trainer and teaches the attributes, reviews the scales and provides continuous training for the panel.	A trained moderator is the group discussion facilitator. The moderator provides the schedule of activities and works with the panel to help them develop the common vocabulary to describe the products of interest.
Panel training	Three steps: Initial—10 to 20 hours of training in a controlled sensory environment providing an introduction to scaling and sensory evaluation techniques. Secondary—50 to 90 hours practice. Final—Validation on skills for confirmation of performance and readiness for data collection.	8 to 12 hours of group discussions; iterative process; each session builds on previous sessions to develop a comprehensive language; some activities may be in home or extended use. After initial training and pilot testing, remedial training sessions may be scheduled.
Product application	Assessors are presented with standardized lexicon and references for attribute understanding (see Tables 2-5). For skinfeel, assessors' test sites are uniform and controlled to restrict variability and encourage panel consistency.	Evaluation procedures are typical for the category of interest; face lotions and creams will be placed on the face, hand lotions on the hands, body lotions applied more broadly, and so forth. Procedures follow intended consumer usage, most typical for product of interest.
Sensory modalities	Lexicons are used to address the client modalities of interest, focusing on appearance and texture or aroma, or both, of the products and test sites before, during, and post-usage.	Language is developed to capture all sensory modalities that are part of the consumer experience including visual, fragrance, and skinfeel, before, during, and after usage.
Technique	Standardized protocols are provided for the evaluation of products.	Individual procedures are developed by the panel and then standardized. Evaluation procedures are modeled after typical consumer usage behavior for that category.
Language development	Standardized lexicons are used as a core with supplementation if needed to address objectives; typical to have 20+ attributes with multiple evaluations of some attributes across the product use experience.	Comprehensive language, not unusual to have 30 to 40 or more sensory attributes to fully describe perceptions before, during, and after usage.
Data collection	Two replications are typical for skin feel evaluations; fragrance evaluation can be performed using consensus evaluation or with replication.	A minimum of three replications are recommended.
Data analysis	Analysis of Variance	Analysis of Variance
Panel performance measures	Inclusive of data review is assessment of overall panel and individual panelist performance. Statistical analysis allows ongoing monitoring of panel and panelist accuracy (when a blind control is included in the test set), ability to discriminate and consistency/ability to replicate judgments.	This method provides for statistical analysis of panel performance including individual assessor performance by attribute, replication, and overall differences observed relative to the panel as a whole. The analysis then focuses on perceived product differences.
Reporting	Charts, histograms, spider and other plots	Spider or radar plots, charts, and means tables
Usage and application	This approach provides research and product development, operations, quality assurance and marketing personnel with documentation of the product's sensory properties. Study output can be used alone or in conjunction with affective consumer methods. When used alone, data provides product and attribute understanding for single or multiple products and can be directly compared within and across studies (shelf life, development, market comparisons, and competitive category assessment). When used in conjunction with affective responses, correlations and multivariate statistics are used to interpret and extrapolate consumer affective responses and describe the relationship between consumer liking, language, behavior and/or understanding and product attributes. Attributes that influence consumer acceptance of products can be identified and sensory characteristics of ideal products determined.	This approach can be used for a wide variety of purposes, including understanding words consumers use to differentiate products, mapping product similarities and differences, ingredient substitution, new product development, competitive assessments, and advertising claim substantiation, among other uses. When correlated with consumer affective measures, the data can be used to determine key drivers that impact consumer choice behavior and preference segmentation. Developers can use the information to provide products that target specific consumer benefits and needs, and marketing can use the language and sensory properties to help communicate said benefits.

assessors on lexicon(s) and intensity references to create a panel that performs as a calibrated human instrument. This method uses a trained panel using descriptors that focus on appearance and tactile qualities of products. Additionally, evaluation of product fragrance can be performed using either the same panel or a separate panel. In both cases, the panel performing the evaluations is trained using fragrance descriptors and references for fragrance evaluation. Participants in these panels have been screened to exclude preexisting conditions or health issues (for tactile evaluations to exclude candidates with eczema, allergies, and hypersensitivity; for fragrance evaluations to exclude candidates with specific anosmias, conditions affecting the sense of smell, allergies, or hypersensitivities to fragrances). The screening process disqualifies assessors with personal habits that would impair or prevent their ability to evaluate a product (for example, activities that could lead to heavy callusing of the fingertips). Screened and selected assessors receive 70 to 100 h of training per sensory modality using intensity references. Intensity reference scales include a wide assortment of products within a category. Products are tested at different stages including before application; during application on specific predetermined sites within specific measured areas; and after application. The intensity of attributes is measured using a predetermined scale (for example, 10, 15, 100 point scales, and so forth). Guidelines (protocols) are provided for all facets of evaluation and include the manipulation of the product alone and on the area on which it is to be tested. Continuous repetition of exposure to scales and evaluation techniques provides understanding of the attributes, scaling for intensities, and use of protocols. Assessor performance is tested through validation exercises before participating in any formal studies. Once the panel is validated, it is ready to evaluate products. The data gathered are analyzed statistically, which allows for differentiation of products both qualitatively (presence of sensory features in some products and not others) and quantitatively (differentiation in level or intensity of attributes). Data gathered provide specific guidelines for those seeking to identify sensory properties perceived in a single product or in a given set of products. The panel is monitored for performance and periodic training and recalibration occur as necessary. Assessors are often trained to evaluate multiple product types.

**4.1.2 Consumer Behavior Approach**—The consumer behavior approach uses the panel as the instrument and acknowledges that there are inherent differences in perception based on behavioral and genetic differences at the receptor level. This approach uses consumers (assessors) who are current users and likers of the product category of interest. Selected assessors are screened for their sensory acuity and articulation ability, along with their willingness to participate on a panel. Twelve of the most sensitive assessors are selected for the descriptive analysis panel. Under the guidance of a qualified panel moderator, selected assessors describe their sensory perceptions of the product(s) of interest using a common everyday descriptive language. Qualitative references are used as necessary to assist with concept alignment and clarification of definitions of terms. Products are evaluated following typical usage behavior expected for that product, for example, hand lotions would be

applied to the hands, body lotions applied more broadly, face creams on the face, and so forth. The protocols and evaluation procedures are developed by the panel in conjunction with the qualified panel moderator. Once a common language is agreed upon by the panel as a group, assessors rate their individual perceptions of each product in the array on an unstructured 6 in. (15 cm) graphic rating scale, one at a time, using at least three repeated measures (replications). The data are analyzed statistically to determine reliability and validity of the results. The analysis includes individual assessor performance, performance as a group, and analyses to determine similarities and differences among products for each sensory attribute (before, during, and after usage). This approach requires about four weeks from start to finish to recruit, screen, train, and evaluate an array of products. Subsequent panel and language development time can be reduced once the evaluation techniques are clearly understood and an initial language has been developed.

## 5. Significance and Use

5.1 The procedures recommended in this guide can be used to assess the sensory characteristics before, during, and after usage of skin care products.

5.2 This guide is applicable to product categories that include skin lotions and creams, facial moisturizers, hand lotions and creams, anti-aging lotions and creams, suntan lotions, personal repellents, and other skin care products.

5.3 Procedures of the type described herein may be used to communicate perceived sensory properties within and between manufacturers and to the consumer through the media. These guidelines are suggested to meet the need for ascertaining the performance of experimental and commercial products.

5.4 These procedures are to be used by assessors who are screened for sensory acuity, trained to use their senses to evaluate products, and in the procedures outlined by the panel method of choice, either technical assessor or consumer behavioral approach.

5.5 This guide provides suggested procedures and is not meant to exclude alternate procedures that may be effective in training skinfeel panels and providing sensory evaluation descriptions.

## 6. Panel Selection and Training

6.1 *Objective*—To select and train a panel of 10 to 15 assessors to evaluate sensory properties before, during, and after usage of skin lotions and creams using descriptive analysis methods that quantify sensory attributes over time.

### 6.2 Panel Selection:

6.2.1 Assessors are recruited from within a company or the local community. The choice to use employees allows a company to have the assessors on site and to keep proprietary information confidential. The use of local community residents provides a smaller risk to assessor attrition both on a daily basis and long term.

6.2.2 A large group of candidates are recruited from the local community by contacting community groups, posting on bulletin boards, websites, placing newspaper ads, or other such ways to communicate. Candidates from within the company

are contacted by interoffice memo, e-mail, company newsletter, or notices posted on regular and electronic bulletin boards. Before the prescreening questionnaire, candidates should be informed of the time commitment for training, potential duration of the panel, use of the panel, and expectation of each assessor relative to the responsibilities of the panel. The prescreening questionnaire is recommended for determining current product usage, skin type, and documentation of potential causes of limited perception, availability, interest, and candidates' ability to articulate perceptions.

6.3 *Skin Types*—Skin types, skin condition, and age may be considered when recruiting assessors for a skincare product panel. This may be important because skin care products are frequently formulated to address the characteristics of a specific skin type, and assessors may generate varying product descriptions of particular attributes based on skin-type differences.

6.4 Since the technical assessor and consumer behavior methods have different methods for assessor screening, selection, and language development, the next sections of this guide will outline the technical assessor approach and the consumer behavior approach in detail.

## TECHNICAL ASSESSOR APPROACH

### 7. Project Scope

7.1 Before screening assessors, the scope of the panel evaluations needs to be determined. Based on needs and strategic planning, it is imperative to decide whether the newly developed panel(s) will perform tactile and visual evaluations only, fragrance evaluations only, or both.

### 8. Equipment

8.1 The following equipment may be used during the evaluation process.

8.1.1 *Template*—Used to outline the 2-in. (51-mm) diameter circles on the forearm. It assures that consistent, measured areas are delineated for product application and evaluation (for example, a flexible plastic material with 2-in. (51-mm) diameter circles cut out for outlining with an appropriate marker).

8.1.2 *Light Source/Viewing Conditions*—A consistent light source for each assessor is recommended for use during the evaluation of shine. The type of light source will depend on the specific nature of the product being evaluated. It is important that all assessors receive the same amount of light on the arms and the same angle of light and that the distance from the test site and light be the same for each assessor (for example, high-intensity desk lamps).

- 8.1.3 *Skin Thermometer*.<sup>3</sup>
- 8.1.4 *Stopwatch*.
- 8.1.5 *Repeater Pipette*.
- 8.1.6 *Metronome*.
- 8.1.7 *Syringe*.

<sup>3</sup> Two telethermometers that would satisfy the guidelines identified in this guide are Telethermometer Model 44TA, marketed by YSI (Yellow Springs Instrument Company, Inc.), Yellow Springs, OH or Digital Thermometer Model No. 5650 from Markson Science, Inc., Del Mar, CA.

- 8.1.8 *Petri Dishes*.
- 8.1.9 *Weigh Boats*.
- 8.1.10 *Hygrometer*.

### 9. Panel Recruitment and Qualifications

9.1 For a panel of 10 to 15 assessors, up to 60 candidates are initially selected based on a prescreening questionnaire to participate in further screening to include acuity screening, rating/ranking tests, and a personal interview. The prescreening questionnaire intent is to gather personal information including availability, health, perception issues specific to the sensory modality for which the panel is being trained, and preexisting knowledge and articulation for the sensory modality of interest. Fig. 1 and Fig. 2 can be used for prescreening a tactile panel, Figs. 3-5 for prescreening a fragrance panel. Prescreening includes administering a scaling questionnaire to evaluate the candidate's ability to learn scaling.

9.2 *Acuity Screening and Rating/Ranking Tests*—Candidates meeting the prescreening criteria are invited to an onsite session for assessment of sensory abilities. Candidates participate in three or more exercises related to comprehension of sensory properties and scaling. Acuity screening tests aim to demonstrate candidates' ability to detect and describe characteristics present in creams and lotions as well as detect and describe intensity differences in these characteristics among products. Rating/ranking tests aim to assess the candidates' ability to rate products and to record differences.

9.2.1 *Acuity Screening and Rating/Ranking Tests for Appearance and Tactile Evaluation*:

9.2.1.1 Candidates are asked to rate the intensity of skin attributes for samples chosen specifically to represent the range for the attributes tested. It is recommended that one attribute be chosen from each evaluation category: appearance (for example, integrity of shape), pick-up (for example, firmness or stickiness), rub-out (for example, ease to spread or thickness), and afterfeel (for example, greasiness or amount of residue).

9.2.1.2 Test products are delivered in a controlled way on the test site, such as the back of hand, fingertips or 2-in. (51-mm) diameter circles on the volar forearm. For example, for rub-out and afterfeel attributes, the three test products are applied in premeasured amounts to three 2-in. (51-mm) circles on each arm. Candidates can use one arm for the rub-out attribute evaluation and the other arm for the afterfeel attribute evaluation to avoid contamination of test sites. Candidates should have at least two thirds of the total products tested rated properly for three of the four attributes to qualify as having high sensory acuity. Each attribute used should be defined on the screening ballot. (See Fig. 6).

9.2.2 *Acuity Screening and Ranking/Rating Tests for Fragrance Evaluation*—Candidates are first presented with a series of tests that might include 10 to 15 fragrances such as peppermint oil, cassia oil, triplal, and eugenol to which the candidate is asked to describe the fragrance by common name or association. Other tests may include fragrance matching, ranking of a specific stimuli (for example, spruce oil), and describing the fragrance/aroma characteristics of lotions directly from a container or after rubbing on the skin.



Prescreening Questionnaire for a Skinfeel Panel	Prescreening Questionnaire for a Skinfeel Panel (Answer Key)
<b>History</b>	<b>History</b>
Name: _____	Name: _____
Address: _____	Address: _____
Phone (home and business): _____	Phone (home and business): _____
From what group or organization did you hear about this program? _____	From what group or organization did you hear about this program? _____
<b>Time</b>	<b>Time</b>
1. Are you currently employed outside the home? _____	1. Are you currently employed outside the home? <u>No/Part-Time</u>
2. Are there any weekdays (M–F) that you will not be available on a regular basis? _____	2. Are there any weekdays (M–F) that you will not be available on a regular basis? <u>Never/Occasionally</u>
3. How many days/weeks of vacation or certain holidays do you plan to take? _____	3. How many days/weeks of vacation or certain holidays do you plan to take? <u>None/2 weeks per year</u>
<b>Health</b>	<b>Health</b>
1. Do you have any of the following?	1. Do you have any of the following?
Central nervous system disorder _____	Central nervous system disorder <u>No</u>
Unusually cold or warm hands _____	Unusually cold or warm hands <u>No</u>
Skin rashes _____	Skin rashes <u>No</u>
Calluses on hands/fingers _____	Calluses on hands/fingers <u>No</u>
Hypersensitive skin _____	Hypersensitive skin <u>No</u>
Tingling in the fingers _____	Tingling in the fingers <u>No</u>
2. Do you take any medications which affect your senses, especially touch? _____	2. Do you take any medications which affect your senses, especially touch? <u>No</u>
3. Have you ever had an allergic or adverse reaction to any lotion, fragrance or cream? _____ If yes, please describe _____.	3. Have you ever had an allergic or adverse reaction to any lotion, fragrance or cream? <u>No/Occasionally</u> If yes, please describe <u>Dependent on product and type of reaction</u> .
<b>General</b>	<b>General</b>
1. Is your sense of touch: (check one) Worse than average _____ Average _____ Better than average _____	1. Is your sense of touch: (check one). Worse than average _____ Average _____ <i>Dependent on ability</i> Better than average _____ <i>versus capacity</i>
2. Does anyone in your immediate family or someone with whom you have close association work for a skin care product company? _____	2. Does anyone in your immediate family or someone with whom you have close association work for a skin care product company? <u>No (if conflict of interest exists, position at company will be determined appropriate/inappropriate on an individual basis.)</u>
3. Does anyone in your immediate family or someone with whom you have close association work for a marketing research or advertising company? _____	3. Does anyone in your immediate family or someone with whom you have close association work for a marketing research or advertising company? <u>No (if conflict of interest exists, position at company will be determined appropriate/inappropriate on an individual basis.)</u>

FIG. 1 Prescreening Questionnaire for a Technical Assessor Panel

9.3 Personal Interview:

9.3.1 Each candidate is interviewed by the panel administrator or trainer to determine attitude; interest; ability to learn and work in a group dynamics situation, and availability for orientation, practice, and panel sessions on a routine basis.

9.3.2 Among the candidates screened, 10 to 15 assessors are selected for training based on a series of exercises and criteria (see Figs. 1-9), as follows:

9.3.2.1 Availability for the complete orientation and 80 to 100 % of the practice sessions during training;

9.3.2.2 No health-related problems—skin irritations, central nervous system disorders, or medications that interfere with the central nervous system and could reduce skin and muscle sensitivity. For fragrance evaluations, the candidates should have no chronic colds or sinus infections, no hypersensitivity and allergies to fragrances, lotions, creams, soaps, or other topical products, and no previous history of allergy to lotions, creams, soaps, or other topical products;

9.3.2.3 Correct and comprehensive descriptive answers to 75 % or more of the open-ended tactile or fragrance questions or both in the prescreening questionnaire;

9.3.2.4 Correct ratings of 80 % or more of the scaling exercise in the prescreening questionnaire;

9.3.2.5 Correct ratings for two thirds of the products for three of the four attribute scales for appearance and tactile evaluation and/or correct description of fragrances, fragrance matching, and ranking of fragrance intensities for at least 80 % of the tests; and

9.3.2.6 Demonstration of good verbal skills, a high interest in descriptive and group dynamics tasks, and a cooperative yet confident personality demonstrated in the interview.

10. Panel Training, Orientation, and Practice

10.1 Panel Orientation and Training:

10.1.1 To begin training of the 10 to 15 selected assessors, the panel trainer shall orient them first to the general concepts,

Prescreening Touch Quiz – Technical Expert Panel	Prescreening Touch Quiz – Technical Expert Panel
<p>PLEASE ANSWER EACH QUESTION IN YOUR OWN WORDS.</p> <ol style="list-style-type: none"> <li>1. What tactile characteristics of a lotion would make you think it is rich? _____</li> <li>2. What is thicker, an oily or greasy film? _____</li> <li>3. When you rub an oily film on your skin, how do your fingers move? Slip _____ or Drag _____ (check one)</li> <li>4. How might the appearance of a hand crème influence your perception of the feel of it? _____</li> <li>5. Name some things that are sticky? _____</li> <li>6. When your skin feels moist, what other words or properties could describe it? _____</li> <li>7. Name some things that are rough: _____ What makes them rough? _____</li> <li>8. Briefly, how would you define absorbent in a lotion? _____</li> <li>9. What properties make a deodorant feel sticky? _____</li> </ol>	<p style="text-align: center;"><b>(Answer Key)</b></p> <p>PLEASE ANSWER EACH QUESTION IN YOUR OWN WORDS.</p> <ol style="list-style-type: none"> <li>1. What tactile characteristics of a lotion would make you think it is rich? <u>thick, viscous, creamy, firm, smooth</u></li> <li>2. What is thicker, an oily or greasy film? <u>greasy film</u></li> <li>3. When you rub an oily film on your skin, how do your fingers move? Slip <u>X</u> or Drag _____ (check one)</li> <li>4. How might the appearance of a hand crème influence your perception of the feel of it? <u>thicker lotion = richer, moisturizing; thinner lotion = oily</u></li> <li>5. Name some things that are sticky? <u>honey, jelly, syrup, Vaseline</u></li> <li>6. When your skin feels moist, what other words or properties could describe it? <u>dewy, wet, oily, sweaty, clammy, greasy, moisturized</u></li> <li>7. Name some things that are rough: <u>concrete, emery board, toast</u> What makes them rough? <u>particles, stiffness, dryness</u></li> <li>8. Briefly, how would you define absorbent in a lotion? <u>An absorbent lotion in not greasy or oily and goes into the skin quickly.</u></li> <li>9. What properties make a deodorant feel sticky? <u>sticks to the skin/fingers, too wet, too thick</u></li> </ol>

FIG. 2 Prescreening Touch Quiz—Technical Assessor Panel

such as the definition, components, and applications of descriptive analysis testing, focusing on the modalities of interest. This takes up to 2 h. It is recommended that for panel evaluating multiple modalities, training should focus on one modality at a time.

10.1.2 Assessors are introduced to the need for strictly controlled procedures for the manipulation and application of samples and the careful definition of each sensory attribute. This takes up to 2 h. (See Table 2 for procedures.)

10.1.3 Discussion and demonstration of each attribute are conducted for each stage: before application (appearance, pick-up, and/or fragrance), during application (rub-out or fragrance or both) and after-feel (skin feel or fragrance or both). This establishes the overall structure of the descriptive analysis of skincare properties. Assessors are encouraged to discuss each term, its definition, the protocol for evaluation, and the corresponding rating scale after they are demonstrated by the panel trainer. This takes 2 to 3 h (see Table 3).

10.1.4 For each attribute, the procedure, definition, and scale are discussed and demonstrated using three to five quantitative references that represent the full intensity range from none or extremely low to high. This training exercise takes 4 to 5 h (see Tables 2 and 3). References are selected to

demonstrate noticeable differences in perception. The scale intensity of each reference represents grand mean values from multiple panel evaluations. Commercially available products are used, with emphasis on including single ingredient products that are widely available over time, such as petrolatum, Johnson’s Baby Oil and aloe vera gel. Reference values are subject to change if manufacturers change the product or process, or if there is production variability. Reference products may be substituted if the original product is unavailable and are assigned scale values based on assessment against the other references for the attribute. Some practitioners choose to represent scale intensity values using a range, such as 15-20, while others use the single value approach shown in Table 3.

10.2 Panel Practice:

10.2.1 Several practice sessions totaling 20 to 24 h per sensory modality are held to review the orientation material. These include the following:

10.2.1.1 Review of the procedure, definition, and rating scale for each attribute.

10.2.1.2 Evaluation of products—these are evaluated independently with the scale references, as needed, and are reviewed with the group.

Prescreening Questionnaire for a Fragrance Panel	Prescreening Questionnaire for a Fragrance Panel (Answer Key)
<p><b>History</b> Name: _____ Address: _____ Phone (home and business): _____ From what group or organization did you hear about this program? _____</p> <p><b>Time</b> 1. Are you currently employed outside the home? _____ 2. Are there any weekdays (M–F) that you will not be available on a regular basis? _____ 3. How many days/weeks of vacation or certain holidays do you plan to take? _____</p> <p><b>Health</b> 1. Do you have any of the following? Nasal Disease _____ Hypoglycemia _____ Allergies _____ Frequent cold or sinus condition _____</p> <p>2. Do you take any medications which affect your senses, especially smell? _____</p> <p>3. Have you ever had an allergic or adverse reaction to any lotion, fragrance or cream? If yes, please describe _____.</p> <p><b>General</b> 1. Is your sense of smell: (check one) Worse than average _____ Average _____ Better than average _____</p> <p>2. Does anyone in your immediate family or someone with whom you have close association work for a skin care product company? _____</p> <p>3. Does anyone in your immediate family or someone with whom you have close association work for a marketing research or advertising company? _____</p>	<p><b>History</b> Name: _____ Address: _____ Phone (home and business): _____ From what group or organization did you hear about this program? _____</p> <p><b>Time</b> 1. Are you currently employed outside the home? <u>No/Part-Time</u> 2. Are there any weekdays (M–F) that you will not be available on a regular basis? <u>Never/Occasionally</u> 3. How many days/weeks of vacation or certain holidays do you plan to take? <u>None/2 weeks per year</u></p> <p><b>Health</b> 1. Do you have any of the following? Nasal Disease <u>No</u> Hypoglycemia <u>No</u> Allergies <u>No</u> Frequent cold or sinus conditions <u>No</u></p> <p>2. Do you take any medications which affect your senses, especially smell? <u>No</u></p> <p>3. Have you ever had an allergic or adverse reaction to any lotion, fragrance or cream? <u>No/Occasionally</u> If yes, please describe <u>Dependent on product and type of reaction</u>.</p> <p><b>General</b> 1. Is your sense of smell (check one). Worse than average _____ Average _____ <i>Dependent on ability versus capacity</i> Better than average _____</p> <p>2. Does anyone in your immediate family or someone with whom you have close association work for a skin care product company? <u>No (if conflict of interest exists, position at company will be determined appropriate/inappropriate on an individual basis.)</u></p> <p>3. Does anyone in your immediate family or someone with whom you have close association work for a marketing research or advertising company? <u>No (if conflict of interest exists, position at company will be determined appropriate/inappropriate on an individual basis.)</u></p>

FIG. 3 Prescreening Questionnaire for a Technical Assessor Panel

10.2.2 Five to six pairs of samples, with initial pairs quite different from each other, are evaluated on all attributes for all stages. For appearance/tactile panels, this includes appearance, pick-up, rub-out, and afterfeel. For fragrance panels, this may include product from container, in use, and/or after application at defined time points. This takes 10 to 12 h.

10.3 *Validation*—Any one of the following methods can be used for panel validation.

10.3.1 Choose three to four different products from the same product category (lotions, creams, gels, mousses, and so forth) that demonstrate significant differences on several attributes. When there is an established panel, the panel results from the recently trained panel are compared to the results of the same samples from the established panel. The recently trained panel should provide similar results in 80 % of all attributes.

10.3.2 Choose panel data across three to four different products from the results of the recently trained panel. Compare these data with consumer attribute data for those attributes

for which consumers have demonstrated understanding and an ability to differentiate among products. If the panel data has a high correlation with the previously validated consumer responses for similar attributes, the panel data can be considered valid.

NOTE 1—A lack of correlation may be a function of consumer terms that are not related to the panel attributes or are not understood by the consumers.

10.4 *Panel Monitoring for Skin Feel Evaluation*—Three different factors can be monitored when reviewing data from the panel and assessors.

10.4.1 A measure of the variability within the panel (that is, among panel members) can be determined with three replications of several samples for all attributes and all assessors. The mean value and standard deviation for each sample for each attribute is computed. The assessors and panel leader can then look at the mean value for each sample and attribute versus

Prescreening Fragrance Quiz – Technical Assessor Panel	Prescreening Fragrance Quiz – Technical Assessor Panel (Answer Key)
PLEASE ANSWER EACH QUESTION IN YOUR OWN WORDS.	PLEASE ANSWER EACH QUESTION IN YOUR OWN WORDS.
1. If a perfume is “floral” in type, what other words would you use to describe it? _____	1. If a perfume is “floral” in type, what other words would you use to describe it? Flowery, perfumey, sweet, fresh, woody, rose, lavender.
2. What are some products that have an herbal smell? _____	2. What are some products that have an herbal smell? Chamomile tea, verbena candle, minty toothpaste.
3. What are some products that have a sweet smell? _____	3. What are some products that have a sweet smell? Baby powder, vanilla.
4. What types of odors are associated with clean and fresh? _____	4. What types of odors are associated with clean and fresh? Spring-like and flowery, orange and lemony, citrusy.
5. How would you define the difference between fruity and lemony? _____	5. How would you define the difference between fruity and lemony? Fruity is sweeter, lemony is sharper, sour and citrusy.
6. Briefly, what words would you use to describe the difference between a feminine fragrance and a masculine fragrance? _____	6. Briefly, what words would you use to describe the difference between a feminine fragrance and a masculine fragrance? Feminine is light and fresh, often floral, and sweet; masculine is strong, rich, spicy and woody.
7. What are some of the words which would describe the smell of a hamper full of clothes? _____	7. What are some of the words which would describe the smell of a hamper full of clothes? Sour, mildewed, bad, strong, reminiscent of wet cats or dogs
8. Describe some of the noticeable smells in... A bakery _____ A liquid dish detergent _____ Bar soaps _____ A basement _____	8. Describe some of the noticeable smells in... A bakery: Caramelized yeasty warm bread A liquid dish detergent: Spring-like and floral and soapy Bar soaps: Soapy, sharp and perfumey A basement: musty, dusty, mildewed

FIG. 4 Prescreening Fragrance Quiz—Technical Assessor Panel

each assessor’s score. This permits the panel leader to determine whether one or more assessors are rating consistently higher or lower than the panel as a whole on one or more attributes. Review of the standard deviations across attributes demonstrates whether some assessors have standard deviations that are higher than most assessors and on which attributes. Large panel standard deviations indicate the need for a review of definitions, evaluation procedures, or reference standards for the attribute in question.

10.4.2 A measure of the repeatability of the panel as a whole can be monitored by analyzing three replications of the panel’s evaluation of two or three samples of the same product type. An analysis of variance will determine whether the panel scores are the same for the same sample across the replicates. This analysis should be conducted for each attribute.

10.4.3 Analysis of the data collected from three replicates of different samples (as used in 10.3.2) can provide information on judge-by-treatment interactions in the analysis of variance. A significant *F* value on any attribute indicates that one or more assessors are evaluating samples differently. Data for these attributes should be plotted to determine the assessors whose values are different from the panel as a whole.

10.4.4 *Ongoing Monitoring*—Every two to six months, repeat procedures (see 10.4).

## 11. Procedure

11.1 *Sample Preconditioning*—Samples should be preconditioned before conducting the descriptive evaluations. Preconditioning consists of storing the samples in an area with similar temperature and humidity conditions (see 11.5) until the samples equilibrate to those conditions.

11.2 *Skin Preconditioning*—For products evaluated on skin, skin should be preconditioned. The assessors should not apply lotions, creams, or any topical products to the volar forearms for approximately 4 h before an evaluation session. The test sites may be reused within 4 h if the sites are cleansed and dried thoroughly. However, possible product buildup or residual effect or both from prior treatments may affect the rating of subsequent treatments. This is especially true if the skin has been treated with antiperspirants or deodorants.

11.3 *Preparation of Test Sites*—Before product application, the assessors should cleanse and prepare the test areas.

11.3.1 The assessors may wash each forearm at the test facility under supervised conditions before the evaluation session, or they may wash at home before the evaluation session. Immediately following the wash, the arms should be











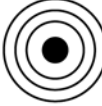

















Pre-Screening Scaling Exercise					Pre-Screening Scaling Exercise – Answer Key				
(This set of scaling exercises ought to be given with each of the prescreening questionnaires)									
<b>Instructions:</b> Mark on the line at the right to indicate the proportion of the area that is shaded.					<b>Instructions:</b> Mark on the line at the right to indicate the proportion of the area that is shaded.				
Examples		None	-----/-----	All	Examples		None	-----/-----	All
		None	---/-----	All			None	---/-----	All
		None	/-----	All			None	/-----	All
1.		None	-----/-----	All	1.		None	-----/-----	All
2.		None	-----/-----	All	2.		None	---/-----	All
3.		None	-----/-----	All	3.		None	---/-----	All
4.		None	-----/-----	All	4.		None	---/-----	All
5.		None	-----/-----	All	5.		None	-----/-----	All
6.		None	-----/-----	All	6.		None	---/-----	All
7.		None	-----/-----	All	7.		None	-----/-----	All
8.		None	-----/-----	All	8.		None	---/-----	All
9.		None	-----/-----	All	9.		None	-----/-----	All
10.		None	-----/-----	All	10.		None	-----/-----	All

FIG. 5 Pre-Screening Scaling Exercise—Technical Assessor Panel

<p style="text-align: center;"><b>Acuity Screening Scaling Exercise – Technical Expert Panel</b></p> <p style="text-align: center;"><b>Sample</b> _____ <b>Code</b> _____</p> <p style="text-align: center;"><b>Ballot</b> _____</p> <p><b>Name:</b> _____</p> <p><b>Date:</b> _____</p> <p><b>Directions:</b></p> <ul style="list-style-type: none"> <li>Place 1 drop of product _____ on forefinger tip of right hand.</li> <li>Compress the drop GENTLY between the forefinger and thumb.</li> <li>Estimate the AMOUNT of each attribute AS COMPARED TO MOST HAND LOTIONS.</li> </ul> <p>THICKNESS: <i>force to compress</i></p> <p> -----  None Extreme</p> <p>PEAKING: <i>amount the sample peaks (when fingers are pulled apart)</i></p> <p> -----  None Extreme</p> <p>WETNESS: <i>amount of wet/watery feel to the product during compression or rotation of fingers</i></p> <p> -----  None Extreme</p>	<p style="text-align: center;"><b>Acuity Screening Scaling Exercise – Technical Expert Panel</b></p> <p style="text-align: center;"><b>(Answer Key Template)</b></p> <p style="text-align: center;"><i><b>The answers for the acuity tests depend on the sample chosen.</b></i></p> <p style="text-align: center;"><b>Sample</b> _____ <b>Code</b> _____</p> <p style="text-align: center;"><b>Ballot</b> _____</p> <p><b>Name:</b> _____</p> <p><b>Date:</b> _____</p> <p><b>Directions:</b></p> <ul style="list-style-type: none"> <li>Place 1 drop of product _____ on forefinger tip of right hand.</li> <li>Compress the drop GENTLY between the forefinger and thumb.</li> <li>Estimate the AMOUNT of each attribute AS COMPARED TO MOST HAND LOTIONS.</li> </ul> <p>THICKNESS: <i>force to compress</i></p> <p> -----  None Extreme</p> <p>PEAKING: <i>amount the sample peaks (when fingers are pulled apart)</i></p> <p> -----  None Extreme</p> <p>WETNESS: <i>amount of wet/watery feel to the product during compression or rotation of fingers</i></p> <p> -----  None Extreme</p>
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**FIG. 6 Acuity Screening Scaling Exercise—Technical Assessor Panel**

rinsed thoroughly with tepid tap water and pat dried thoroughly with absorbent paper towels (non-fragranced, non-moisturized, and non-softened).

11.3.1.1 A recommended procedure for a supervised cleansing would include a 1-min wash with a mild soap (non-fragranced and non-moisturized) and a 15-min dry-out period.

11.3.2 Approximately 15 min after drying, the test sites (location for product application) should be marked on the forearms of each assessor. Using an appropriate skin marker (that is, eyebrow pencil or skin scribe), mark two 2-in. (51-mm) diameter circles on the inner aspect of the forearm. The circles should be located 2-in. (51-mm) above the wrist and 2-in. (51-mm) below the elbow.

11.4 *Skin Temperature Reading*—The skin temperature of the test sites may be measured 15 min after the wash procedure. During the 15-min wait, the assessors should be seated in the panel room.

11.4.1 The temperature of each site (2-in. [51-mm] circle) should be measured by placing the skin probe of the thermometer against the skin surface for approximately 1 min. Depending on the instrument used, the length of time per measurement may vary; however, the instrument should be used consistently among the assessors.

11.4.2 A record of the temperature readings should be placed in the study records. A history of skin temperature measurements may be used to correlate the effects of skin temperature with the rate of absorption, the within and between assessor variability, and other variables that may be influenced by skin temperature.

11.5 *Environmental Conditions*—The environmental conditions of the panel room should be controlled as much as possible.

11.5.1 For discussion and training, seating should be provided for the entire panel at a round table or in a table arrangement that facilitates group interaction. The assessors may sit at individual booths during the actual evaluation sessions.

11.5.2 All outside distractions and interruptions should be prohibited while the panel is in session.

11.5.3 The temperature and, if possible, relative humidity of the panel room should be maintained at a constant level. Comfortable levels should be established by the panel leader before the start of the session. The comfort level of the panel members should be taken into consideration.

11.5.3.1 Ambient temperature and humidity readings should be recorded before the start of the session and at approximately

**Directions:**

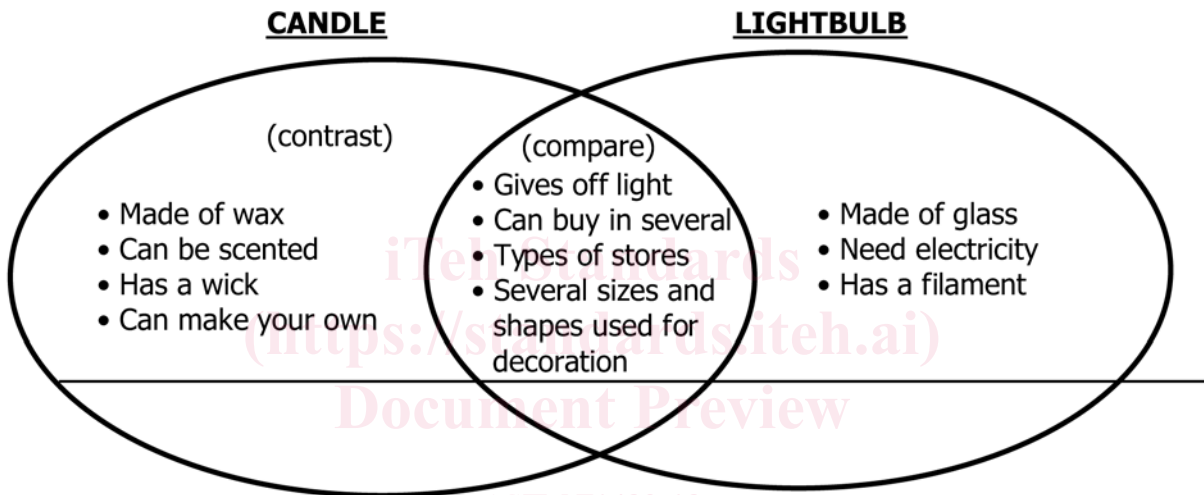
As you know, even though objects/products may be in the same category they are not exactly the same. In this exercise, you are going to be comparing the sensory characteristics (look, feel, aroma, etc.) of two related products.

First, see the example below. In this example, you can see how a candle and a light bulb are alike (compare) and different (contrast.)

After reviewing the example, please fill in the worksheet on the next page using the same criteria – what is alike (compare) and what it different (contrast) about the two products.

**Compare and Contrast Example**

In the areas below, listed are examples of how candles and light bulbs are different (the “contrast” areas) and how they are the same (the “compare” area).



**Compare and Contrast Exercise**

Please think about **facial moisturizer** and **body lotion**. How are they alike? How are they different? In the outer circles, please describe all the ways **facial moisturizer** and **body cream**/ list the attributes they share. You are not strictly limited to how the products feel on the skin, but please include some of those differences and similarities.

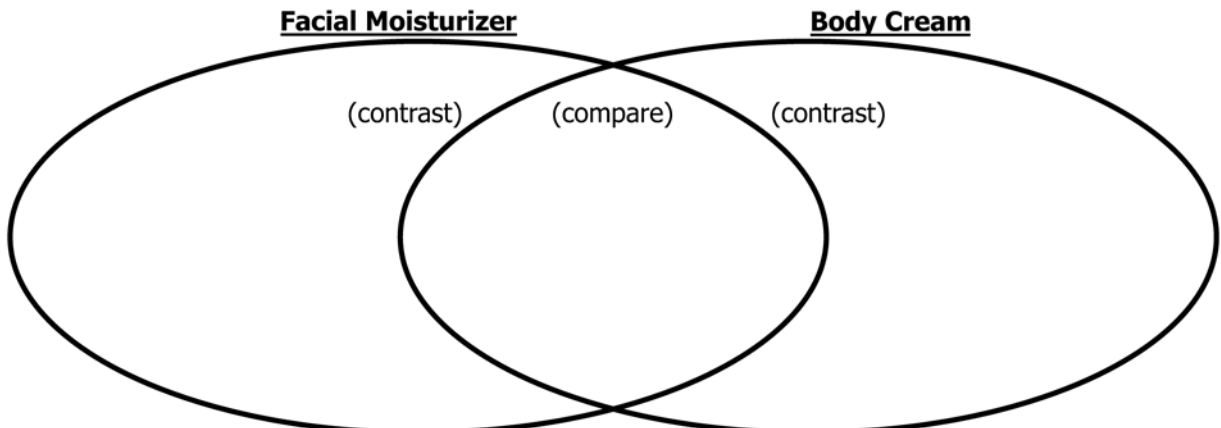


FIG. 7 Acuity Screening—Technical Assessor Compare and Contrast Exercise

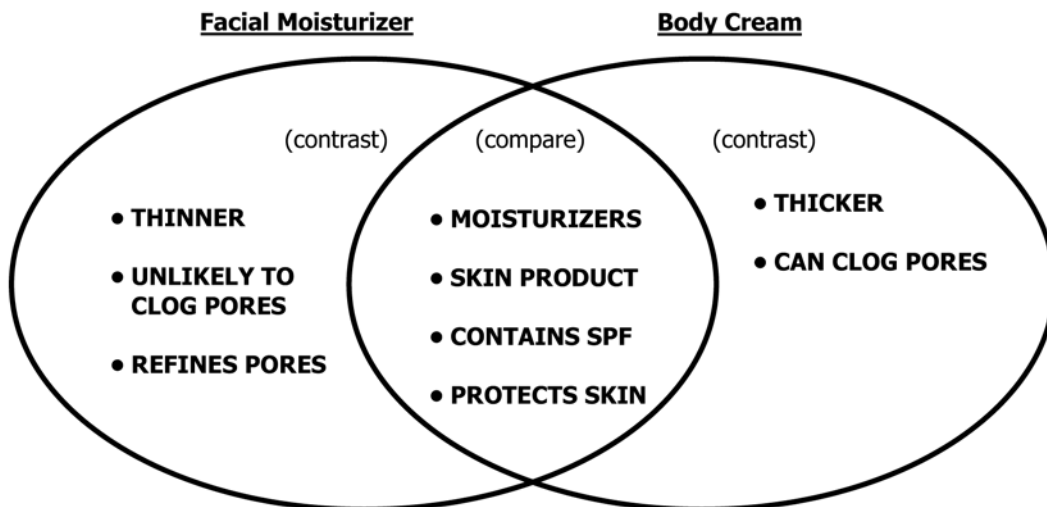


FIG. 8 Acuity Screening—Technical Assessor Compare and Contrast Exercise (Answer Key)

Interview Questionnaire - Technical Expert Panel	Interview Questionnaire - Technical Expert Panel (Answer Key Template)
Name: _____	Name: _____
Date: _____	Date: _____
1. Are you comfortable working in a group situation? _____	1. Are you comfortable working in a group situation? <i>Yes/think so</i>
2. How do you feel about voicing your opinion? _____	2. How do you feel about voicing your opinion? <i>I comfortable voicing my opinion. I have no problem.</i>
3. How do you feel about opinionated people? _____	3. How do you feel about opinionated people? <i>They do not bother me.</i>
4. How do you feel about committing your time to a training program? _____	4. How do you feel about committing your time to a training program? <i>It does not bother me. I am flexible.</i>
5. Are you interested in being an assessor? _____	5. Are you interested in being an assessor? <i>Yes.</i>
6. Do you have any questions for me? _____	6. Do you have any questions for me? _____
Comments: _____ _____ _____	Comments: _____ _____ _____
Accepted: YES NO	Accepted: YES NO

FIG. 9 Interview Questionnaire—Technical Assessor Panel

every hour interval throughout. A drastic change in room temperature or relative humidity (that is, 5°F (-15°C) or 8 % relative humidity or both) should be considered in the final interpretation of the data and noted in the final report. Imme-

diately following such a drop, skin temperature measurements should be retaken (see 11.4).

11.5.4 Room lighting should be consistent for each panel member and remain standard within a given study. Individual