



Establish Texture Reference Scales for Asian Countries

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Background

- Texture: the sensory properties that relate to the feel of a surface or product, or the impression created by a surface structure or general physical appearance of a surface.
- Highly related to quality
- No boundaries to product category
- Difficulties with consumer expression
- Field expansion

Background

- Original development of Texture reference scales:
  - Szczesniak et. al. 1963
- Major modification:
  - Alejandra M. Muñoz, Development and Application of Texture Reference Scales, 1986
- Most recent publication:
  - MEILGAARD, M., CIVILLE, G.V. and CARR, T. 2007. Sensory Evaluation Techniques Forth Edition. CRC Press, Boca Raton, FL.
- Bourne et. al. 1975
- Hough et. al. 1993

Objective

- To establish texture reference scales for common texture attributes specifically for the Asian countries of Thailand and South Korea.

Methodology

- Focus first on Thailand, then South Korea
- SAC Professional Descriptive Sensory Analysis Panelists
  - Panelists have more than 120 hours of descriptive training and average more than 2000 hours of testing experience
  - Highly trained on a wide variety of food and non-food products
  - Highly trained on all modalities
  - Generic scaling system: 15 point scale with 0.5 increments; attribute specific reference standards

Methodology

- 101 Shelf Stable Foods
  - Brought to KSU, Manhattan, KS from either Thailand or Korea or purchased from local international grocery stores
- Screened by 4 member professional descriptive panel plus researcher
- Each product screened for practicality of use as a reference standard

Methodology

- Those determined functional were evaluated for texture characteristics using reference standards pulled from literature
- All attributes were addressed during the screening
- Reference standards and intensities from literature were used for rating the new products

Results

- 48 products determined functional and consistent, were rated for intensity of texture characteristics using a consensus methodology
- Markets in both Thailand and Korea were reviewed for product availability
  - 16 of the 48 products found to be available in both Thailand and Korea
  - Emphasis placed on using these products since availability was determined
- Intensity scales were determined based on the intensities given during screening and product availability

Final review by screening panel

Texture Terms

- Viscosity
- Hardness
- Adhesiveness to Palate
- Fracturability
- Cohesiveness
- Denseness
- Wetness
- Adhesiveness to Lips
- Roughness
- Springiness
- Cohesiveness of Mass
- Moisture Absorption
- Adhesiveness to Teeth

MEILGAARD, M., CIVILLE, G.V. and CARR, T. 1999. Sensory Evaluation Techniques Third Edition. CRC Press, Boca Raton, FL.

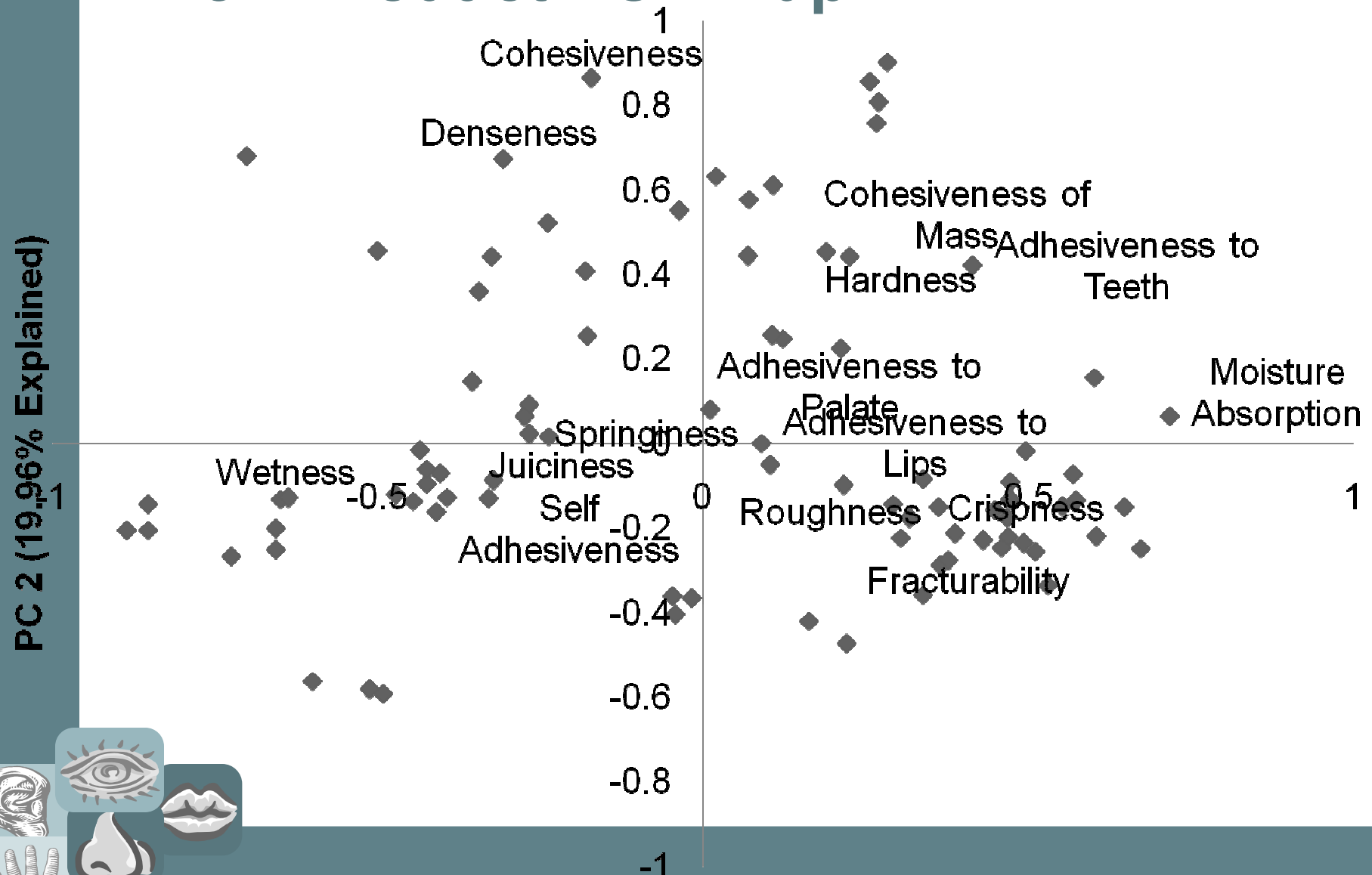
Texture Terms

- Self-Adhesiveness
  - Muñoz, A.M. 1986. Development and Application of Texture Reference Scales. J. Sensory Studies *1*, 55-83.
- Juiciness
  - Campbell, RE, Hunt, MC, Levis, P, and Chambers E IV. 2001. Dry-Aging Effects on Palatability of Beef Longissimus Muscle. J. Food. Sci. 66: 196-199.
  - Hongsoonern, P. and Chambers E IV. 2008. A lexicon for flavor and texture characteristics of fresh and processed tomatoes. J. Sensory Studies. 23: 583-599.
- Crispness
  - Vara-ubul S. et. al. 2006. Determination of the Sensory Characteristics of Rose Apples Cultivated in Thailand. J. Food Sci. 71: S547-S552

New Scale Foods

- Sticky Rice
- Hard Boiled Egg White
- Canned Rambutan
- Hanami Cracker
- Pringles
- Rice Cracker Wrapped in Seaweed
- Spam
- Mentos Candy
- Crispy Green Pea
- Ritz Cracker
- Pocky
- Ace Cracker
- Chewy Candy
- Cocktail Peanut
- Tuna Canned in Oil
- Hard Candy

New Product PCA Map



Validation 1

- Descriptive sensory texture evaluation of crackers using both reference scales to determine adequacy of newly developed scales
- 9 different crackers chosen
- 10 texture attributes determined relevant to this product category
  - Adhesiveness to Lips, Roughness, Hardness, Crispness, Fracturabiltiy, Cohesiveness, Denseness, Cohesiveness of Mass, Moisture Absorption, Adhesiveness to Teeth

Methodology

- 6 highly trained panelists from KSU SAC
  - Panelists had no involvement with reference material screening and or determination of texture intensities of new products
- Completely randomized design
- 3 replications per sample per scale type
- Scale usage randomized within session
- Data collected in Compusense
- Orientation to both reference scales and products within category but not to the specific samples evaluated

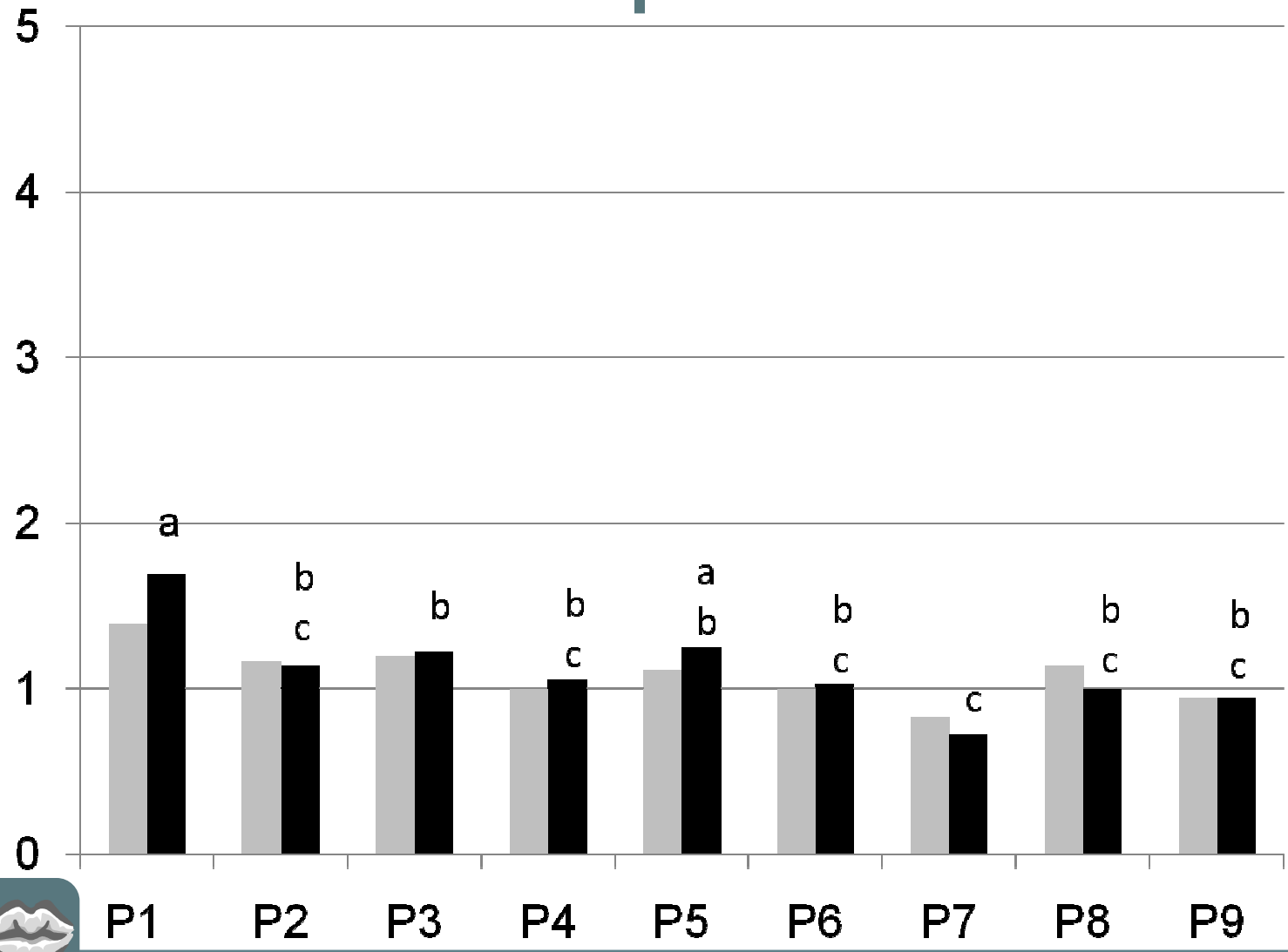
Results

- The following were reviewed to determine effectiveness of new scales:
- Overall trend of the mean intensity scores
- Significant discrimination
- Groupings of samples based on LSD separation
- Overall standard deviation for each attribute

Results

- Adhesiveness to Lips
- Roughness
- Cohesiveness
- Cohesiveness of Mass

Adhesiveness to lips



Existing

New

Adhesiveness to Lips

Current References	
Cherry Tomato (Uncooked, fresh, unpeeled, 1/2" slice)	0.0
Nougat (3 Muskateers, 1/2" cake, chocolate removed)	4.0
Breadstick (1/2 stick)	7.5
Pretzel Rod (1 piece)	10.0
Rice Krispies (1 tsp)	15.0

New References	
Hard Boiled egg White (1/2" piece)	0.0
Hanami Cracker (1 piece)	1.0
Ace Cracker (1 piece)	2.0
Pringle (1 piece)	3.5
Rice Cracker in Seaweed (1 piece)	10.0
Sticky Rice	15.0

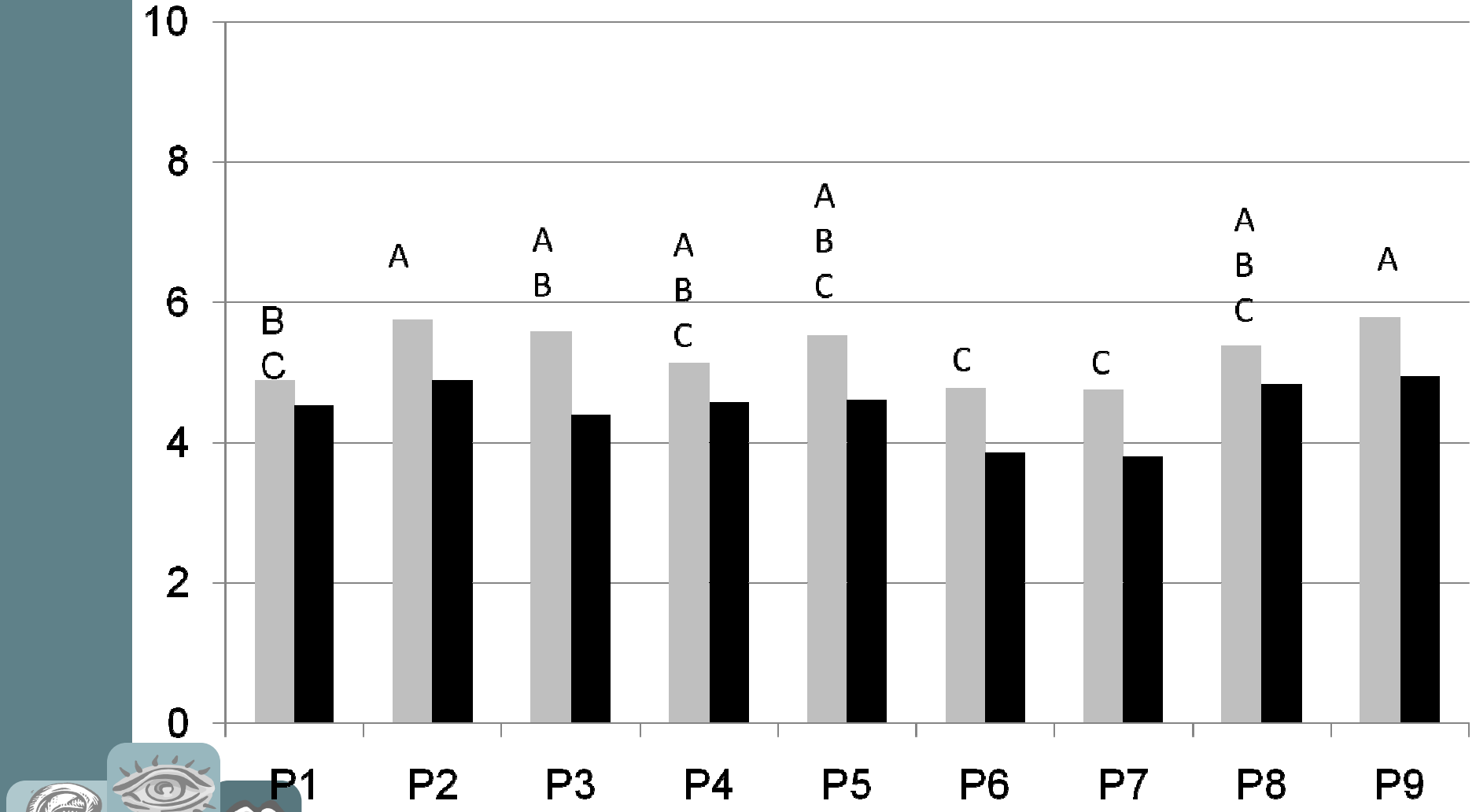
Technique

Take a sip of water then gently blot lips with napkin before evaluating. Hold sample near mouth; compress sample lightly between lips and release.

Definition

The degree to which the surface of the sample adheres to the lips. None -- Very

Roughness



Existing

New

Roughness

Current References	
Gelatin Dessert (2 Tbsp)	0.0
Orange Peel (1/2" piece)	5.0
Pringle (5 pieces)	8.0
Hard Granola Bar (1/2 bar)	12.0
Rye Wafer (1/2" square)	15.0

New References	
Pocky (1/2" piece)	0.0
Hard Boiled Egg White (1/2" piece)	0.0
Mentos (1 piece)	1.0
Ace Cracker (1 piece, top side)	3.0
Crispy Green Pea (1 piece)	5.0
Ritz Cracker (1 cracker, top side)	6.0
Pringle (1/2 chip)	8.0
Hanami Cracker (1/2 cracker)	10.5

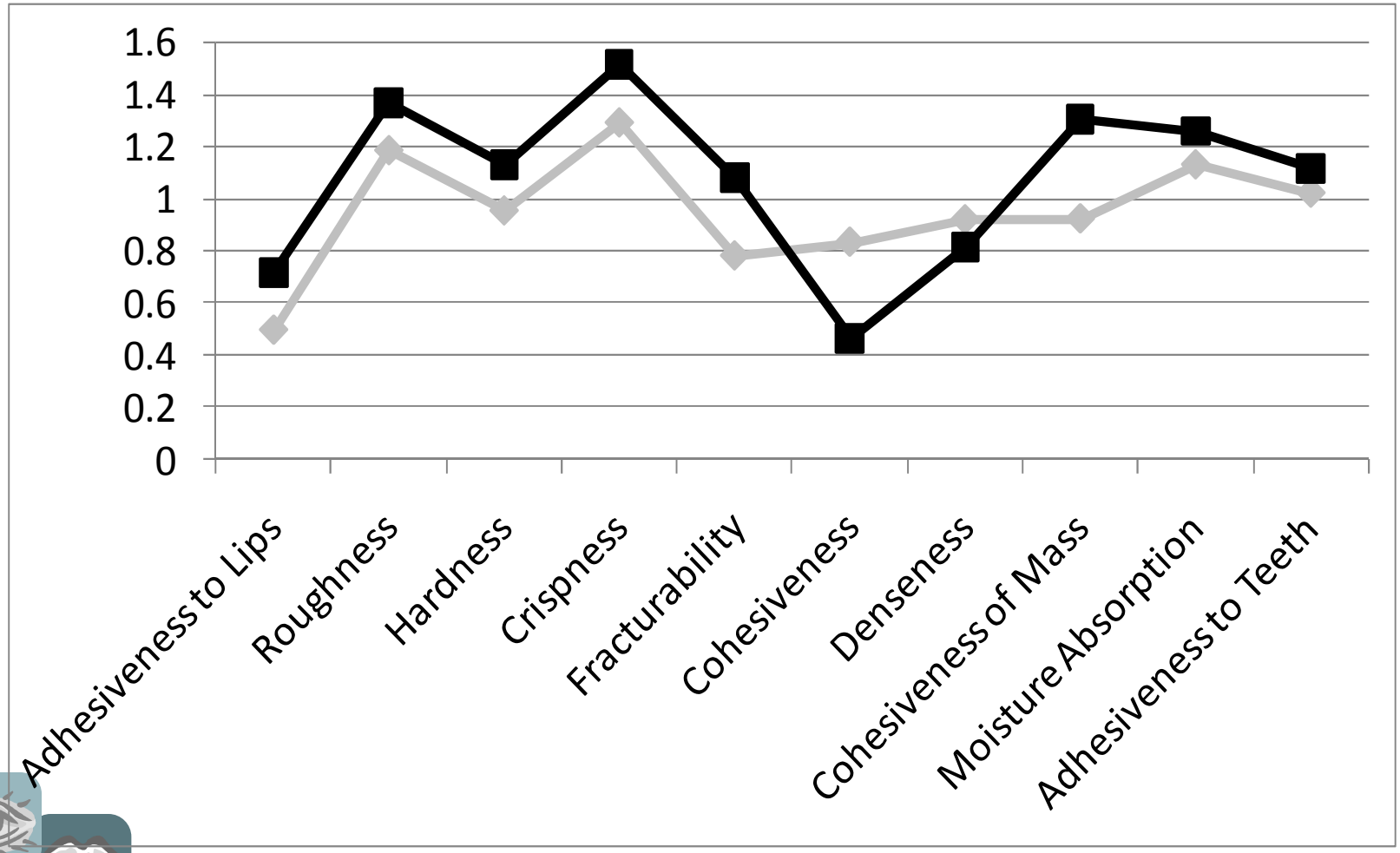
Technique

Hold sample in mouth; feel the surface to be evaluated with the lips and tongue.

Definition

The amount of particles in the surface. Smooth -- Rough

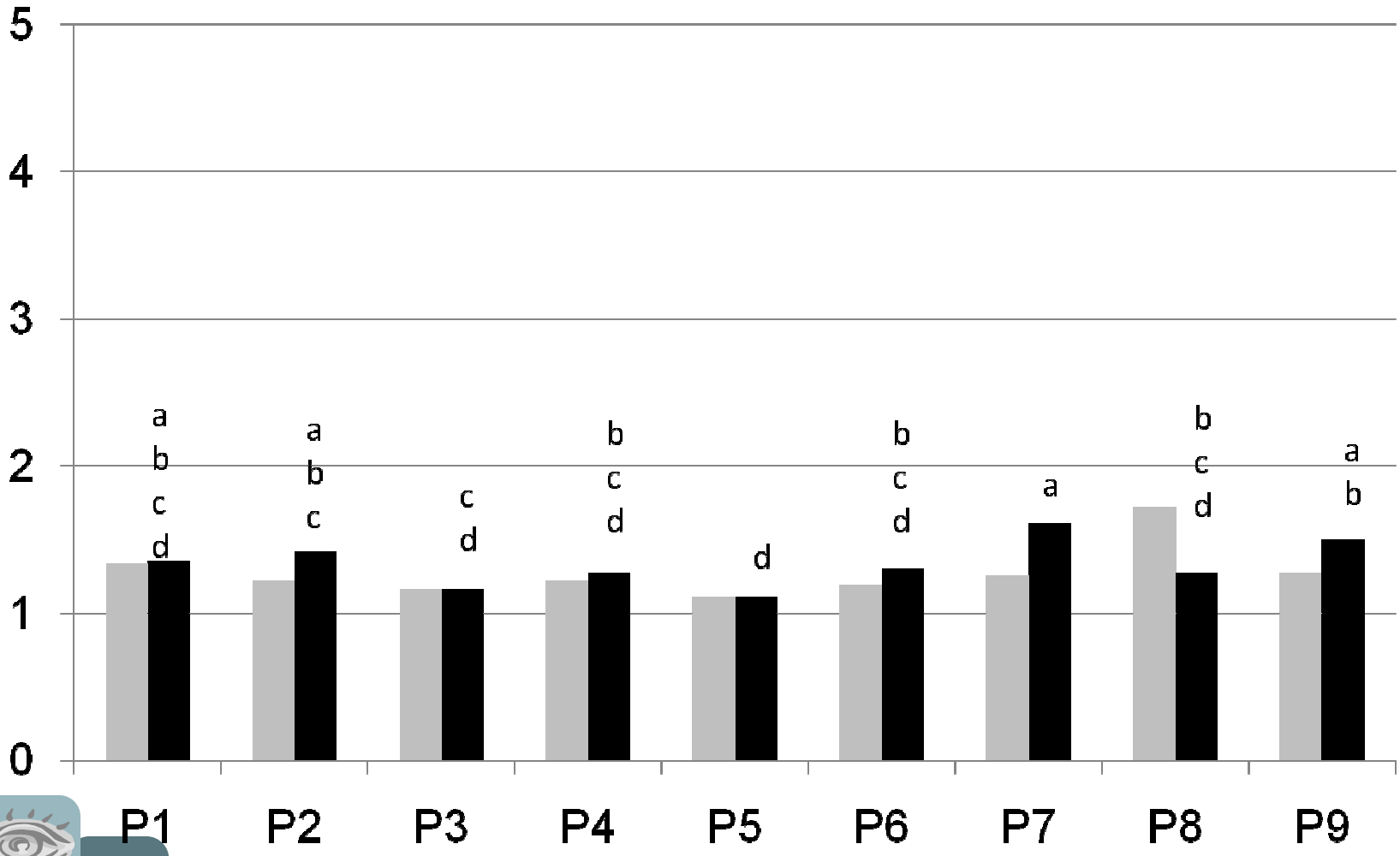
Standard Deviation



Existing

New

Cohesive



Existing

New

Cohesiveness

Current References	
Corn Muffin (1/2" cube)	1.0
Cheese (1/2" piece)	5.0
Soft Pretzel (1/2" piece)	8.0
Raisin (1 tsp)	10.0
Starburst (1 piece)	12.5
Freedent (1 Stick)	15.0

New References	
Ritz (1/4 cracker)	1.0
Hard Boiled Egg White (1/2" piece)	3.0
Rambutan (1/2" piece)	6.0
Orion Chewy Candy (1 piece)	11.5
Mentos (1 piece)	13.0
Sugus Chewy Candy (1 piece)	13.0

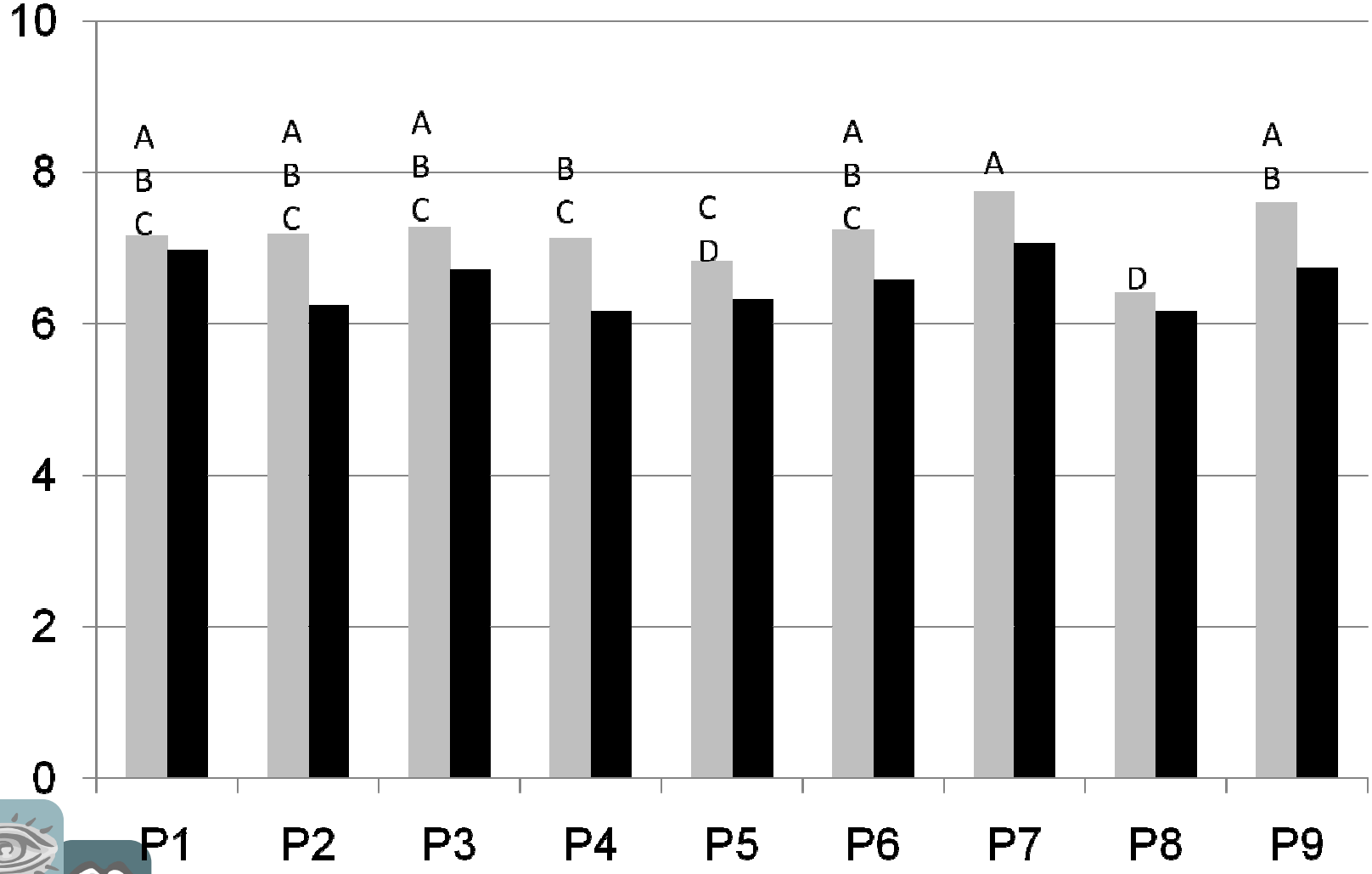
Technique

Place sample between molars; compress fully (can be done with incisors).

Definition

The degree to which sample deforms rather than crumbles, cracks, or breaks. Rupturing -- Deforming

Cohesiveness of Mass



Existing

New

Cohesiveness of Mass

Current References	
Licorice, Shoestring (1 piece)	0.0
Carrots (1/2" slice)	2.0
Mushroom (1/2" slice)	4.0
Hebrew National Frank (1/2" slice)	7.5
Velveeta (1/2" cube)	9.0
Brownie (1/2" cube)	13.0
Country Biscuit Dough (1/2 tsp)	15.0

New References	
Bean Threads	0.0
Tuna in Oil (1/2 tsp)	2.0
Hard Boiled Egg White (1/2" piece)	3.0
Crispy Green Peas (2 pieces)	4.0
Hanami Cracker (1/2 piece)	5.0
Ace Cracker (1/4 cracker)	6.5
Sticky Rice (1/2 tsp)	7.0
Coctail Peanut (2 pieces)	9.0
Mentos	14.5

Technique

Chew sample with molars for up to 15 chews.

Definition

The degree to whch chewed sample (at 10 to 15 chews) holds together in a mass. Loose -- Mass

Summary 1

- Roughness reference at 5.0 intensity of new scale may have too much variability
- Cohesiveness of mass scale may not be as effective with panelist to panelist variability
- Overall, new scales are effective

Validation 2

- Kasetsart University, Bangkok, Thailand
  - Sensory and Consumer Research Center
  - Established 2008
  - Established trained descriptive evaluation panel
    - KSU faculty and staff assisted with the training process
    - Texture reference scales were submitted for use during texture training of the new panel
    - Feedback was submitted by training facilators

Summary 2

- Slight modifications were made in piece size
- Lack of Korean Cracker
- Overall, scales were effective in training the panelists

Next

- Comparison of Thai texture data to KSU SAC texture data

Implications

- Revised texture scales may be used as:
  - Teaching Tool for Universities
  - Training Tool for Industry
  - Insight Tool for Product Development/Research
  - Open new doors

Summary

- Texture reference scales may be developed by transporting shelf stable food products to the panel location
- The newly developed scales can be as effective as the existing scales
- The newly developed scales are effective as a training tool

More Information

- Please send me an email!

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Thank You For Your Time and Attention