How does consumers' taster status influence their emotions on sugar-free chocolate?

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INTRODUCTION

- 61% of SA population overweight or obese

- Excess sugar consumption may cause health problems

- Easy answer for an overweight population - consume less sugar?

- Taste remains an important factor when we choose food products

- Consumers will rather choose "unhealthy" foods with higher sugar content

- General perception that foods with reduced sugar

  - may taste unpleasant

  - only consumed when health is at stake

INTRODUCTION

- Three taster status categories according to our bitter sensitivity

  - Non-tasters

  - Medium tasters

  - Supertasters - increased sensitivity towards bitter tastes

- Taster status influence consumption & emotional response to foods

- Studies confirm the link between foods' sensory properties and emotions

  - e.g. eating chocolate = cravings or feelings of guilt

- Few studies looked at how different taster status influence our emotions when we consume sugar-free foods

AIM

To develop emotional lexicons for
sugar free chocolates
based on consumers' taster status

METHODOLOGY

- Ethical approval (NWU-00490-20-A1)

- Cross-sectional

- Self-administered electronic questionnaire

- Non-probability convenience sampling method

- Specific inclusion criteria

- Recruitment via advertisement on social media platforms

- Screening questionnaire

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SAMPLE BAG COLLECTION

- Consumers collected one sample bag at a central location
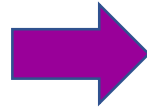
- 2 x unbranded chocolate bars clearly marked as sample 1 and 2

- 3 x propylthiouracil (PROP) test paper strips in zip-lock bag

- Bottle of still water (250 ml)

- Instruction pamphlet

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CHOCOLATE SAMPLES

- 1 x Milk and dark sugar-free chocolate bar (40g)

- Contain no added sugar

- Fibres - dextrin, inulin, oligofructose

- Sweeteners - erythritol, steviol glycosides

- Cocoa solids
  - Milk – 36%
  - Dark –80%

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CHOCOLATE SAMPLES: NUTRITIONAL INFORMATION

Description	Milk		Dark	
	Per 100 g	Per g serving	Per 100 g	Per g serving
Energy (kJ)	2024	810	1851	262
Protein (g)	7.9	3.2	5.8	0.8
Carbohydrate (g)	34	14	18	3
Total sugar (g)	20.9	8.4	3.0	0.4
Total fat (g)	36.2	14.5	36.3	5.1
Saturated fat (g)	22.9	9.2	22.8	3.2
Monounsaturated fat (g)	12.1	4.8	12.3	1.7
Dietary fibre (g)	17.0	6.8	34.5	4.9
Sodium (mg)	240	96	8	1

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QUESTIONNAIRE

1. Consumers' taster status

PROP Taster Status Test

Labelled magnitude scale (LMS):

1 = ''barely detectable'' - 100 = ''strongest imaginable''

2. Consumers' consumption, purchasing behaviour and acceptance of chocolates

(5-point Likert scales)

General chocolate consumption
  - Frequency of consumption
  - Reason for consumption
  - Purchase intention

Sugar-free chocolates
  - Acceptance – taste & aftertaste
  - Purchase intention

4. Demographic information
Gender, age & origin of geographic location

3. Emotional lexicon for sugar-free chocolate for consumers with different taster statuses

Emotional Response
  - Emotional terms from EmoSensory® wheel: Check-All-That-Apply (CATA).
  - Open-ended question.
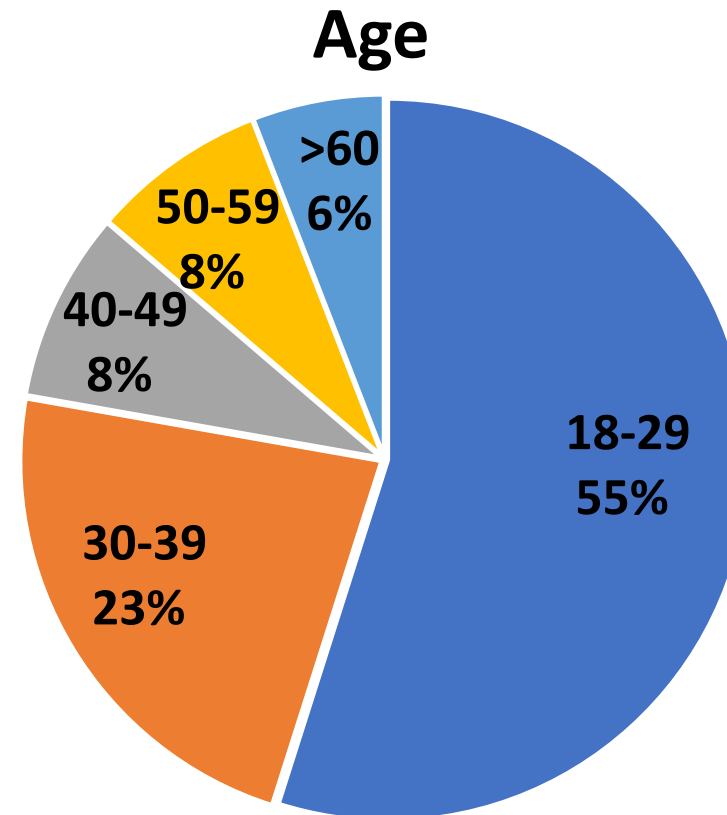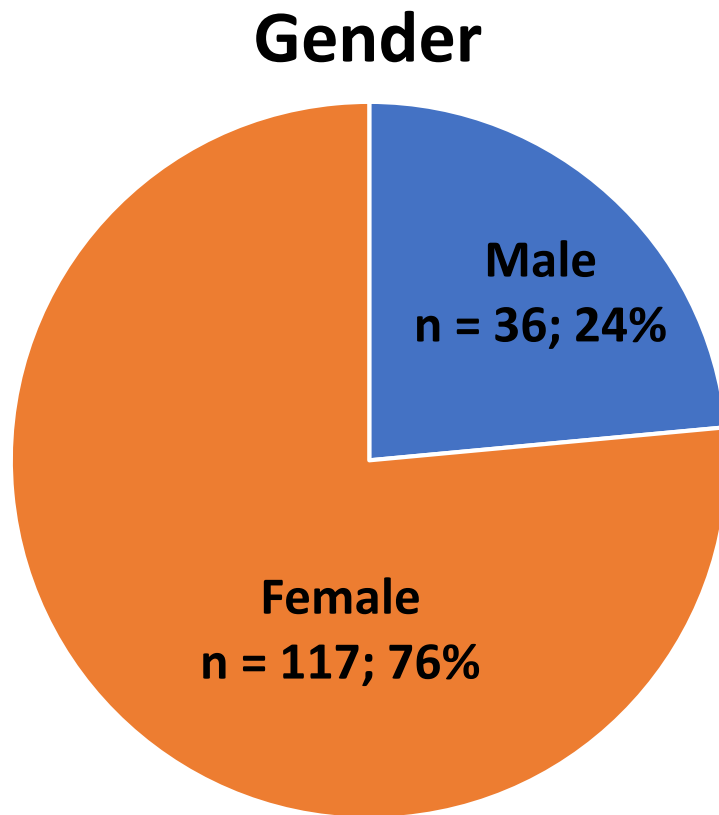
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Schouteten et al., 2015

DATA COLLECTION & ANALYSIS

- January 2021 – SA entered lockdown level 3 - Covid-19 pandemic

- Complete questionnaire within 72 hours

- Data analysis

  - Descriptive analysis

  - Associations - cross-tabulation with phi coefficient & Cramer's V

  - Significance level of $p < 0,05$

RESULTS
DEMOGRAPHICS

- 153 adult respondents

Gender

Male
n = 36; 24%

Female
n = 117; 76%

Age

>60
6%

50-59
8%

40-49
8%

30-39
23%

18-29
55%

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PROP TASTER STATUS TEST

Taster status groups

Super tasters (>51)

21,5%

Non tasters (0 – 15.5)

38,6%

39,9%

Medium tasters (15.5 – 51)
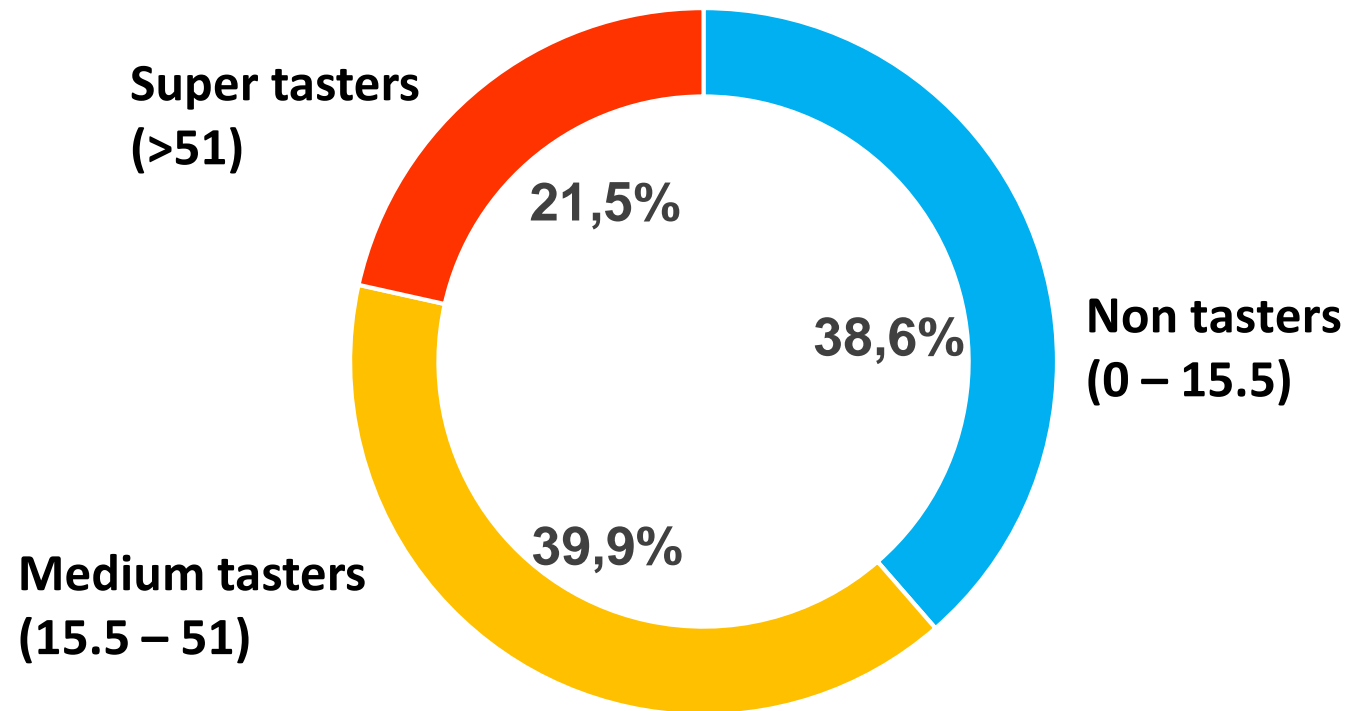
LMS: 1 being ''barely detectable'' to 100 being ''strongest imaginable''

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CHOCOLATE CONSUMPTION

Frequency

- Daily 7%
- More than twice a week 26%
- Twice a week 18%
- Once a week 33%
- Once a month or less 16%

Reason

- For emotional satisfaction (indulgence) 58%
- As a habit 24%
- Other reason 18%
- Regard it as healthy 1%
- To overcome hunger 0%

Purchase intention

- Flavour 75%
- Brand 17%
- Price 8%
- Packaging 0%
- Other reason 0%

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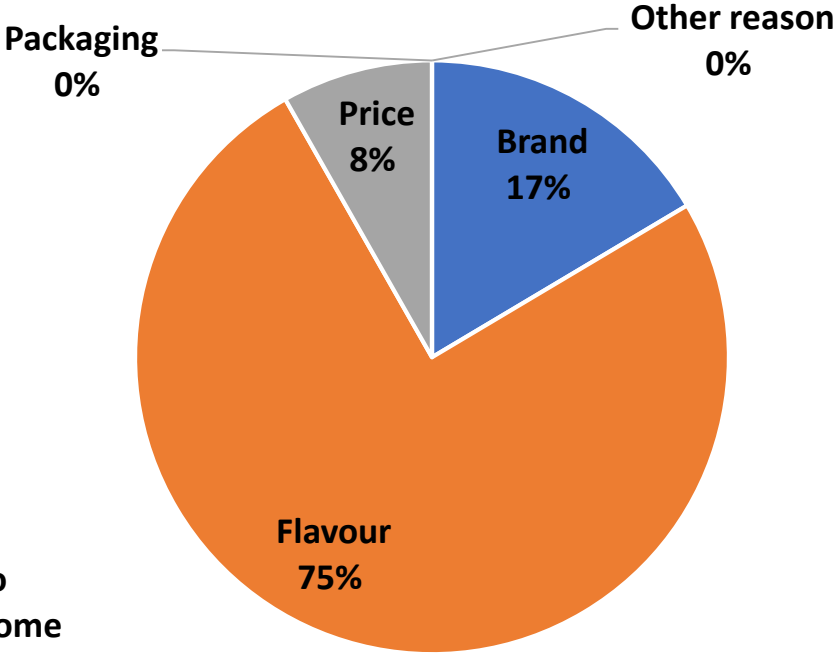
SUGAR-FREE CHOCOLATE: ACCEPTANCE & PURCHASE INTENTION

	Percent (%)					Mean	SD
	1	**2**	**3**	**4**	**5**		
Milk chocolate							
Taste[1]	1,9	1,3	19,6	54,4	22,8	3,95	0,80
Aftertaste[1]	1,9	6,3	25,3	44,9	21,5	3,78	0,92
Purchase intent[2]	4,4	10,1	12,7	41,1	31,6	3,85	1,11
Dark chocolate							
Taste[1]	1,3	6,6	15,8	34,8	41,4	**4,09**	0,97
Aftertaste[1]	5,1	7,0	13,9	39,9	33,5	**3,90**	1,102
Purchase intent[2]	4,4	10,8	10,1	31,6	42,4	**3,97**	1,171

[1] 1 = dislike extremely, 2 = dislike very much, 3 = neither like nor dislike, 4 = like very much, 5 = like extremely

[2] 1 = definitely would not buy, 2 = probably would not buy, 3 = might or might not buy, 4 = probably would buy, 5 = definitely would buy

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EMOTIONAL RESPONSE

Emotion	Percent (%)	
	Milk	**Dark**
Positive		
Contented	36,1	35,4
Desire	12,7	24,7
Enthusiastic	*6,3*	*13,9*
Glad	17,1	22,8
Good	51,9	53,2
Happy	43,7	39,9
Pleasant	56,3	49,4
Satisfied	**57,6**	**53,8**
Negative		
Disappointed	**12**	10,1
Discontented	2,5	5,1
Disgust	3,2	5,1
Dissatisfied	8,9	**10,1**
Guilty	9,5	3,2
Nervous	*0*	2,5
Sad	2,5	*1,9*
Unpleasant surprise	3,8	8,9
Unclassified		
Calm	51,9	43,7

Fancy

Powerful

Wealthy

Accomplished

Extravagant

Luxury item

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EMOTIONAL LEXICONS

	Non tasters	Medium tasters	Supertasters
Milk chocolate: Highest selected emotion	Pleasant (+) Sad (-)	Guilty (-)	Happy (+) Satisfied (+) Calm
Dark chocolate: Highest selected emotion		Glad (+) Good (+) Dissatisfied (-) Unpleasant (-) surprise	Desire (+) Enthusiastic (+) Disappointed (-) Discontended (-) Disgust (-) Nervous (-)
Milk chocolate: Lowest selected emotion	Desire (+) Enthusiastic (+) Glad (+) Unpleasant surprise (-)	Discontended (-) Disguist (-) Sad (-)	Discontended (-)
Dark chocolate: Lowest selected emotion	Guilty (-) Nervous (-) Sad (-)	Pleasant (+) Dissatisfied (-)	Happy (+) Pleasant (+) Satisfied (+)

ASSOCIATION BETWEEN EMOTIONAL LEXICONS AND CONSUMERS' TASTER STATUS

Chocolate sample	Taster status	Emotion	Phi	P-value
Milk chocolate	Non tasters	Content (+)	0.216	0.070
		Guilty (-)	-0.212	0.008*
	All tasters	Content (+)	0.220	0.020*
Dark chocolate	Supertasters	Discontent (-)	0.230	0.004*
		Disgust (-)	0.160	0.044*

RELATIONSHIP BETWEEN DEMOGRAPHIC CHARACTERISTICS AND CONSUMERS' TASTER STATUS

CONSUMERS' TASTER STATUS GROUPS IN AGE AND YEARS

Legend: ■ Non-tasters ■ Medium tasters ■ Supertasters

MALE: 50,00% / 30,60% / 19,40%
FEMALE: 35,00% / 41,90% / 23,10%
18-29: 27,40% / 46,40% / 26,20%
30-39: 51,40% / 40,00% / 8,60%
40 AND OLDER: 52,90% / 23,50% / 23,50%

GENDER — Phi = 1.32; p-value = 0.264

AGE IN YEARS — Phi = 0.290; p-value = 0.012*

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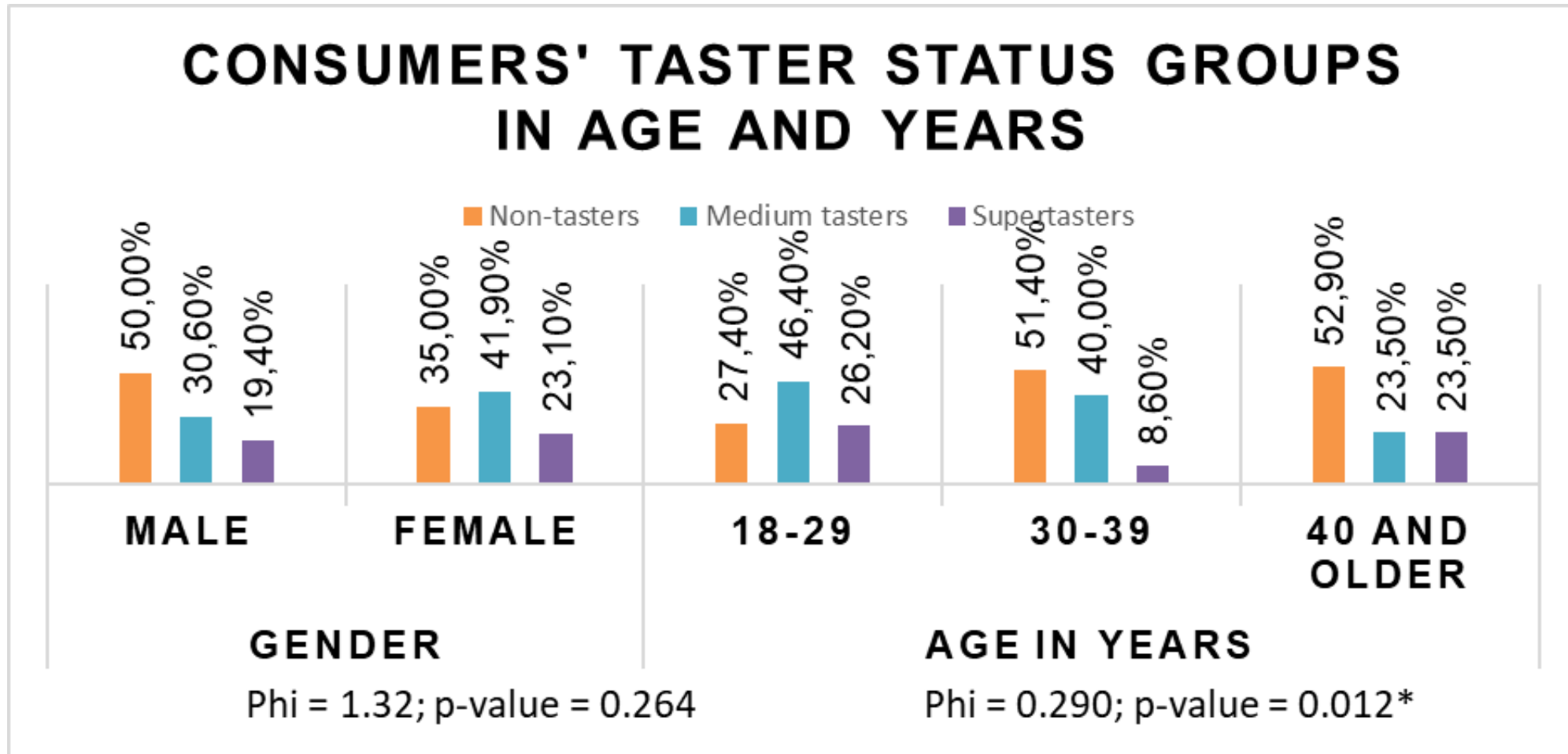
VALUE OF THE STUDY

- Relationship between demographics and taster status - valuable information for marketers to target specific consumers

  - e.g. development of sugar-free foods with bitter notes – target more men when marketing – more women = supertasters

- Use of emotional lexicons during product development will ensure that needs of consumers in different segments are met and increase product's success

  - e.g. run marketing campaign – target Generation Z – advertise sugar-free dark chocolate as an affordable luxury item to influence their perception

- When the focus is rather on a specific taster status, it will ensure that consumers have access to foods that have been altered to their taste sensitivity

- May lead to consumers choosing more sugar-free products

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CONCLUSIONS

- Sugar-free chocolates with sweeteners

  - can be consumed and enjoyed as a healthier alternative

  - evoked different emotional terms for consumers with different taster statuses

- Different emotional lexicons are required for each taster status

- Emotional lexicons will contribute to future research on the sensory acceptability of and behaviour with regard to chocolate and sugar-free products for the South African market

THANK YOU

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