



**LENÍZY CRISTINA REIS ROCHA**

**EMOJI UM CONTEXTO RELACIONADO A ALIMENTOS E  
EMOÇÕES.**

**LAVRAS - MG**

**2022**

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Tese apresentada à Universidade Federal de Lavras, como parte das exigências do Programa de Pós-Graduação em Ciência dos Alimentos, área de concentração em Desenvolvimento e avaliação funcional, química, biológica e sensorial de alimentos, para a obtenção do título de Doutora.

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Orientadora

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Orientadora

**LAVRAS - MG**  
**2022**

*Aos meus pais Alenir (in memoriam) e Joana.*

*Ao meu esposo Vander Júnior.*

*Ao meu filho Pedro.*

*Por estarem sempre ao meu lado me incentivando e apoiando...*

*Com amor,*

***Dedico!***

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*” Foi o tempo que dedicastes à tua rosa que a fez tão importante”*

*(Antoine de Saint-Exupéry).*

## RESUMO

As respostas emocionais a alimentos e bebidas foram estabelecidas como um importante tópico de pesquisa dentro da ciência sensorial e do consumidor. A presente pesquisa contribuiu para o crescente corpo de pesquisas sobre o uso de emojis em pesquisas sensoriais e de consumo, com novos insights sobre as expressões espontâneas dos consumidores de experiências emocionais relacionadas a alimentos. O objetivo geral foi explorar os emojis em um contexto relacionado à alimentação, posto isto o estudo foi dividido em duas etapas. i) Explorar o significado dos emojis pelo aplicativo Whatsapp em um contexto relacionado à emoções e aos atributos sensoriais de chocolates com diferentes características. Os resultados mostram que os participantes não apresentaram dificuldade em relação ao uso dos emojis para expressar suas emoções e determinar os atributos de características dos chocolates. Os emojis demonstram de forma positiva para utilização na descrição das emoção sendo principalmente relacionado ao sentimento de alegria. Os atributos foram associados a diferentes emojis, e o mesmo emoji foi relacionado a diferentes características. ii) Por meio de questionário onlines os emojis poderiam estar associados a descrição dos cinco gosto básicos. O gosto amargo foi associado a 18 emojis com diferentes expressões emocionais, o gosto doce e salgado apresentaram grande semelhança no grupo de emojis que foram utilizados para serem caracterizados. Já o umami e o ácido foram classificados majoritariamente por emojis com denominação de descontentamento e insatisfação. Em relação aos emojis de alimentos, o queijo foi o mais associado ao umami e a cenoura foi o emoji com a menor ligação. Esse estudo é o primeiro a explorar os emojis em relação a associação ao gostos básicos, assim conclui-se que os emojis podem ser uma possibilidade para descrição em relação aos gostos básicos, os consumidores não apresentaram dificuldade na associação dos emojis. Os emojis estão cada vez mais sendo usados para comunicar expressões emocionais em equipamentos eletrônicos, representam uma fonte relevante de informação para empresas de consumo sobre as atitudes e comportamentos dos consumidores relacionados à alimentação. No entanto, dado que os emojis transmitem uma ampla gama de significados, é necessário um entendimento profundo de como os consumidores os interpretam para permitir seu uso em pesquisas de consumo relacionadas a alimentos.

**Palavras-chave:** Comunicação sensorial. Emoji. Emoção. Comportamento do consumidor.



## ABSTRACT

Emotional responses to food and drink have been established as an important research topic within sensory and consumer science. The present research contributes to the growing body of research on the use of emojis in sensory and consumer research, with new insights into consumers' spontaneous expressions of food-related emotional experiences. The overall objective was to explore emojis in a food-related context, so the study was divided into two stages. i) Explore the meaning of emojis through the Whatsapp application in a context related to emotions and sensory attributes of chocolates with different characteristics. The results show that the participants had no difficulty in using emojis to express their emotions and determine the chocolates' characteristic attributes. Emojis demonstrate positively for use in the description of emotions, being mainly related to the feeling of joy. Attributes were associated with different emojis, and the same emoji was associated with different characteristics. ii) Through an online questionnaire, emojis could be associated with the description of the five basic tastes. Bitter taste was associated with 18 emojis with different emotional expressions, sweet and salty taste showed great similarity in the group of emojis that were used to be characterized. Umami and acid, on the other hand, were mostly classified by emojis named discontent and dissatisfaction. Regarding food emojis, cheese was the most associated with umami and carrot was the emoji with the lowest connection. This study is the first to explore emojis in relation to the association with basic tastes, so it is concluded that emojis can be a possibility for description in relation to basic tastes, consumers did not have difficulty in associating emojis. Emojis are increasingly being used to communicate emotional expressions on electronic equipment, representing a relevant source of information for consumer companies about consumer attitudes and behaviors related to food. However, given that emojis convey a wide range of meanings, a deep understanding of how consumers interpret them is required to enable their use in food-related consumer research.

**Keywords:** Sensory communication. Emoji. Emotion. Consumer behavior.

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## **PRIMEIRA PARTE**

## 1 INTRODUÇÃO

Há um impulso contínuo na ciência sensorial sobre a mensuração eficaz da emoção dos provadores em relação ao produto (ZHI *et al.*, 2018). O consumo de alimentos induzido por emoções foi amplamente estudado nas últimas décadas. A relação entre emoções e alimentação tem se mostrado complexa, pois diferentes variáveis, como intensidade da emoção e características individuais, podem intervir nessa relação (CÔTÉ *et al.*, 2018). Evidências recentes sugerem que os modelos para predição da escolha do consumidor com base na aceitabilidade sensorial são reforçados por informações sobre as emoções provocadas pelos alimentos (CHANG *et al.*, 2022).

As emoções são consideradas construções feitas por indivíduos para dar significado às sensações que percebem de dentro e fora de seu corpo, sendo de suma importância para a medição os auto relatos que estão diretamente associados as experiências emocionais das pessoas (JAEGER; VIDAL; ARES, 2021). As emoções são parte integrante da vida diária das pessoas. Eles não apenas moldam nossas cognições, mas também dão origem a várias mudanças fisiológicas e são motivadores importantes para o comportamento (EVERS *et al.*, 2018).

As emoções estão relacionadas ao comportamento alimentar, sendo assim a análise da emoção importante para a composição de perfis sensoriais-emocionais de produtos alimentícios, onde se tornaram uma ferramenta essencial para a construção de uma compreensão holística do produto além do sabor (DANNER *et al.*, 2019). Na pesquisa de emoções relacionadas à alimentos, os questionários são muito mais populares do que outros métodos (CARDELLO; JAEGER, 2016). No entanto, do ponto de vista prático, já foi observado que há uma preocupação com questionários extensos em situações de testes de produtos, onde o tempo é limitado e as tarefas são projetadas para serem fáceis de realizar (YANG *et al.*, 2018).

Embora os questionários baseados em palavras emocionais dominem atualmente (VIDAL *et al.*, 2020), os métodos verbais têm a desvantagem de que a tradução é difícil e que, mesmo dentro da mesma língua, diferenças culturais podem levar a diferenças de significado para o mesmo termo emocional (VAN ZYL; MEISELMAN, 2017). Uma alternativa, para examinar as emoções dos produtos alimentícios provocados em consumidores seria o método não-verbal (SCHOUTETEN *et al.*, 2018). Emojis ou personagens ilustrados, são uma alternativa às palavras de emoção como um meio de transmitir auto relatos, uma vez que fornecem

representações gráficas de sentimentos, emoções e conceitos abstratos (JAEGER; VIDAL; ARES, 2021).

Emojis surgiram como um novo método para determinar a aceitação e preferência, devido ao rápido crescimento da popularidade e por serem conhecidos em todo o mundo (ARES; JAEGER, 2017a). Esse amplo reconhecimento faz dos emojis uma escolha vantajosa para avaliar a aceitação, especificamente a resposta emocional (SWANEY-STUEVE; JEPSEN; DEUBLER, 2018). A fim de quantificar a resposta emocional provocada por alimentos o uso de emoji vem sendo proposto como um método não-verbal para avaliar as emoções do provador (RAMSEY *et al.*, 2018).

Em termos de aplicabilidade, os emoji mostraram-se adequados para medir as respostas emocionais dos consumidores a alimentos e bebidas quando avaliados com estímulos escritos, imagens, rótulos de embalagens e descrições de situações de consumo. Como exemplos, Gupta *et al.*, (2021) comparou as respostas da escala hedônica tradicional a resposta com emojis para o gosto geral de iogurtes, Santos *et al.*, (2022) avaliaram o significado dos emojis pelos brasileiros, Vidal; Ares; Jaeger, (2016) analisaram os tweets com emojis sobre comida e ocasiões de consumo. As respostas do método Check-all-that-apply (CATA) aos estímulos alimentares usando emojis foram avaliadas por Jaeger, *et al.*, (2017).

De modo geral, objetivou-se compreender de que maneira o uso dos emoji pode estar relacionado as expressões das sensações emocionais na análise sensorial. A concepção da pesquisa envolve enfoques científicos por meio de emojis como resposta emocional e caracterização de diferentes chocolates. Além disso, buscou-se através de questionário a correlação entre os emojis e a percepção entre os cinco gostos básicos, e a associação da percepção do quinto gosto básico o umami através da associação aos emojis de alimentos.

## 2 REFERENCIAL TEÓRICO

### 2.1 Análise sensorial

A análise sensorial é uma ferramenta importante neste processo, que envolve um conjunto de diversas técnicas elaboradas com o intuito de avaliar um produto quanto à qualidade sensorial, em várias etapas de seu processo de fabricação (GALLO; SWANEY-STUEVE; CHAMBERS, 2017).

A ciência sensorial de alimentos são processos chave, fazendo a ponte entre as características do produto e a percepção e aceitação do consumidor (RUIZ-CAPILLAS; HERRERO, 2021). Trata-se de uma ciência que objetiva, principalmente estudar as percepções, sensações, atitudes e comportamento do consumidor. Os estudos e avaliações sensoriais de alimentos podem ser vistos como um processo de coleta de informações usado para medir, analisar e interpretar as respostas comportamentais a produtos alimentícios com base nos cinco sentidos da visão, audição, paladar, olfato e tato, onde membros do painel humano são usados como instrumentos para medir as qualidades de um produto alimentar (YU; LOW; ZHOU, 2018).

Os testes sensoriais auxiliam nas decisões sobre formulações de produto e são essenciais no desenvolvimento e comercialização de novos produtos, bem como em melhoramento de formulações de produtos já existentes. Assim cada vez mais tem sido realizada a caracterização sensorial de produtos por meio de métodos que utilizam os consumidores. De fato, os produtos com maior pontuação de preferência são escolhidos com mais frequência que os produtos com menor pontuação de preferência (GUTJAR *et al.*, 2014).

Os resultados obtidos fornecem informações importantes sobre a qualidade e as características do produto alimentar que podem ser utilizadas em vários aspectos como desenvolvimento de novos produtos, compreensão do consumidor, perfil de sabor e controle de qualidade. Esse tipo de análise tem sido usado há séculos com o propósito de aceitar ou rejeitar produtos alimentícios. Historicamente, foi considerada uma metodologia que complementa a segurança tecnológica e microbiológica na avaliação da qualidade dos alimentos (ISAAC *et al.*, 2017).

Sua importante evolução e impacto nas últimas décadas, posicionou-a como uma das mais importantes metodologias de inovação e aplicação para garantir a aceitação do produto final pelos consumidores (ORTEGA *et al.*, 2020). Em geral, a análise sensorial tradicional pode

ser dividida em duas: analítica e afetiva. Os testes analíticos podem abordar análises como discriminação ou diferenciação entre novos produtos (os novos produtos são diferentes?) Ou descrição do produto (quão diferentes são os novos produtos?). Isso fornecerá informações que podem ser empregadas com diferentes finalidades na otimização de desenvolvimentos tecnológicos (RUIZ-CAPILLAS; HERRERO, 2021).

Os testes afetivos avaliam a escolha de um produto e o nível de aceitação usando os critérios subjetivos dos provadores. Na maioria dos casos, os painelistas correspondem a consumidores não treinados na descrição de preferências, onde sua avaliação é baseada no gosto e focada na decisão de compra e aceitação geral. Os testes afetivos procuram avaliar a aceitação do produto e são divididos em testes de preferência e testes hedônicos (TAYLOR *et al.*, 2020). Os testes de preferência ou escolha permitem verificar a preferência (ou não) por um novo produto com base na resposta majoritária de um painel. O método hedônico oferece uma avaliação do gosto pelo produto testado, por meio de escalas hedônicas (hedônica de 9 pontos) (RUIZ-CAPILLAS; HERRERO, 2021).

As técnicas sensoriais tradicionais, como as avaliações discriminatórias, descritivas, de preferência e os testes hedônicos, ainda são amplamente utilizadas nos dias atuais. Porém, nas últimas décadas, esforços têm sido feitos no desenvolvimento de novas metodologias de caracterização sensorial de alimentos com o objetivo de ganhar rapidez e simplicidade em relação às tradicionais. Essas novas técnicas buscam fornecer informações completas em inovação e desenvolvimento de produtos e na abordagem adequada de suas campanhas de marketing, para garantir o sucesso (SCHIANO; HARWOOD; DRAKE, 2017).

## **2.2 Análise de respostas emocionais relacionados a alimentos**

As indústrias de alimentos têm buscado identificar e atender os anseios dos consumidores em relação aos seus produtos, como forma de ampliar sua competitividade, utilizando de informações de pesquisa com consumidores. Assim, gradualmente o consumidor passou a ser envolvido no processo de desenvolvimento e inovação, trazendo maior assertividade e sucesso para os novos produtos (GRIGOR *et al.*, 2016). Na ciência sensorial, a aceitação (gostar) tem sido a principal medida usada para compreender a preferência e o comportamento de escolha alimentar. (LAGAST *et al.*, 2017).

Além das características sensoriais dos alimentos, a sensação emocional evocada pelos alimentos é um fator crucial na predição da preferência alimentar do consumidor e no

desenvolvimento de novos produtos. Apenas as classificações hedônicas não predizem o comportamento de escolha de alimentos com precisão (GUTJAR *et al.*, 2014). Ao longo do tempo tem-se observado que os estados emocionais, o humor e a escolha de alimentos interagem de forma sutis conscientemente ou não, através dos efeitos fisiológicos que alteram o apetite, alterando o comportamento devido a escolha do alimento ou vice-versa, produzindo assim ações benéficas, corretivas ou não (GRIGOR *et al.*, 2016).

Determinados alimentos podem alterar o humor através dos efeitos sensoriais pelo contexto social associado, devido a expectativas cognitivas, psicológicas ou alterações de modulação do apetite (WEISSMAN; TANNER, 2018). Alimentos e emoções têm sido relatados para compartilhar uma relação bidirecional: por um lado, as emoções podem moldar a escolha de alimentos, a ingestão de alimentos e o gosto; enquanto, por outro lado, o consumo de alimentos pode influenciar o humor e as emoções dos consumidores (VIDAL; ARES; JAEGER, 2016). Há um esforço contínuo na literatura científica sensorial e de consumo para uma medição eficaz da emoção em relação aos alimentos (EATON *et al.*, 2018).

Além disso, a análise do perfil emocional pode fornecer informações adicionais para o marketing e o desenvolvimento de produtos alimentícios (MEISELMAN, 2015). A inclusão do perfil emocional aumenta o valor preditivo em comparação com o uso exclusivo de avaliações de gosto para o comportamento de escolha de produtos dos consumidores (SCHOUTETEN *et al.*, 2018).

A avaliação da emoção induzida pelos alimentos é uma tarefa complexa, pois mede estados corporais e cognitivos distintos, resultantes de um conjunto de consequências experimentadas. Fatores que influenciam a mensuração da emoção incluem o tipo de alimento, condição do alimento (nome dos alimentos, sabor ou aroma dos alimentos degustados, imagem do alimento), formato do questionário, hora do dia / local, número de produtos em uma sessão de teste e estado emocional anterior do consumidor (WARDY *et al.*, 2017).

Quando se analisa o perfil emocional é importante levar em consideração o modelo psíquico de emoções que descreve duas dimensões subjacentes: valência (negativa a positiva) e excitação (KIM; PRESCOTT; KIM, 2017). Enquanto a dimensão de valência tem muito em comum com as medidas de gosto, a dimensão de excitação também pode fornecer um valor explicativo no gosto doce às preferências alimentares. A excitação é conhecida por se relacionar mais intimamente com o estado de motivação de querer do que gostar. Assim, a fome tende a aumentar a excitação, uma vez que isso facilita qualquer busca por alimentos. Por outro lado, o



consumo de alimentos tem sido associado à redução da excitação, por exemplo, sentimentos de calma (WEISSMAN; TANNER, 2018).

Essa crescente atenção à emoção na pesquisa sensorial e de consumo levou à introdução de muitos instrumentos emocionais para capturar as emoções dos consumidores provocadas pela comida (EATON *et al.*, 2018). Instrumentos gráficos de auto relato são atraentes para a mensuração de experiências afetivas, uma vez que não exigem que os usuários verbalizem suas emoções. Em vez disso, eles confiam na capacidade humana de atribuir de maneira intuitiva e confiável o significado emocional a elementos gráficos (simples) (KAYE; MALONE; WALL, 2017).

Como as ferramentas gráficas de auto relato não dependem de descrições verbais de emoções, elas também podem ser úteis para estudos transculturais, uma vez que eliminam a necessidade de tradução (DORADO *et al.*, 2016). Além disso, eles podem ser mais eficazes para medir e expressar emoções mistas (complexas) que são difíceis de verbalizar. Ferramentas que combinam elementos gráficos com rótulos verbais para esclarecer seu significado pode ser útil para populações com problemas de leitura inerentes (TOET *et al.*, 2018).

Dependendo de como as associações emocionais são avaliadas, esses instrumentos geralmente podem ser divididos em métodos explícitos e implícitos (WILLOUGHBY; LIU, 2018).

A mensuração implícita de emoções foi incluída em estudos recentemente, pois são indiretas e não auto referidas e registram emoções enquanto os participantes estão consumindo, cheirando ou olhando para alimentos, sem a necessidade de uma tradução cognitiva após a experiência do consumidor (MOJET *et al.*, 2015). A maioria das medições implícitas é registrada continuamente, enquanto os métodos explícitos obtêm dados em determinados momentos (por exemplo, preenchimento de um questionário durante ou após o consumo). A pesquisa interdisciplinar criou novas abordagens para medir as emoções de uma maneira implícita (WALSH *et al.*, 2015) através de medidas comportamentais fisiológicas, expressivas e implícitas

Os métodos explícitos são medições verbais ou visuais auto referidas que pedem aos participantes que relatem seus sentimentos, emoções ao consumir, cheirar ou ver produtos alimentícios (GUTJAR *et al.*, 2014). O primeiro usa um léxico emocional, que é um formato de questionário com uma lista de termos emocionais ou um conjunto de descritores emocionais ou uma lista de que podem ser verificados (por exemplo, CATA) ou classificados (por exemplo,

RATA ou escalas de classificações). O método CATA pede aos consumidores que verifiquem todos os termos aplicáveis. Já o método RATA é uma variante da escala CATA que solicita aos consumidores que avaliem ou indiquem a intensidade do termo aplicável (LAGAST *et al.*, 2017).


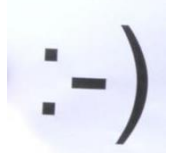
Várias pesquisas de emoção baseadas em palavras para pesquisa sensorial e de consumidor focada no produto surgiram, variando em termos de formulação, comprimento, escalas de resposta, linguagem (CARDELLO; JAEGER, 2016). Apesar de sua crescente popularidade, existem algumas preocupações com o uso frequente de palavras pelos consumidores ao transmitir emoções relacionadas à alimentos e conclusão de tarefas estranhas para alguns participantes, sendo que muitos autores já concluíram que é mais pertinente a utilização de escalas emojis em comparação com escalas numéricas (ARES; JAEGER, 2017a).



### 2.3 Elementos pictográficos

Representações pictográficas das emoções têm sido utilizadas em ambientes online, portanto estão sendo estudadas em diversas áreas de pesquisa, que vão desde a área de saúde aos estudos sobre comportamento (BAI *et al.*, 2019). No entanto não há um consenso sobre como devem ser chamadas as figuras responsáveis pela representação de emoções, intenções e humor. Termos como smiles, stickers, emoticons e emojis são alguns dos tipos dessas representações a que tais estudos se referem.

Para esclarecer e definir cada um dos termos, (BAI *et al.*, 2019) produziram a tabela 1 contendo as principais informações sobre cada tipo de elemento pictográfico.

Tabela 1 - As diferenças entre Smiley, Emoticons, Emoji e Stickers.

Nome	Época de ocorrência	Forma	Conteúdo	Unicode	Exemplos
Smiley	Anos 60	Estático	Rosto sorridente	Sem Unicode	
Emoticon	1982	Estático	Várias expressões faciais	Sem Unicode	

Emoji	1999	Estático	Expressões faciais, conceitos abstratos, emoções/sentimentos, animais, plantas, atividades, gestos/partes do corpo e objetos	Unicode próprio	
Sticker	Depois do século XXI	Estático ou animado	Expressões faciais, conceitos abstratos, emoções/sentimentos, animais, plantas, atividades, gestos/partes do corpo e objetos.	Sem Unicode	

Fonte: (BAI *et al.*, 2019)

Alguns trabalhos nomeiam os emoticons e emojis como semelhantes. No entanto, evidencia-se na literatura que os significados e características são distintos. O termo “Emoticon” resulta da aglomeração das palavras em inglês emotion (emoção) e icon (ícone), o que sugere uma indicação de expressão emocional. Geralmente os emoticons são construídos utilizando caracteres de teclado e são lidos na horizontal, da esquerda para a direita, por exemplo: :( (face triste) (DERKS; BOS; GRUMBKOW, 2007).

Emoticons, o antecessor de novos emojis, foram originalmente considerados como marcadores simples de emoções onde começaram como uma sequência de símbolos de teclado destinados a capturar expressões faciais, introduzidas por um membro do corpo docente motivados a reduzir os mal-entendidos em um e uma universidade (RIORDAN, 2017). A falta de diversidade na representação (por exemplo, tom de pele, raça e etnia) levou a apelos para a criação de uma nova classe (MURTHY, 2021).

Já o termo “emoji” vem do japonês (e=cenário) (mo=escrita) (ji=caractere) e possuem unicode próprio e nome predeterminado, que representa expressões faciais, conceitos abstratos, emoções/sentimentos, animais, plantas, atividades, gestos/partes do corpo e objetos (PRADA *et al.*, 2018). Tung & Deng, (2007) descobriram que os emojis intensificaram o senso de conectividade e o nível de presença social. E comparado ambos, os emojis possuem mais apelo visual do que os emoticons (PRADA *et al.*, 2018). O Emoji passou a ser considerado uma versão avançada de emoticons, e são superiores aos emoticons em termos de riqueza de conteúdo, velocidade de entrada e expressividade. Como ambos atuam como meios auxiliares de comunicação, emoji e emoticons estão completando funções semelhantes (AULL, 2019).

## 2.4 Emojis: uma ferramenta de comunicação e expressão

A comunicação é fundamental para a vida das pessoas onde se baseia-se em comportamentos verbais (por exemplo, fala) e não-verbais (por exemplo, expressões faciais) com o intuito de transmitir informações (KAYE; MALONE; WALL, 2017). Desde o surgimento dos sites de redes sociais, um crescimento exponencial no diálogo online tem sido visto, particularmente em formas de interação baseadas em texto e figuras (WALL; KAYE; MALONE, 2016).

A interação pela comunicação online tem sido uma ferramenta eficaz para a transmissão de mensagens verbais, mas carece dos comportamentos sutis não-verbais associados à interação face a face. Como resultado, os mecanismos compensatórios rapidamente se desenvolveram para combater os canais não verbais. Um desses desenvolvimentos é o uso de comportamentos digitais, como emoticons e emojis (WILLOUGHBY; LIU, 2018).

Emojis são símbolos gráficos facilmente inseridos na comunicação mediada por computador que recentemente explodiram em uso e popularidade (WEISSMAN; TANNER, 2018). Um emoji é definido como uma representação visual icônica de uma ideia, entidade, sentimento, status ou evento, que é usado ao lado ou em vez de palavras em mensagens digitais e mídias social Thompson (2016), servem como taquigrafia digital que transmitem pistas gestuais e fornecem uma modalidade para entender a comunicação interacional contemporânea nas práticas digitais (MURTHY, 2021).

Emojis fornecem uma maneira fácil de adicionar respostas/reações emocionais a uma comunicação não verbal baseada em texto e, em comparação à digitação de uma resposta, o envio de um emoji pode ser muito mais rápido e fácil (WILLOUGHBY; LIU, 2018). Os pequenos personagens se tornaram cada vez mais populares e revolucionaram a forma como as pessoas se comunicam e interagem na era digital (GOLDMAN, 2018) . Do ponto de vista linguístico, emojis parecem funcionar como palavras reais, para servir como um substituto de sinais não-verbais e contribuir para o significado geral das mensagens escritas (MARENCO; GIANNOTTA; SETTANNI, 2017).

No facebook para interagir, além de comentar, os usuários podem selecionar uma representação gráfica que visa expor suas emoções em relação à publicação. As curtidas podem ser manifestadas por meio de um emoji na forma de uma mão apontando o dedo polegar para

cima (Curtir), um emoji de coração (Amei), um emoji sorrindo (Haha), um emoji que representa surpresa (Uau), um emoji triste (Triste) ou um emoji irritado (Grr) que ficam disponibilizados abaixo de cada publicação e são denominados “reações” (figura 1) (ZAGALO, 2022).

Figura 1 - Interface reativa do Facebook mapeada nas Emoções Universais.



Fonte: Zagalo, (2022).

Al Rashdi (2018), estudando o uso de emojis no Whatsapp por homens e mulheres de origem omanense observou que tais figuras podem servir para muitas funções comunicativas, além de indicar emoções, substituindo perguntas, indicando o tom da mensagem e podem conter mais de um significado ao mesmo tempo.

Dada a ampla utilização de emoji pela população e as dificuldades de determinação do perfil emocional com métodos verbais explícitos, emoji pode ser uma abordagem interessante ao examinar conceitualizações emocionais provocadas por alimentos experimentados pelas pessoas (LAGAST *et al.*, 2017). É crescente o interesse por pesquisas que interpretam o significado dos emojis para os usuários consumidores da internet. Conduzidos pela Teoria da Presença Social, Tung; Deng, (2007) descobriram que os emojis intensificaram o senso de conectividade e o nível de presença social. E comparado ambos, os emojis possuem mais apelo visual do que os emoticons (PRADA *et al.*, 2018).

Recentemente, o uso de emoji foi proposto como um método não-verbal para avaliar as emoções do consumidor para produtos alimentícios. Vidal; Ares; Jaeger, (2016), descobriram que os emoji foram bem-sucedidos na elucidação de associações produto-emocionais em resposta a amostras degustadas ao trabalhar com diferentes categorias de produtos (por exemplo, chocolate, mel, nozes, queijo, suco, iogurte, frutas) usando uma população adulta. Ares; Jaeger, (2017) estudaram o significado mais comum associado a 33 emojis de acordo com os consumidores chineses no ano de 2017.

Jaeger *et al.*, (2017b) propuseram a substituição de palavras emocionais por emojis em questionários para descobrir as associações emocionais dos consumidores com os

produtos. Realizando pesquisas na web com mais de 1000 consumidores nos EUA e na China, esses autores descobriram que os produtos podem ser caracterizados emocionalmente e diferenciados usando emoji facial. Tendo investigado gostaram e não gostaram (aceitação) de alimentos e bebidas em uma variedade de categorias de produtos (por exemplo, lasanha, café, couve de Bruxelas, bolinhos, fundo de frango).

Um estudo de Gallo; Swaney-stueve; Chambers, (2017) explorou as diferenças na aplicabilidade de emoji com 111 crianças para 8 produtos alimentícios (cenouras, queijos cheddar, salgadinhos de chocolate, espinafre fresco, doce de goma lichia, suco de laranja, pão branco e uvas brancas) quando se trabalha com fotos e degustação real das amostras. Eles descobriram que as respostas das crianças diferiam entre a imagem e a condição de degustação. No entanto, o estudo de Gallo; Swaney-stueve; Chambers, (2017) examinou se os emoji foram capazes de discriminar entre amostras de alimentos da mesma categoria de produtos alimentícios, obtendo resposta positiva.

Emoji foram usados para comparação de associações emocionais de crianças com produtos alimentícios em diferentes esquemas de rotulagem nutricional na frente da embalagem. Sendo concluído que em geral, as crianças que avaliaram pacotes usaram emoji para a associados a emoções positivas (LIMA *et al.*, 2019).

## **2.5 Testes emojis**

### **2.5.1 Escala emojis**

A resposta afetiva humana aos alimentos pode ser avaliada objetivamente medindo os sinais comportamentais e fisiológicos das pessoas, que podem ser medidos através do uso de ferramentas de autorrelato afetivo (por exemplo, questionários, léxicos afetivos, escalas gráficas como as a escala emojis) (TOET *et al.*, 2018). As ferramentas sensoriais gráficas com emojis permitem que os usuários relatem seus sentimentos de maneira eficiente e intuitiva, indicando ou classificando a figura ou emojis que melhor representa seu estado afetivo em relação ao produto.

Embora as pessoas não identifiquem com facilidade as emoções relacionadas aos alimentos, elas parecem usar a escala emoji (figura 2) de maneira espontânea e intuitiva para

comunicar experiências emocionais relacionadas a alimentos (VIDAL; ARES; JAEGER, 2016). As escala emoji podem ajudar os usuários a expressar e transmitir sua intenção e sentimento de forma mais clara e explícita (REIS *et al.*, 2018). Uma vez que emojis abrangem uma ampla gama de emoções, por exemplo, rosto sorridente versus rosto zangado, rosto sonolentos com a língua presa e o olho piscando (TOET *et al.*, 2018).

Figura 2 - Escala emoji estruturada com 7 pontos.



Fonte: Swaney-stueve; Jepsen; Deubler, (2018).

A escala emoji (figura 3) pode extrair a mesma gama de respostas emocionais que escalas, por exemplo, com fotografias de rostos humanos (MOORE; STEINER; CONLAN, 2013). Em contraste com as fotografias de rostos humanos, os emoji não estão associados à supergeneralização (a má atribuição de emoções e características a rostos humanos neutros que meramente carregam uma sutil semelhança estrutural com expressões emocionais; ou raciais, culturais e preconceitos sexuais (GOLDMAN, 2018).

Figura 3 - Escala emoji estruturada com 5 pontos.



Fonte: Alismail; zhang, (2018).

As ferramentas de classificação baseadas em escala emoji estão se tornando ferramentas cada vez mais populares como instrumentos de autorrelato (KAYE; MALONE; WALL, 2017) para medir, por exemplo, a experiência do usuário e do consumidor. Por exemplo, Moore; steiner; conlan, (2013) desenvolveram uma escala emoji de nove pontos para medir as respostas

afetivas dos usuários a uma simulação de treinamento online em relação a determinados alimentos, e Alismail; zhang, (2018) usaram uma escala emoji de cinco pontos para avaliar a experiência do usuário com questionários eletrônicos.

Schouteten *et al.* (2018), avaliou 5 amostras diferentes de um biscoito ('speculoos'), com o uso de emoji para o perfil emocional de 149 crianças. O gosto geral e o perfil emocional com escala emoji foram avaliados para cada amostra. Os resultados mostraram que os emoji foram capazes de discriminar entre os produtos, enquanto menos discriminação foi obtida entre amostras hedonicamente semelhantes. Além disso, os resultados indicaram que algumas respostas emoji foram influenciadas pela frequência de consumo. Além disso, este estudo descobriu que a adição de medidas de emoji melhora a previsão de escolha de alimentos em comparação com as medições gerais de sabor.

Para tornar a escala de auto avaliação mais acessível para as crianças, Hayashi *et al.*, (2017) substituiu os personagens de desenhos animados por emoji. Sendo a escala caracterizada como “emoti-SAM” de cinco pontos, sendo que foi rapidamente compreendida por crianças e podendo ser usada de forma efetiva como versão on-line e em papel. Por sua vez, Swaney-stueve; Jepsen; Deubler, (2018) desenvolveram uma escala de valência bipolar de sete pontos marcada com emoji. Eles compararam essa escala a uma escala verbal de nove pontos em que as crianças relataram suas respostas afetivas a diferentes sabores de pizza.

### 2.5.2 Questionários

O interesse em medir as associações emocionais eliciadas pelo produto aumentou acentuadamente desde 2010, em parte impulsionado pela diversificação do campo “além da hedônica” (MEISELMAN, 2013). Surgiram várias pesquisas de emoções baseadas em palavras para pesquisas sensoriais e de consumo focadas no produto, variando na formulação das perguntas, extensão, escalas de resposta, linguagem, etc. (CARDELLO; JAEGER, 2017).

O uso de questionários baseados em palavras para obter associações emocionais a produtos está se tornando uma abordagem dominante na ciência sensorial e do consumidor (MEISELMAN, 2015). Diferentes questionários foram desenvolvidos para medir o envolvimento do consumidor com os produtos, considerando a interação entre os elementos cognitivos e afetivos. Esses questionários podem ser usados para segmentar consumidores com



base em seu nível de envolvimento e para estudar a influência desse construto complexo sobre como eles percebem e selecionam produtos (CIVILLE; OFTEDAL, 2012).

No entanto, os consumidores tendem a não usar palavras para expressar espontaneamente suas emoções relacionadas à comida (VIDAL *et al.*, 2019), e isso levanta algumas preocupações sobre a validade ecológica dos questionários de emoção baseados em palavras. Uma preocupação é que os consumidores possam selecionar palavras de emoção, mesmo que não estejam realmente experimentando as emoções que as palavras transmitem (BAI *et al.*, 2019). Também foi sugerido que questionários de emoção baseados em palavras podem induzir o processamento analítico e podem falhar em capturar as associações emocionais intuitivas e automáticas evocadas durante o consumo do produtos (JAEGER; VIDAL; ARES, 2021).

Como parte natural dessa evolução, variantes metodológicas surgiram para atender às necessidades específicas de pesquisa e perspectivas ideológicas. Os exemplos incluem pesquisas específicas de produtos para associações emocionais com formatos mais longos / mais curtos e com diferentes abordagens de dimensionamento (CARDELLO; JAEGER, 2016).

A avaliação de questionários de emoji como um método em pesquisas de consumo relacionadas a alimentos é aprofundada por este estudo metodológico que visa explorar até que ponto eles podem ser usados com uma variedade de segmentos populacionais. Emoji se tornou a forma mais popular de expressão não verbal no contexto das comunicações mediadas por computador (BAI *et al.*, 2019)

Mais recentemente, os emoji foram aplicados em pesquisas baseadas em questionários que medem as associações emocionais dos consumidores aos produtos. Os resultados de um estudo realizado por Ares; Jaeger, (2017b), mostraram que a interpretação do emoji não é influenciada pela idade e frequência do uso de emoji. Concluíram grandes evidências de que questionários de emojis podem ser usados como um método de pesquisa para descobrir associações emocionais eliciadas por produtos.

Jaeger; Roigard; Ares, (2018), compararam o uso de emoji na pesquisa de emoções em produtos com palavras de emoção por meio de questionários. Os emojis, de modo geral, era mais discriminatório do que as palavras emocionais. Parecendo que as palavras emocionais eram menos adequadas para uso com consumidores respondendo, especialmente aqueles que evocavam emoções negativas.

### 2.5.3 Check-All-That-Apply (CATA)

Os testes sensoriais auxiliam nas decisões sobre formulações de produto e são essenciais no desenvolvimento e comercialização de novos produtos, bem como em melhoramento de formulações de produtos já existentes. Assim cada vez mais tem sido realizada a caracterização sensorial de produtos por meio de métodos que utilizam os consumidores (MIRABALLES; GÁMBARO, 2018).

Check-all-that-apply (CATA), é um tipo de análise sensorial em que um grande número de consumidores respondem uma determinada pergunta selecionando em uma lista de palavras ou frases as quais consideram apropriado para descrever um determinado produto (MIRABALLES; GÁMBARO, 2018). Ele fornece um grau de reação sensorial a um produto gerado no consumo, uma descrição dos aspectos qualitativos e quantitativos da percepção dos consumidores com a identificação de associações indiretas feitas pelos consumidores (LAZO; CLARET; GUERRERO, 2016).

O método inclui não apenas itens sensoriais, mas também hedonistas, e aqueles referentes à intenção de compra ou vínculos afetivos (ANTÚNEZ *et al.*, 2017). Em comparação com as técnicas tradicionais de escala, as questões CATA são consideradas fáceis, rápidas e mais naturais para os consumidores, além de fornecer informações valiosas porque já foram usadas para um grande número de alimentos diferentes (MIRABALLES; GÁMBARO, 2018).

A principal vantagem deste formato de pergunta é que ele não requer processamento cognitivo profundo e, portanto, pode levar a uma resposta menos analítica do que as escalas Ares; Jaeger, (2017b). No contexto da mensuração da emoção, as questões da CATA foram relatadas com mais relevância, menos difíceis de relacionar e menos imparciais do que as escalas. Portanto, abordagens que encorajam respostas mais espontâneas devem ter vantagens para a mensuração emocional. Em uma análise de sentimentos é necessário classificar a polaridade das respostas, onde as sentenças podem apresentar um aspecto positivo, negativo ou neutro. As classificações de sentimento de polaridade, podem ser por exemplo, em estados emocionais como zangado, triste e feliz (SATAPATHY; CAMBRIA; HUSSA, 2017).

Várias pesquisas de emoção baseadas em palavras para pesquisa sensorial e de consumidor focada no produto surgiram variando em termos de formulação, comprimento, escalas de resposta e linguagem (CARDELLO; JAEGER, 2016). Apesar de sua crescente

popularidade, existem algumas preocupações com o uso frequente de palavras pelos consumidores ao transmitir emoções relacionadas à alimentos e conclusão de tarefas estranhas para alguns participantes (ARES; JAEGER, 2017a).

Com esse ímpeto, os emojis também foram introduzidos como uma alternativa às palavras emocionais para uso em pesquisas CATA que provocam associações emocionais de produtos. Jaeger *et al.*, (2017a) propuseram que os emojis poderiam ser mais familiares e intuitivos para os consumidores do que palavras de emoção e encorajaram a avaliação de seu potencial na pesquisa. Eles concluíram que os emoji têm potencial para uso na medição de associações emocionais elicitadas pelo produto.

Já por sua vez (JAEGER *et al.*, 2018), realizaram uma comparação de cinco variantes metodológicas de CATA e RATA usando emoji para medir associações emocionais concluindo que pesquisas de emojis podem ser usadas para medir as associações emocionais dos consumidores aos produtos e, nesta pesquisa. O RATA apresentou desempenho superior em termos de frequência de uso de emoji e discriminação da amostra.

Pinto *et al.*, (2020), avaliaram as respostas emocionais pelo uso de emojis dentro da análise CATA, em relação a aceitação dos consumidores e a intenção de compra em relação a bebidas lácteas, com e sem adição de kefir pelo uso de emojis dentro da análise CATA. Concluíram que os emojis são capazes de explorar as emoções evocadas por alimentos podendo ainda fornecer informações adicionais além das medidas hedônicas.

### 3 CONSIDERAÇÕES FINAIS

Emojis fazem parte da vida diária da grande maioria das pessoas em todo o mundo, independentemente de seu sexo, idade e cultura. Se considerarmos os emojis como um conjunto de ícones padronizados que têm certos significados, implica que eles podem ser usados e entendidos de forma semelhante entre os indivíduos em um contexto específico, sendo assim adequados para pesquisas interculturais. Que por sua vez a interpretação não é fortemente dependente do contexto cultural.

Os emojis são considerados a linguagem que mais cresce no mundo, e se tornaram um meio eficaz de análise de sentimento em relação a alimentos sendo amplamente usados para expressar emoções. Assim para fins de pesquisa de sensoriais relacionadas com emoções acreditamos que eles oferecem algumas vantagens em relação aos estudos baseados em palavras. Os emoji são um meio de transmitir auto relatos, uma vez que fornecem representações gráficas de sentimentos, emoções e conceitos abstratos.

Por fim, os emojis parecem apresentam maior validade em relação a palavras em pesquisas sobre as respostas emocionais direcionadas a alimentos. Já foi concluído que em questionários de emoção baseados em palavras induzem o processamento analítico e, portanto, podem não capturar reações emocionais intuitivas e automáticas. O uso de questionários baseados em emoji se ajusta à relevância de pistas não verbais (ou seja, gestos, entonação vocal e expressões faciais) para melhor comunicação de emoções.

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**SEGUNDA PARTE – ARTIGOS**

**ARTIGO 1**

**Emojis in the measurement of emotions and characterization of chocolates.**

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“Versão Preliminar”

**ABSTRACT**

Recent research shows that emojis can be used to discriminate against food products, but it's unclear how they might be linked to emotional words and sensory attributes. The aim was to investigate emojis in a context related to emotions and sensory attributes of chocolates. Two experiments were carried out: 1) Test with emojis: the sensory attributes and emotional profiles of four samples of chocolates were evaluated using the relationship between descriptor terms and emojis from the Whatsapp application. 2) Test without emojis: evaluation of characteristics and emotion in relation to chocolates only by descriptor terms. At this stage, the acceptance test of the chocolates was also carried out. The results show that the participants had no difficulty using emojis to express their emotions and determine the characteristics of the chocolates. Emojis demonstrate positively for use in the description of emotions, being mainly related to the feeling of joy. Attributes were associated with different emojis, and the same emoji was associated with different characteristics. Regarding the test without emoji, we can observe a reconciliation between the terms used for both emotion and attributes when compared with the emoji test. Thus, it can be concluded that emojis can be used as a means to express emotions and discriminate chocolates in relation to their attributes.

**Keywords:** emotion. chocolate. emoji.

## 1 INTRODUCTION

The study of emotions related to taste for food is becoming more and more regular, as it is recognized that emotions can exert a great influence on eating and drinking, and thus can provide a relevant understanding about consumers' experiences with products (Pierguidi, Spinelli, Dinnella, Prescott & Monteleone, 2020). In addition, the emotional profile can provide additional information for marketing and development of food products.

Including emotional profiles increases predictive value compared to using taste ratings exclusively for consumers' product-choice behavior (Schouteten, Verwaeren, Lagast, Gellynck, & De Steur, 2018). With the restriction of available and acceptable methods for this type of research, less traditional means are being explored. An example of this is the use of emoji to record reactions to consumer products (Deubler, Swaney-Stueve, Jepsen, and Su-Fern, 2020). Emojis are small ideograms that represent objects, people and scenes, they have exploded in popularity (Sick, Monteleone, Pierguidi, Ares, & Spinelli, 2020).

Jaeger, Vidal, Kam, & Ares, (2017), monitored the use of emojis as a non-verbal method to assess consumer emotions towards food products, emojis demonstrated success in elucidating emotional responses to samples experienced in different categories of food products. Emojis can be used in place of verbal communication to evaluate food and beverages through emotions and attitudes that transcend hedonic responses and demonstrate consumers' subjective experiences (Pinto et al., 2020).

Emojis can act as visual symbols or be read as non-verbal cues that fulfill semantic or emotional functions (Bai, Dan, Mu, & Yang, 2019). Although emojis are static and unnatural representations of emotional expressions of the human face, they have become a very popular mechanism for expressing emotions, they have become a commonly used expression of emotion and communicative intent (Gantia, Araujo, Castillo, Claro, & Hurtado- Parrado, 2021).

Emojis, are available on all major mobile phone platforms and social media sites, as well as many other places (Cappallo, Svetlichnaya, Garrigues, Mensink, & Snoek, 2019). Although emoji have become ubiquitous, the lack of understanding of their meaning acts as a barrier to their understanding in sensory and consumer science (Jaeger et al., 2021).

Emojis are increasingly present to convey consumers' emotional and conceptual emotions, for example (Jaeger, Vidal, & Ares, 2021), (Gallo, Swaney-Stueve, & Chambers,

2017), (Jaeger, Xia, et al. , 2018), (Swaney-Stueve, Jepsen, & Deubler, 2018), (Alismail & Zhang, 2018), (Jaeger, Lee, et al., 2018), (Gantiva et al., 2021), (Vidal, Ares , Blond, Jin, & Jaeger, 2020), (Sick et al., 2020) and (Rodrigues et al., 2020).

The aim of this study was to understand the applicability of emojis to obtain emotional responses and attribute descriptions in chocolates with different characteristics.

## **2 MATERIALS AND METHODS**

### **2.1 Sensory analysis**

The chocolates used in the sensory tests for experiments 1 and 2 were purchased from local businesses in Lavras-MG. Four formulations of chocolates from the same brand were evaluated: CH-1 Milk Chocolate (30% cocoa without nuts), CH-2 Milk Chocolate with nuts (30% cocoa with nuts), CH-3 Dark Chocolate, (70% cocoa without nuts) and CH-4 Dark chocolate with nuts (70% cocoa without nuts). Chocolate was chosen because it is called an emotional product (Vidal et al., 2020).

This study was examined and approved by the Ethics Committee for Research with Human Beings of the Federal University of Lavras, under code 20048219.1.0000.5148. Sensory analysis was performed at the Sensory Analysis Laboratory at the Federal University of Lavras, MG, Brazil. They were carried out under ideal conditions, under white light, at a controlled temperature of 25°C and in individual booths.

The chocolate samples for the 2 tests were coded in random numbers of three digits and developed in monadic and balanced order, following the sensorial methodology proposed by Wakeling and Macfie (Wakeling & MacFie, 1995). How four of the unique chocolates were personalized in 50 mL disposable plastic cups, each containing a guaranteed-sized piece of chocolate. Water was served to cleanse the palate between an evaluation of the chocolates.

#### **Experiment 1 - Test with emojis**

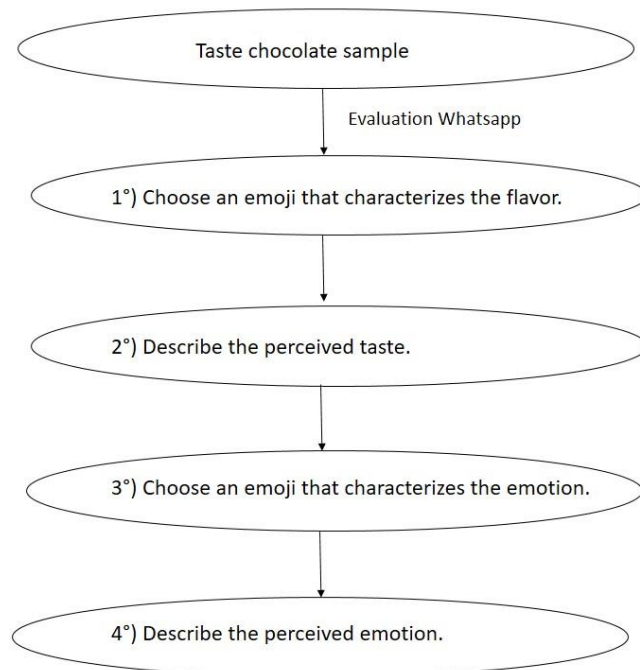
The chocolates used in the sensory tests of experiments 1 and 2 were purchased from local shops in Lavras-MG. Four chocolate formulations of the same brand were evaluated: CH-1 Milk Chocolate (30% cocoa without nuts), CH-2 Milk Chocolate with nuts (30% cocoa with nuts), CH-3 Semisweet Chocolate (70% nut-free cocoa) and CH-4 Nutty dark chocolate (70%

nut-free cocoa). Chocolate was chosen because it is called an emotional product (Vidal et al., 2020).

This study was analyzed and approved by the Ethics Committee for Research with Human Beings of the Federal University of Lavras, under code 20048219.1.0000.5148. Sensory analysis was performed at the Sensory Analysis Laboratory at the Federal University of Lavras, MG, Brazil. They were carried out under ideal conditions, under white light, at a controlled temperature of 25°C and in individual booths.

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**Flowchart 1:** Description of the emoji test steps.



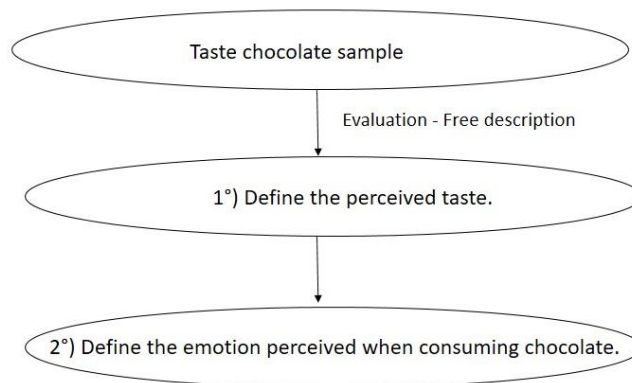
The tasters were asked to try the sample of chocolates, then on WhatsApp® choose emojis that could describe the emotion evoked at the time of consumption in relation to the sample, and later mention terms that would be related to each chosen emoji and the feeling sent when consuming the chocolate. The same procedure was performed for the test with the

attributes, first they were asked to choose the emojis that portrayed the characteristics of the chocolate and then the association through terms described for the sensory attributes.

### **Experiment 2 - Test without emojis**

The test followed the steps illustrated in flowchart 2. The sensory test without the use of emojis was performed at a different time than the test with the use of emojis, as a way to avoid interference in the description of emotion and attributes. The analysis followed the same requirements as the first free-form test, but the description was only in words for both emotion and attributes with the absence of emojis.

**Flowchart 2:** Description of test steps without emojis.



#### **2.1.1 Acceptance test**

The acceptance test was applied in experiment 2, taking into account the global evaluation of the chocolates, using a nine-point numerical, structured and verbalized hedonic scale, where the scores ranged from (1) “I disliked extremely” to (9) “I liked it extremely”, with the value (5) “neither liked nor disliked” being the central point.

#### **2.2 Data analysis**



The data from experiments 1 and 2 were analyzed following the same manipulation line, so they are being felt in the same session.

### 2.2.1 Frequency analysis of emojis and descriptor terms chocolates

For data analysis, emojis were initially selected. The frequency of mention of each emoji was based on counting the number of participants who responded using the emoji within each chocolate sample. For the selection of emojis, a minimum frequency of 5 citations was considered (Jaeger et al., 2021). Therefore, 20 emojis were selected for the emotion analysis (Table 1), and 21 emojis for the description of the attributes of the chocolates (Table 2).

**Table 1:** List of emojis selected for emotion analysis of chocolates.

















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**Table 2:** List of emojis selected for chocolate attribute analysis.

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Then, Pareto charts were generated, taking into account the frequency of use of each of the emojis in the different samples of chocolates, and in relation to attributes and emotion, with an analysis performed in Microsoft Excel.

As for the selection of terms from experiments 1 and 2 that were responsible for describing the attributes and emotion, the citation frequency of at least 5 in each chocolate



sample was also considered, and only the terms mentioned by more than 15 % of participants were retained. So for experiment 1, 12 descriptors were selected for emotion analysis and 14 descriptors for attribute analysis were evaluated (Table 3). In experiment 2, 15 terms were selected for emotion and 13 terms for the sensory characteristics of chocolates (Table 4).

**Table 3:** List of descriptors used in the analysis to characterize the chocolates in relation to emotion and characteristics with emojis.

<b>Emotion</b>	<b>Features</b>
happiness	Sweet
Calm	Bitter
Satisfaction	Creamy
Tranquility	Milk
Family (Union)	Soft
Nice	Tasty
Peace	Melt in the mouth
Infancy	Cocoa
Indifferent	Crunchy
Dissatisfaction	Strong flavour
Sadness	Nut
	Caramel
	Peanut

**Table 4:** List of descriptors used in the analysis to characterize the chocolates in terms of emotion and features without emojis.

<b>Emoção</b>	<b>Características</b>
Happiness	Sweet
Tranquility	Bitter
Peace	Soft
Nostalgia	Cocoa
Pleasure	Buttery
Infancy	Creamy
Satisfaction	Melt in the mouth
Union	Honey
Calm	Milk
Sadness	Caramel

Satiety	Nut
Dissatisfaction	Salty
Indifferent	Fruity
Well-being	
Nice	

### 2.2.2 Cochran's Q test

Cochran's Q test was used to verify differences in meaning between samples for each emoji and terms described in the chocolate samples. The statistical program used was the R version and the Senso MineR package (Husson & Cadoret, 2017).

### 2.2.3 Correspondence analysis

Correspondence analysis (CA) was performed on the matrix containing the citation frequency of emojis for which origin differences were identified by the Cochran Q test, in order to determine the spatial configuration of emojis. A double three-dimensional representation of the samples and attributes that allowed to determine the similarities and differences between the products (Popoola, Bruce, McMullen, & Wismer, 2019). The statistical program used was Sensomaker (Nunes & Pinheiro, 2014).

Correspondence analysis (CA) also took into account the frequency of citation of emojis with attribute and emotion descriptors. In order to determine the spatial configuration of emojis and descriptors, using the Sensomaker software. Taking into account the frequency of use of the terms describing the characteristics and emotion in the different chocolates, a correspondence analysis was performed using the Sensomaker Software.

It was intuitive to point out the spatial configuration of the descriptors, and of the Chocolate exhibitions in experiment 2. The same process was followed for the data obtained in the analysis without using emojis, terms expressed in table 4.

### 2.2.4 Test accepted

Acceptance test data were evaluated by ANOVA and Dunnett's Test ( $p < 0.05$ ), in the SensoMaker software (Nunes & Pinheiro, 2014). Graphical analysis was performed using the QtiPlot software (<https://www.qtiplot.com/index.html>).

## 3 RESULTS AND DISCUSSION

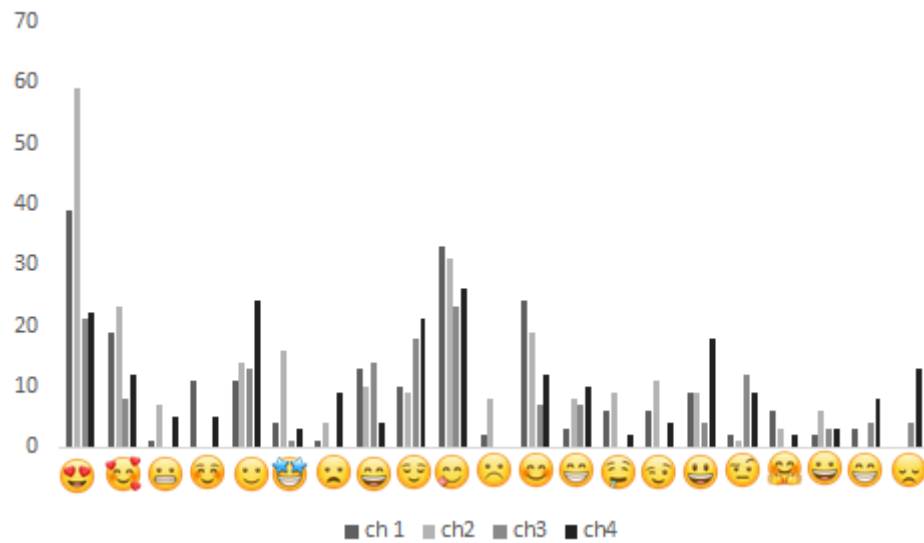
### Experiment 1

#### 3.1 Frequency of use of emojis in chocolates

The frequency distributions of emojis in the exception of chocolate in relation to the attribute analysis are expressed in the Pareto diagram (Figure 1). The vertical axis corresponds to the repetition frequency related to each emoji. The most frequent emojis in the characterization of the 4 Chocolate Samples were the smiley face emojis with heart eyes (😍), smiley face 3 hearts (😄), slightly smiling face (😊), smiling face with smiling eyes smiling face with tranquility (😌), face tasting food (😋) and smiling face with smiling eyes (😁).

As for the frowning face with open mouth emoji (😞), displeased face (😞) and embarrassed smiling face (😏) were the least cited. Where, the emoji frowning face with open mouth was used only in sample CH-4 (Bitter chocolate with chestnuts), while the embarrassed smiling face was mentioned in exhibitions CH-1 (Milk chocolate) and CH-4 (Bitter chocolate with nuts), and the unhappy face was present in the description only of CH-1 (Milk chocolate) and CH-

(Milk chocolate with nuts).

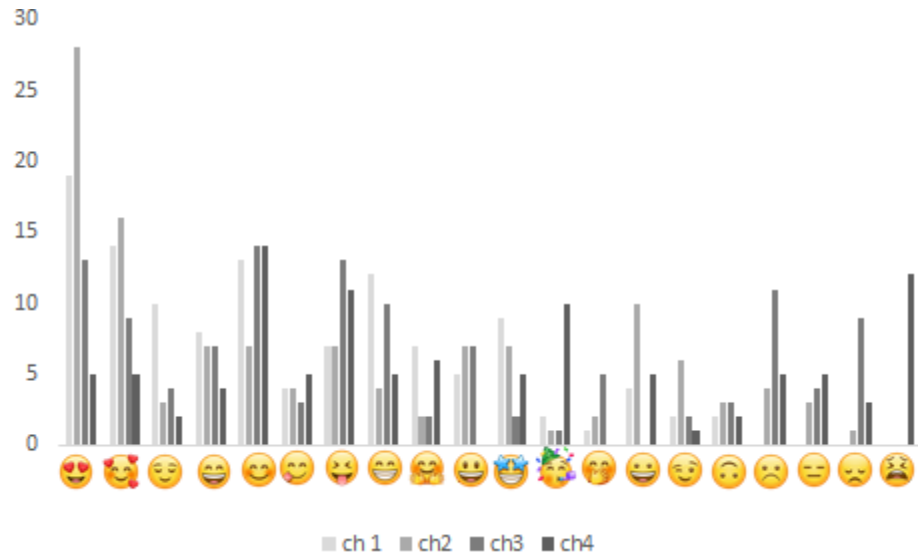


**Figure 1:** Frequency of emojis in the chocolate samples in the analysis with chocolate attributes.

Emoji can be considered a "set of emoticons that have a certain meaning" and are therefore expected to be interpreted similarly among consumers in a given context (Bai, Dan, Mu, & Yang, 2019). The interpretation of emoji seems to be located mainly with its facial expression, particularly in the case of emoji conveying basic sensations (Jaeger et al., 2018).

The frequency of the emoji from the analysis of the emotion sent when consuming the chocolates can be seen in Figure 2. Regarding milk chocolate (CH-1) and milk chocolate with nuts (CH-2), the emoji that stood out in terms of emotion expression were smiling face with heart eyes (😍), smiling face 3 hearts (😘), smiling face with smiling eyes (😊), smiling face with smiling eyes (😁), happy face (😄), face with amazed look (😆) and the face with half-closed eyes and tongue out (😝). The happy face emoji (😄) showed greater relevance in the CH-3 sample.

The emojis that stood out in dark chocolate (CH-3) and dark chocolate with chestnut (CH-4) were the smiling face with smiling eyes (😊), face with half-closed eyes and tongue out (😝), smiling face with smiling eyes (😁). Emojis with disgruntled faces (😞) and (😟) had greater relevance in the CH-3 sample, in turn, the festive happy face emoji (🎉) and the unhappy face (😞) excelled in describing the evocation of emotion in relation to CH.4.



**Figure 2:** Frequency of emoji in the chocolate samples in the chocolate emotion analysis.

Pictograms, like emoticons and emojis, have been considered a partial replacement for standard language, as well as an automatic and effortless way of expressing emotions. Emoji have been identified as an important cue to add personal expression and portray emotional or social intent (Vidal et al., 2020). According to Evans (2015), emojis are the preferred means of expressing emotions for many people.

Therefore, considering the wide range of meanings that can be conveyed with emoji, the opportunity to include them in the response to an open question can facilitate the expression of emotional and conceptual associations, in addition to making the task more engaging for consumers. In this regard, surveys satisfied that emoji are useful for capturing consumers' emotional product associations when included in scaled, check-all-that-applies (CATA) questions (Jaeger et al., 2018 ; Swaney-Stueve, Jepsen, & Deubler , 2018).

### 3.2 Match analysis - emoji and chocolates

According to Cochran's Q test (Table 4) for the analysis of emotion, it can be observed that of the 20 emojis, the frequency with which consumers used 7 emojis in the evocation of emotion experienced differences between the sample, namely: (😍), (😊), (🥳), (😄), (😞) and (😫). And for 13 emojis there was no statistically significant difference. Thus, they did not significantly contribute to the discrimination of emoji use and had a significance  $> 0.05$ .

As for the analysis of attributes through Cochran's Q test, it can be considered that in the total of 21 emojis, the frequency with which the tasters used 15 emojis to define the attributes of the chocolates showed a significant difference between samples. And only for 6 emojis there was no statistically significant difference, namely: 😊, 😄, 😁, 😂, 😃 and 😅. The other emojis tolerated significantly for the description of the characterization of the attributes of the chocolates and showed significance  $< 0.05$ .

This result suggests that the methodology allowed identifying the difference between the sample and the use of emojis, that is, consumers were able to describe the sensory characteristics and the emotion evoked through the use of emoji, thus, according to individual sensory perception, they selected emojis for represent the descriptors differently to describe as Exception of chocolates.

**Table 4:** Cochran's Q test p-value for emojis in the analysis of emotion and attributes.

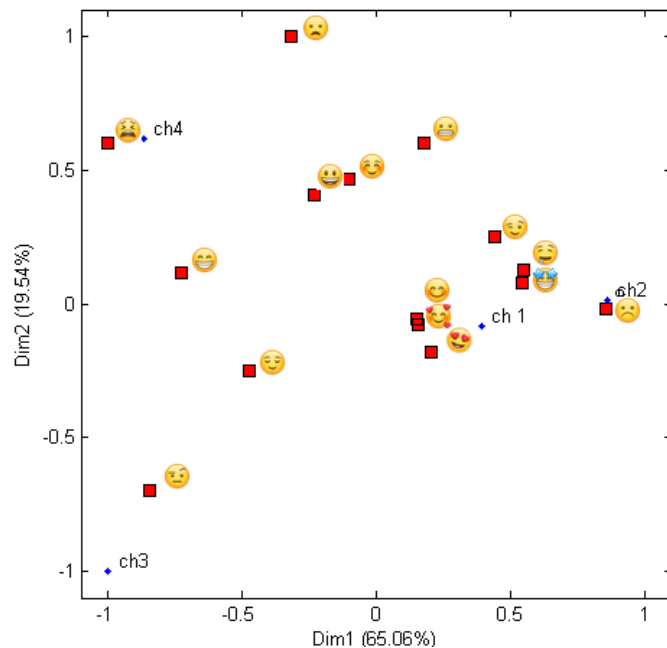
Emotion	Valor p	Attributes	Valor p
😍	< 0.001*	😍	< 0.001*
😘	0,070 <sup>ns</sup>	😘	0,022*
😊	0,028*	😏	0,018*
😄	0,692 <sup>ns</sup>	😄	0,002*
😁	0,371 <sup>ns</sup>	😊	0,058 <sup>ns</sup>
😂	0,914 <sup>ns</sup>	😂	< 0.001*
😃	0,374 <sup>ns</sup>	😞	0,002*
😅	0,110 <sup>ns</sup>	😄	0,092 <sup>ns</sup>
😆	0,151 <sup>ns</sup>	😌	0,035*
😇	0,075 <sup>ns</sup>	😘	0,392 <sup>ns</sup>
😈	0,154 <sup>ns</sup>	😞	0,001*
🎉	< 0.001*	😏	0,006*
😏	0,072 <sup>ns</sup>	😄	0,283 <sup>ns</sup>
😁	0,014*	😏	0,009*
😂	0,127 <sup>ns</sup>	😌	0,006*
😃	0,940 <sup>ns</sup>	😄	0,016*
😅	0,005*	😏	0,001*

😞	0,176 <sup>ns</sup>	😄	0,078 <sup>ns</sup>
😓	0,002*	😁	0,440 <sup>ns</sup>
😔	< 0.001*	😌	0,022*
		😞	< 0.001*

\*Indicates significant difference at 5% ns: not significant

### 3.3 Analysis emojis-sensory attributes

Figure 3 shows the Correspondence Analysis (CA) graph applied to the contingency table with chocolate attributes, in which only the experienced emojis were used for sample distribution. The first and second dimensions represent approximately 84.6% of the experimental data variance, with 65.06% and 19.54%, respectively. It can be seen that the emojis that characterize contrasts appear in opposite directions, for example, (😞) and (😓).



**Figure 3:** Representation of the emoji and the Exceptions of chocolates in the first and second dimensions of the correspondence analysis referring to the analysis of attributes.

A sample of chocolates had different characteristics, which can lead to different emoji associations. According to the Internet users of the packaging, chocolate 1 is called milk with a high concentration of sugar and creaminess, while chocolate 2, in addition to the exclusive characteristics of chocolate 1, has a crunchy composition due to its composition of milk with

chestnuts, chocolate 3 and named as characteristic of bitter and finally chocolate 4 and described as bitter and crunchy.

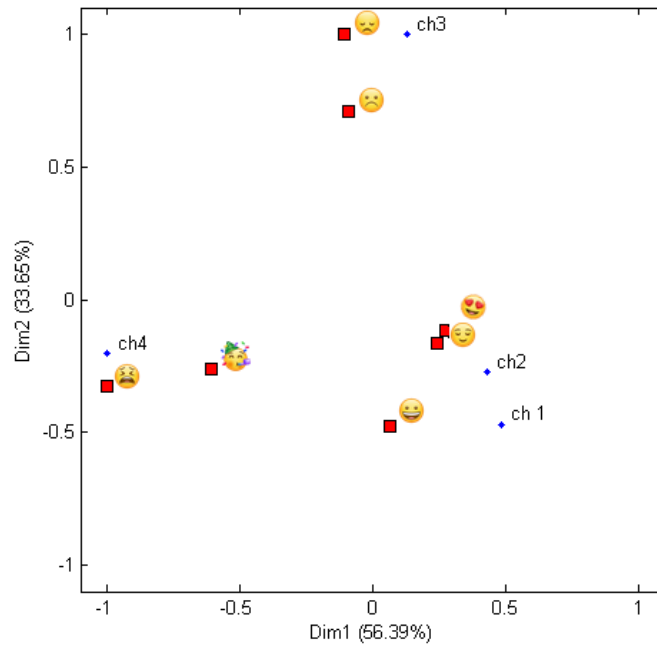
The sensory map (Figure 3) shows that CH-1 and CH-2 chocolates were characterized mainly by emojis (😍), (😘), (😄), (😊), (😏), (😌) and (😞). The emojis (😐) and (😏), were linked to CH-3 and in turn, the emojis, (😞), (😄), (😏) Specify as sample CH-4. Being that these emojis that tolerate for the distancing of the Exception with chocolates. As for the emojis (😏), (😄) and (😐) podem ser considerados para as Excepções CH-1 e CH-4.

Currently, in food-related consumer research, emojis allow for a deeper understanding of consumer perception of products and services. It can be used to understand consumer choices and experiences and thus provide insights for optimization and new product/service development (Jaeger et al., 2018) as well as formulation changes (emotional responses can identify whether changes will result on a positive or negative result for the test product) (Pinto et al., 2020).

Figure 4 demonstrates the Correspondence Analysis (CA) applied to data obtained by emotion analysis, where only significant emojis were used for sample discrimination. The first and second dimensions represent approximately 90.04% of the variance of the experimental data, with 56.39% and 33.65%, respectively. CH-1 and CH-2 chocolates showed homogeneity in relation to the emojis that characterized them in terms of emotion, namely: (😍), (😏) and (😄). As for the emojis (😞) and (😞) stood out for the definition of emotions related to sample CH-3. And finally the CH-4 chocolate was called predominant by (🎉) and (😞).

The chocolates were mostly inspired by using emojis associated with positive emotions. Bartkiene et al., (2021), showed that chocolate consumption can decrease negative mood, while emotions of happiness and surprise were often related to a sweet taste. Emojis may have advantages in collectivist cultures where social norms may discourage the use of negative words to characterize stimuli (Pinto et al., 2020). In this sense, (Vidal et al. 2019) reported that emoji had advantages over words to characterize food stimuli that provoke negative emotional responses.

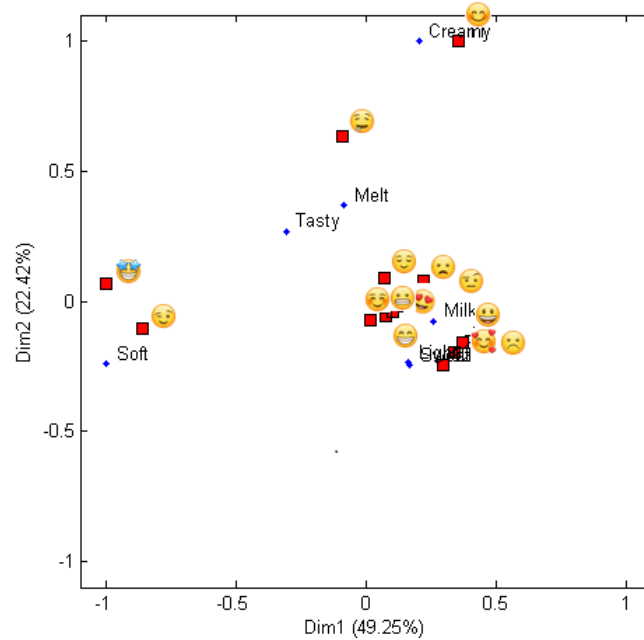




**Figure 4:** Representation of emojis and chocolate samples in the first and second dimensions of the correspondence analysis referring to the emotion analysis

For the correspondence analysis referring to the emojis and the attributes of the chocolates, in the same way as before, only the existing emojis were used for the detection of the descriptors. Chocolate samples were identified by different emojis and attributes.

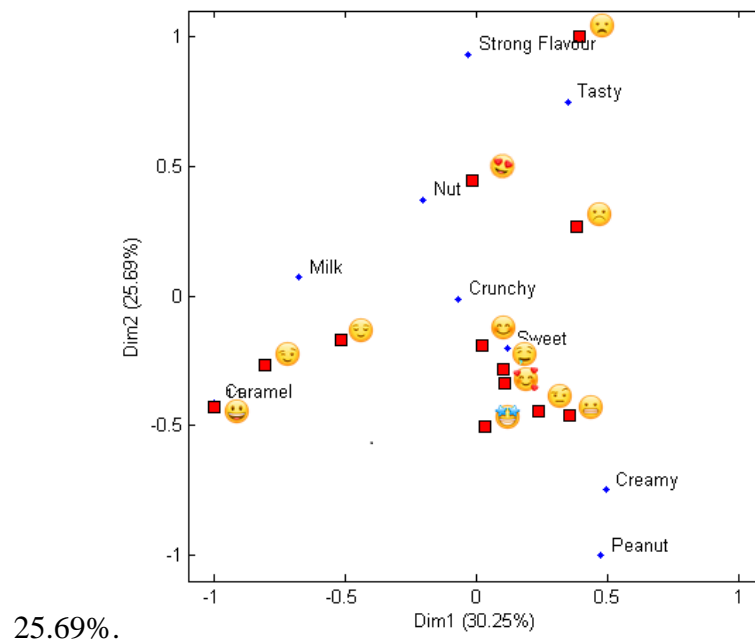
Figure 5 refers to milk chocolate CH-1, the first and second dimensions represent approximately 71.67% of the variance of the experimental data, with 49.25% and 22.42%, respectively. The sweet, light and milk attributes are expressed by the same group of emojis: (😍), (😘), (😋), (😊), (😁), (😄), (😌), (😏), (😞) and (😏). The creamy attributes were denominated by (😋), the soft attribute by the emoji (😋) and (😏) and the definitions of tasty and melt in your mouth were identified by (😋).



**Figura 5:** Representation of emojis and attributes of chocolates in the first and second dimensions of the Correspondence Analysis. For chocolate sample 1 (CH 1).

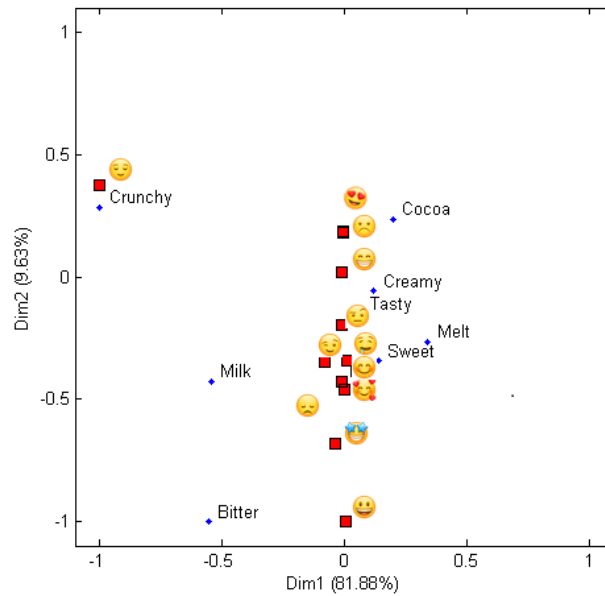
In turn, in milk chocolate with nuts CH-2 illustrated by figure 5.1 shows that the emoji (😍) featured nut attribute and emoji (😞) identified as tasty characteristics and strong flavor. As for the emojis (😄), (😊) and (😌) were responsible for defining caramel and milk. And finally, the definitions of creamy sweet, peanut and crispy were identified by (😂), (😘), (😏), (😁), (😄) and (😞). The emoji (😞) it can be termed within the crunchy and chestnut attributes. The original variables were reduced to two dimensions, responsible for 55.94% of

the total variability, where the first dimension was responsible for 30.25% and the second for



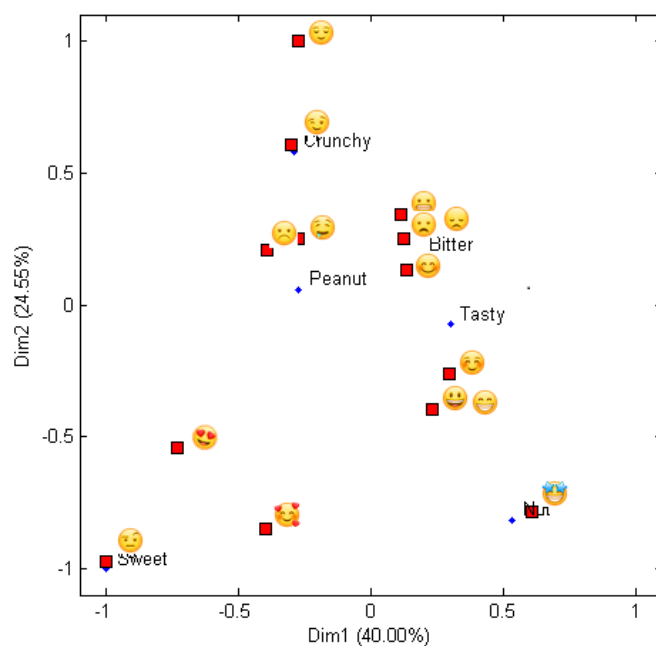
**Figure 5.1:** Representation of emojis and attributes of chocolates in the first and second dimensions of the Correspondence Analysis. For chocolate sample 2 (CH 2).

As observed in Figure 5.2 referring to the characterization of dark chocolate CH-3, the first and second dimensions represent approximately 91.51% of the variance of the experimental data, with 81.88% and 9.63%, respectively. The crunchy attribute has been identified (😋) presenting itself more distant from the other attributes such as the bitterness that was identified by (😄), (😜) and (😞). The other descriptors such as cocoa, creamy, tasty, melt in your mouth, sweet and milk were characterized by emojis (😍) (😜), (😞), (😍), (😊), (😋), (😌), (😞), (😞) and (😄).



**Figure 5.2:** Representation of emojis and attributes of chocolates in the first and second dimensions of the Correspondence Analysis. For chocolate sample 3 (CH 3).

Figure 5.3 shows the correspondence analysis between dark chocolate and nuts, the first and second dimensions represent approximately 64.55% of the variance of the experimental data, with 40.00% and 24.55%, respectively. The sweet attribute was identified by emojis (🍬), (🍩) and (🍪), turn brown by (🍫). As for the emojis (😞), (😓), (😔), (😬), (😏) and (😓) characterized the descriptors peanut and bitter. And finally, the tasty attribute was named by (😋), (😍) and (😄), and crunchy by the following emojis (🍪) and (🍩).



**Figure 5.3:** Representation of emojis and attributes of chocolates in the first and second dimensions of the Correspondence Analysis. For chocolate sample 4 (CH 4).

Some emojis had the same attribute description on different chocolates, for example (🍬) which defines the sweet taste for the 4 chocolate samples. However, the facial expression of some emojis seems to bring ambiguity to their interpretation, leading to multiple and unrelated meanings (Vidal et al., 2019).

The results confirm that consumers continue to relate emojis to chocolate attributes. There are different variants of similar emojis, for example different variants with tongue sticking out. But it seems that these emojis have quite similar meanings, according to the results of Jaeger et al. (2018).

Vidal et al., (2020), finding that participants use emojis to emphasize information that has already been expressed in writing, at least part of the information was conveyed exclusively by emojis in 20% of responses. This emphasizes the potential for emojis to add additional effects to consumers' experiences with the product. As expected, emojis were used by participants to convey a wide range of meanings that included their hedonic reaction to products, hedonic reaction to specific sensory characteristics, as well as emotional and conceptual associations.

### 3.4 Analysis emojis-emotions

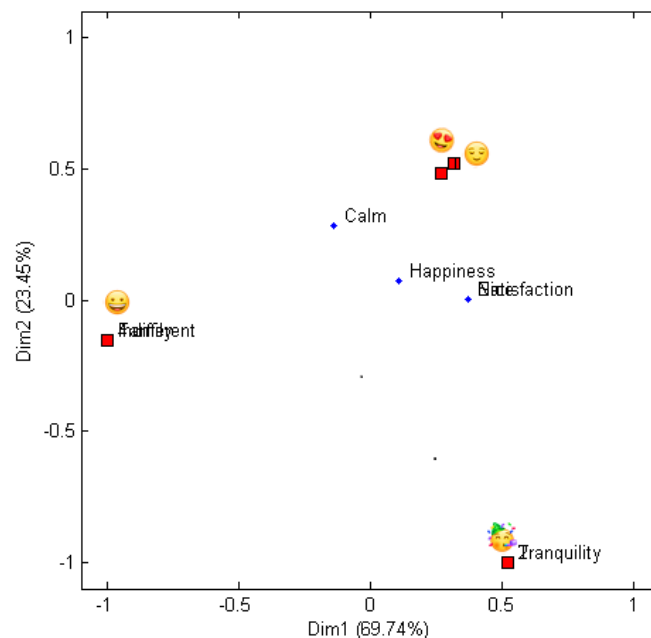
For Correspondence Analysis (CA) applied to data obtained by emotion analysis, only expressive emojis were used to describe the descriptors. An emotion is defined by King & Meiselman, (2010) “as a feeling that is brief, intense and often focused on a referent”. Emotion is one of the conceptual categories that are associated with eating, along with concepts and abstracts. In addition, emotions, whether positive or negative, influence food intake. Emotional responses depend on consumers' attitudes towards food (Schouteten et al., 2018).

The chocolates were characterized by different emojis and emotion descriptors. Although the emojis included in the answers are associated with positive, neutral and negative values, positive emojis were the most used. Figure 6 refers to CH-1, the descriptor tranquility was identified by the emoji (🎉). As for the emojis (😍) and (😊) were responsible for the characterization of calm, happiness, satisfaction and pleasant. This is because chocolate has an

immediate mood-enhancing effect due to its palatability, which flips the switch associated with emotional eating (Macht & Muller, 2007).

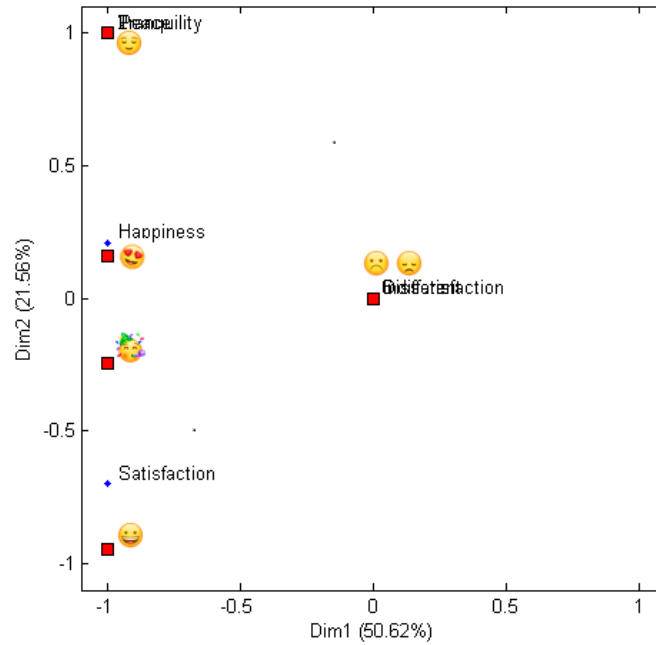
Another important factor for improving mood influenced by chocolate is the presence of tryptophan in cocoa, an amino acid capable of causing an attraction of serotonin, a neurotransmitter associated with a feeling of pleasure and well-being and a decrease in cases of stress and depression (Martins and others, 2017). And the terms family and indifferent were denominated exclusively by (😐).

The variables were reduced to two dimensions, responsible for 93.19% of the total variability, where the first dimension was responsible for 69.74% and the second for 23.45%.



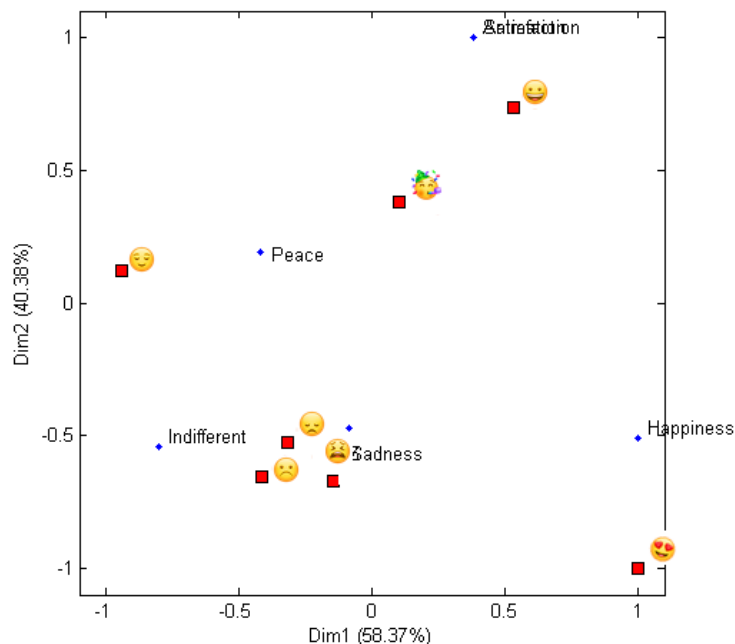
**Figure 6:** Representation of emojis and emotions in the first and second dimensions of Correspondence Analysis. For chocolate sample 1 (CH 1).

Figure 6.1 shows the results of the CH-2 sample, the first and second dimensions represent approximately 72.18% of the variance of the experimental data, with 21.56% and 50.62%, respectively emoji (😌) define tranquility and peace, pleased turn was identified by (😊) and (🎉). The feeling of happiness when consuming milk chocolate with nuts was characterized by the emoji (😍) and (🎉), and the feeling of dissatisfaction and indifference was defined by (😐) and (😞).



**Figure 6.1:** Representation of emojis and emotions in the first and second dimensions of Correspondence Analysis. For chocolate sample 2 (CH 2).

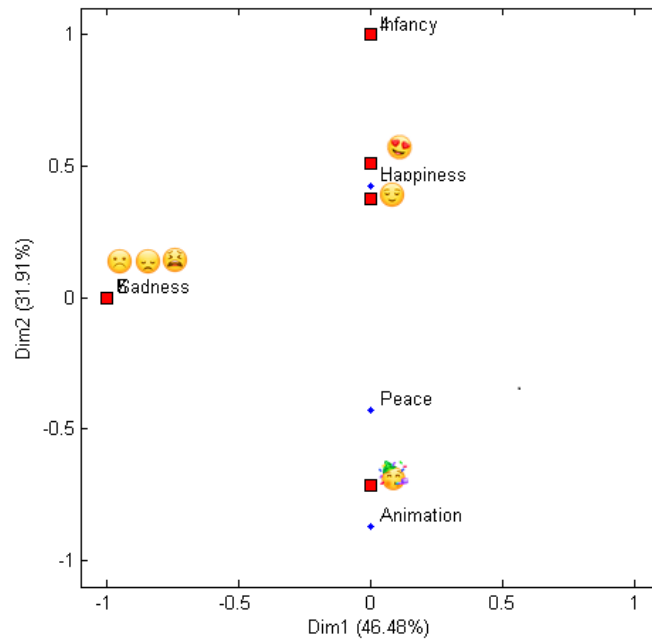
When considering figure 6.2 in relation to chocolate CH-3, it can be observed that happiness was presented exclusively by the emoji (😍). The feelings of sadness and indifference were named by (😞), (😓) and (😞). The mood-improving effect is only possible when chocolate is ingested in small amounts and with full awareness of its consumption, otherwise it can lead to a worsening of mood and initiate feelings of guilt and sadness due to the ingestion of high caloric amounts and concern for the body (Meier et al., 2017).



**Figure 6.2:** Representation of emojis and emotions in the first and second dimensions of Correspondence Analysis. For chocolate sample 3 (CH 3).

The feeling of peace was presented by (😊) and (🎉). Then the emoji (😄) characterized the descriptors of emotion, excitement and satisfaction. The variables accounted for 98.75% of the data variability, with 58.37% in the first dimension and 40.38% in the second dimension.

The CH-4 sample correspondence map is shown in figure 6.3, the first dimension represented 46.48% and the second 31.91, thus the data variance was 78.39%. The feeling of sadness was identified by (😞), (😓) and (😔), in contrast the feeling of happiness and memory of childhood was identified by (😍) and (😊). And finally, the emoji (🎉) was responsible for describing the emotion related to peace and animation.



**Figure 6.3:** Representation of emojis and emotions in the first and second dimensions of Correspondence Analysis. For chocolate sample 4 (CH 4).

Emojis can be used as a means to express emotions and discriminate chocolates. The findings of this study are in line with previous studies that show that the judgment regarding emotions evoked in relation to food is based on cultural cues and pre-knowledge about food products. Where evaluators were able to relate emojis and attribute emotions evoked when consuming chocolates with different characteristics, observe that consumers did not demonstrate difficulty in expressing their emotions and characterize as an example with the presence of emojis.



The effects of these signals and how they are received and valued by consumers can make the acceptability of food and beverage products less dependent on sensory attributes (Pinto et al., 2020). Emojis with positive expressions were used more than emojis with unhappy faces. Emoji code is constantly evolving and expanding, and some emojis are more popular than others. Happy faces account for 44.8% of emoji usage, while sad faces account for 14.3% (Danesi, 2016).

Pinto et al., (2020), elucidated certain differences in the meanings of emojis for Brazilian consumers compared to the meanings found in previous studies (Jaeger et al., 2018). For example, face with raised eyebrow (🙄) and grimace (😬) characterized good and bad emotions with varying degrees of intensity (low, medium and high). In turn, in the current study, it can be observed that emojis did not vary between positive and negative emotions.

Previous research found that emojis are useful for capturing consumers' emotional product associations when included in scales, check all that apply (CATA), or rate all that apply (RATA) (Jaeger, Lee, et al., 2018; Swaney-Stueve, Jepsen & Deubler, 2018).

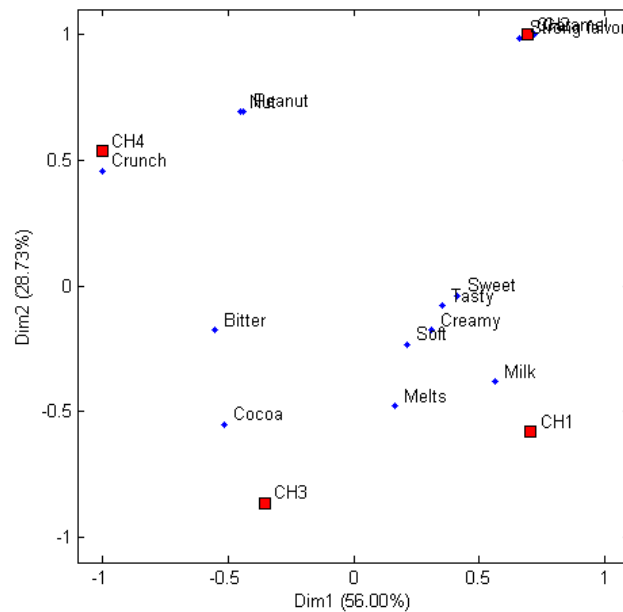
Sick et al., (2020), used the CATA methodology with emoji to investigate the emotional meaning of emoji used to describe eating experiences in preadolescents aged 9 to 13 years old and to measure age and related gender differences. In general, negative emoji had more distinct meanings than positive emoji, but differences in meaning were also found among positive emoji. Older girls and preteens (12–13 years old) discriminated the positive positive emoji satisfactorily than younger boys and preteens (9–11 years old). This suggests that older girls and preteens may have greater emotional granularity (the ability to experience and discriminate emotions), particularly positive emotions.

### **3.5 Analysis of correspondence descriptors – chocolates with emojis**

The analysis of the correspondence referring to the chocolates and attribute descriptors referred to in figure 7, through which we can conclude which are the characteristics and emotion descriptors that are directly associated with each chocolate sample for the analysis associated with emojis.

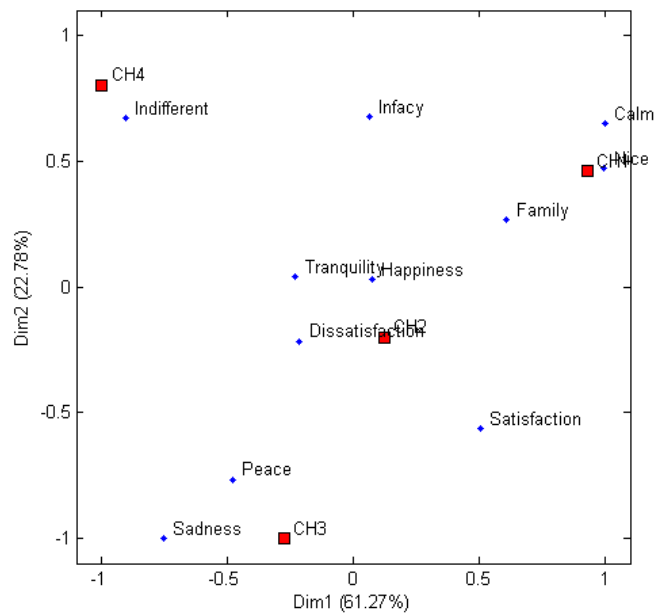
The variation of the total data was 86.41%, where 49.6% came from the first dimension and 36.81% from the second dimension. Sample CH-1 was predominantly characterized by sweet, soft, creamy, tasty, milk and melt in the mouth, while CH-2 was named by the attributes

caramel and strong flavor, in turn CH-3 was identified by the descriptors bitter, cocoa , soft and melt-in-the-mouth, and finally the CH-4 has gone crunchy, brown, peanut and bitter.



**Figure 7:** Representation of emotions and attributes in relation to chocolates in the first and second dimensions of the Correspondence Analysis. Analysis regarding the characterization of chocolates through attributes.

Figure 7.1 shows the connection between the chocolates and the evoked emotion. The first dimension was responsible for 48.34% of the data variation and the second dimension for 35.47%, thus the total variability was 83.81%. Milk chocolate was identified by the feeling of calm, family, childhood and pleasure. The feeling of dissatisfaction, happiness, family and tranquility was referred to milk chocolate with chestnut CH-2. Therefore, emotions related to sadness, satisfaction and peace were more affected by dark chocolate CH-3, and finally, dark chocolate with chestnut CH-4 was related to the feeling of indifference.



**Figure 7.1:** Representation of emotions and attributes in relation to chocolates in the first and second dimensions of the Correspondence Analysis. Analysis regarding the emotion evoked in relation to chocolates.

What we found in this study is in line with what has been reported many times before in relation to measuring chocolate-emotion associations (eg Cardello & Jaeger, 2016), that positive emotions would dominate the sample profiles. Emotions have been defined as represented states of readiness that arise from cognitive estimates of events or thoughts that are often expressed physically through gestures, posture, and facial features (Bartkiene et al., 2021).

Emotions are evoked by the consumption of food and drink; therefore, meditating on these emotions can help to understand consumer behavior and food choices. It has been shown that eating behavior in humans is affected by (1) cues between visual, taste and food taste stimuli, (2) physiological impulses such as hunger, (3) cues and social influences, (4) physical and physical environment ( 5) emotional and affective responses to tasty food (Gunaratne et al., 2019).

The fact that eating and drinking are mostly positive experiences explains this, as well as the nature of what we consume more often things we like than we don't (Lefebvre et al., 2019). Researchers have sought to link specific emotions to sensory properties; the had to relate the emotions with the basic tastes (bitter, sweet, salty, sour). Disgust was associated with bitter taste, joy with sweet and emotions of surprise, joy, fear, sadness, anger and disgust with sour and salty tastes (Mielmann & Brunner, 2022).

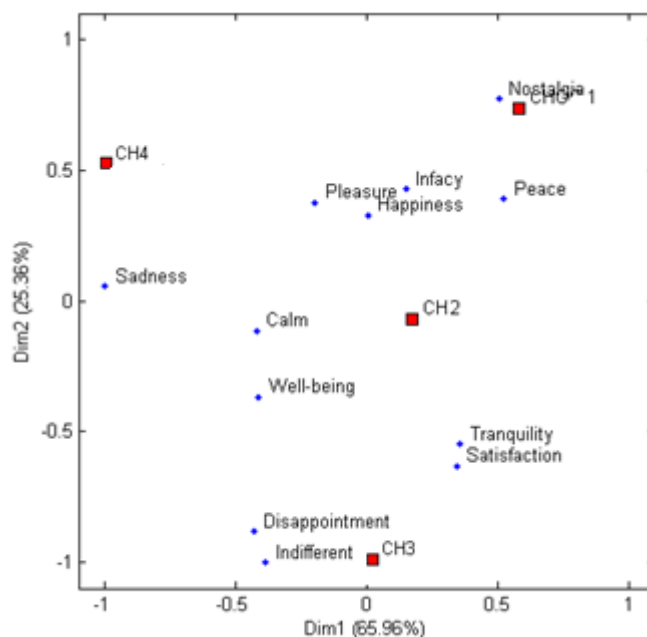
In contrast, Lefebvre et al., (2019), concluded that the feeling of sadness can lead individuals to consume more sweets while watching a movie. They also identified that the self-reported mean helplessness the effect of sadness on increasing consumption of sweets (e.g. chocolate) as individuals consume food as a form of compensatory consumption. Emotion-related studies can be used to obtain more information on performance of the product when compared to conventional methods, such as hedonic measures (Schouteten et al., 2017). Therefore, the development of emotional lexicons is of great importance for understanding consumer choices.

## **Experiment 2**

### **3.6 Descriptor correspondence analysis – chocolates without emojis**

The results on the emotion-chocolates descriptors of the analysis without emojis are illustrated by figure 8, and it is possible to observe that feelings related to nostalgia, peace, childhood, happiness and pleasure were responsible for characterizing the sensation during the consumption of CH- 1, while CH-2 was predominantly related to tranquility, satisfied, pleasure, calm, peace, happiness, childhood and well-being. And in turn, CH-3 correlated with feelings of indifference, dissatisfaction, well-being, tranquility and satisfaction. And finally, CH-4 is more connected to emotions directed towards sadness and pleasure. The first dimension was responsible for 65.96% of the data variation and the second dimension for 25.36%, thus the total variability was 91.32%.

Automatically, with the analysis of the emojis, we can observe the great synchronization of the descriptors mentioned in the two tests. With the application of emojis, the feeling of feeling good was mentioned, without the emojis, the term well-being and pleasure was mentioned. Since both descriptors can lead to the same conclusion of contentment in relation to the emotion evoked at the time of chocolate consumption. The other descriptors were the same for both analyses, however there was divergence in relation to the denomination of the emotion descriptors in the sample of the two tests.



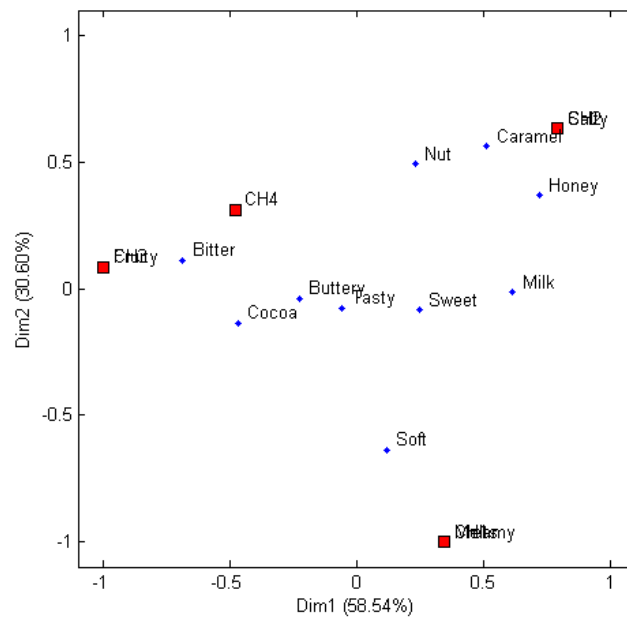
**Figure 8:** Representation of emotions and attributes in relation to chocolates in the first and second dimensions of the Correspondence Analysis. Analysis regarding the characterization of chocolates through emotions.

Simoni, (2018) concludes that the emotions sadness and anger were the most related to the consumption of chocolate or preparations that contained this ingredient in their composition, such as brigadeiro, cake, chocolate ice cream, hazelnut cream or chocolate drinks. Still with regard to anger, foods and chocolates with a resistant or hard texture were also mentioned, such as raw carrots, chestnuts, chocolate with nuts, granola and pork rinds. These foods were not mentioned for consumption in any of the other emotions evaluations.

Findings by Schouteten et al., (2018) in a study on chocolates and emotions denote after the consumption test with some stored, revealed feelings related to nostalgia where during the sample meal they were reminded of their childhood and family associating the flavor with that period of their lives. And they also related to some brand of old chocolates that they liked during childhood. This confirms what Braun et al., (2002) clarified that brand relationships in early childhood are the emotional foundation for later brand relationships in adulthood.

Regarding the attributes directed to the chocolates through figure 8.1, it is observed that the CH-1 was characterized by the descriptors creamy, soft, melt in the mouth, sweet, milk and tasty, the CH-2 associated with the description of the terms caramel, salty, chestnut, jam, milk and honey. And because of their CH-3 and CH-4 chocolates, they are associated with bitter, cocoa, buttery, tasty. However, the fruity attribute was only associated with CH-3. The first

dimension was responsible for 58.54% of the data variation and the second dimension for 30.60%, thus the total variability was 89.14%.



**Figure 8.1:** Representation of emotions and attributes in relation to chocolates in the first and second dimensions of the Correspondence Analysis. Analysis referring to evoked emotion in relation to sensory attributes.

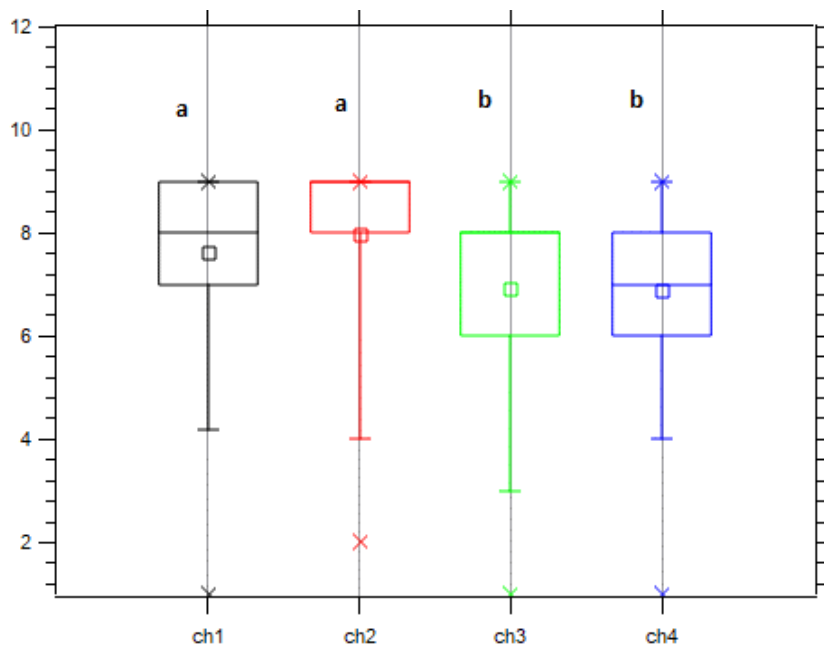
In comparison, with the result of the analysis with emojis, we can observe that the attributes mentioned showed some differences, for example, in the analysis with emojis, the terms peanut and strong flavor were mentioned in relation to the example, while in the test without emojis, fruity, honey was presented, buttery and salty. Other terms mentioned equally. And just as for emotion, the attributes were distributed differently among the chocolates.

### 3.7 Acceptance test

The study included the exception of milk chocolate and dark chocolate both with the presence of nuts. The heterogeneity seen in Figure 9 was not unexpected, given previous reports of segmentation among consumers regarding their preference for milk chocolates versus dark chocolate (e.g., Harwood, Ziegler, & Hayes, 2012; Jaeger et al., 2021). The characteristic of the milk chocolate samples received a positive contribution to their acceptance, since they obtained the highest affective scores that ranged from liked moderately to liked a lot.

These samples (CH-1 and CH-2) showed no significant difference ( $p > 0.05$ ) between them. However, we observed a significant difference ( $p < 0.05$ ) with the other Examples (CH-3

and CH-4). The lowest score was obtained for dark chocolate with nuts, with an average of 6.88. The presence of nuts did not affect acceptance, as it was the most accepted chocolate and with the highest average (7.98) was milk chocolate with nuts.



**Figure 9:** Acceptance of chocolate samples.

Muhammad et al., (2022), obtained similar results, concluding that differences in acceptability responses did not deviate only from the sensory attributes of the samples, but also from other consumer characteristics, such as consumption habits and individual compulsions. This seems to confirm that the habitual consumption of a food increases its acceptability.

#### 4 CONCLUSION

Emojis were used by consumers to convey a wide range of meanings to communicate their reaction to consuming different samples of chocolates, such as emotional and conceptual associations. The results of this study illustrate that emoji can be used as a sensory attribute response format and to obtain discriminating emotions from chocolates. This study reinforces the need for a careful approach in associating emoji with measures of acceptance and attitude in other products. Regarding the characteristics of the chocolates in experiment 1 and 2, it is possible to conclude that there was great similarity in the terms used for attributes and emotion.

Future studies should be carried out with the use of cell phones, but with the selection parameter of the most frequently used emojis in digital and experimental platforms. More research is needed to inform the interpretation of data from consumer studies involving this increasingly popular communication. In particular, research should explore the meaning of emoji in the context of food consumption and digital media.

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## **ARTIGO 2**

### **Association of emojis to the five basic tastes (Sweet, Salty, Sour, Bitter and Umami) present in food.**

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## ABSTRACT

The growing popularity of computer-mediated communication has resulted in the emergence of a new pictographic form of language called emojis that provide an intuitive and informal way of conveying emotions and attitudes. The goal was to create a new language relating emojis and basic tastes. To see if emojis could be associated with the five basic tastes, 285 volunteers took part in an online survey. The questionnaire was designed with 42 questions, 41 of which were aimed at associating emojis with the five basic tastes, and one related to the association of emojis that represent food with umami taste. Emojis could be associated with more than basic taste in the same question. Bitter taste was associated with 18 emojis with different emotional expressions, sweet and salty taste showed great similarity in the group of emojis that were used to characterize them. Umami and acid, on the other hand, were mostly classified by emojis named discontent and dissatisfaction. Regarding food emojis, cheese was the most associated with umami and carrot was the emoji with the lowest connection to umami taste. This study is the first to explore emojis in relation to their association with basic tastes. Thus, it is concluded that emojis can be a possibility for describing the perception of basic tastes, being possible to create a new form of expression of basic tastes, consumers did not have difficulty in associating emojis.

**Keywords:** sensory communication; emoji; basic taste.

## 1 INTRODUCTION

Japanese emoji means e [image] + moji [character], they are graphic symbols with names/IDs and predefined codes (Unicode), they cover a wide range of meanings that include not only representations of symbolic expressions (😊), abstract concepts (🤔), foods (🍕) and emotions/feelings (❤️), but also animals (🐼), plants (🌹), activities (🏠), gestures/body parts (🙌) and objects (🔪) (Vidal et al., 2019).

The emoji is the only image that is used as a text character (Rodrigues et al., 2017), they are distinct from other images, as they actually function as part of the language, sometimes they occurred as substitutes for a written word and other times they function as a form of evaluation (Provine, Spencer & Mandell, 2017). The first emojis considered as the originals are the smiley or frowning faces, however in recent years the number and variety of emojis has proliferated (Das, Wiener & Kareklas, 2019). Currently, there are more than 3000 official emojis in use, with new emojis being added with each operating system update (Unicode, 2022).

Interpersonal communication has been significantly altered due to innovations in technology (Pourmand et al., 2020). Emojis are currently an undeniable part of the world's communication language, they are ubiquitous on the internet where 92% of users report that they employ emojis in their online communications (Das, Wiener & Kareklas, 2019). Emoji is considered a powerful non-verbal communication tool (Bai et al., 2019), which is often used by individuals around the world to express their emotional states as part of contextualization during dialogues (Kutsuzawa et al, 2022). More than that, they are considered powerful tools with the potential to shape the way messages are understood (Pourmand et al., 2020).

Recently, it has also been applied in consumer research fields to assess users' emotional states. The interpretation of emojis seems to be determined mainly by your facial expression, particularly in the case of emojis that convey basic emotions. For example (Jaeger, Vidal and Ares, 2021a), a set of emojis was used with the specific aim of exploring the meaning of the emoji in a context related to pattern eating. Research appreciates that the interpretation and feeling of emojis related to the intended meaning and does not differ much between consumers (Barbieri, Ronzano & Saggion, 2016).

Experimental ones are mainly used and considered as the standard measurement approach that can be implemented with emojis. Quizzes with emojis are less studied when

compared to emotions with emotion words, but they have high affinity in consumer research as graphic representations (Jaeger et al., 2021). The use of emojis in these studies has been shown to be tolerated in relation to the ease of answering questions, and in familiarizing and directing people with different languages.

Therefore, a better understanding of how each emoji is associated with the respective human emotional states can help accelerate its applicability (Kutsuzawa et al., 2022). Emojis are often used by people all over the world as a tool to express their emotional and conceptual states being considered for evaluation in research. Although emojis have become ubiquitous, lack of understanding of the meaning of emojis acts as a barrier to their acceptance in sensory and consumer science (Jaeger, Vidal & Ares, 2021b).

















Due to the lack of studies relating emojis and basic tastes, the objective of the work was to create a new language for basic tastes through emojis as a way to facilitate the expression of sensations. We aimed to explore and identify information about the ways that emojis can correspond to basic tastes (Sweet, Salty, Bitter, Sour and Umami). And identify consumers' perception of Umami taste through association with food emojis.

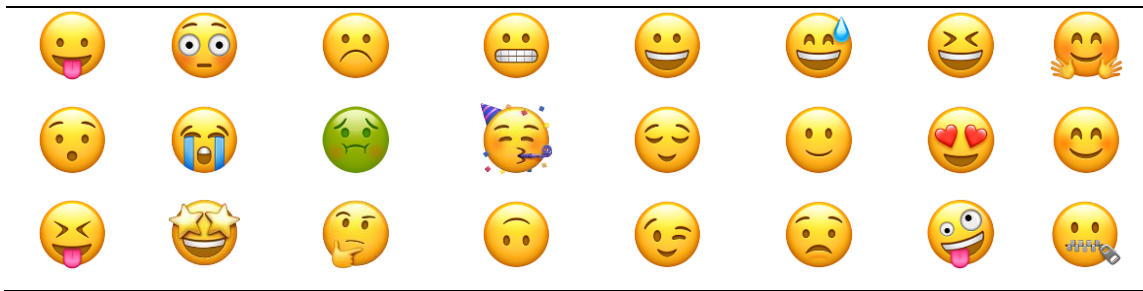
## 2 MATERIALS AND METHODS

### 2.1 Quiz

The survey was carried out using the Google forms platform, with 285 participants chosen at random. An online research class was designed with 2 sessions. Session 1: 41 questions were asked to determine which emojis could be associated with each basic taste (Sweet, Salty, Bitter, Sour and Umami). 40 emojis were used (table 1), according to the website <https://emojipedia.org/>, which were the most cited emojis on the internet at the time of the research, and option none above was also included.

**Table 1:** List of emojis for analysis with 5 basic tastes.



All questions follow the same questioning The sensations induced by the basic tastes (Sweet, Salty, Bitter, Sour and Umami) can be associated with which emojis or not fit any. “Please, check below which basic tastes are related to the emoji”, expressed in (figure 1). Being that the emojis could be directed to more than one taste.

Por favor, assinale abaixo quais os gostos básicos estão relacionados ao emoji. \*

Check below which basic tastes are related to emojis.



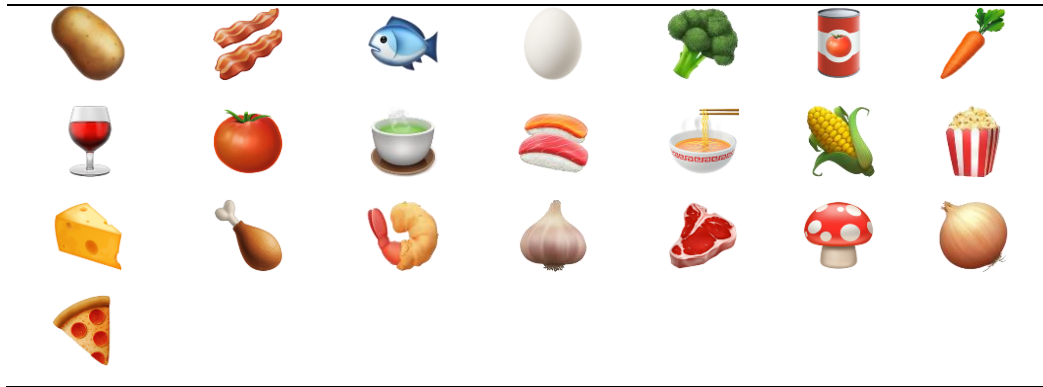
- |                          |         |        |
|--------------------------|---------|--------|
| <input type="checkbox"/> | Doce    | Sweet  |
| <input type="checkbox"/> | Salgado | Salty  |
| <input type="checkbox"/> | Amargo  | Bitter |
| <input type="checkbox"/> | Azedo   | Sour   |
| <input type="checkbox"/> | Umami   | Umami  |
| <input type="checkbox"/> | Nenhum  | None   |

**Figure 1:** Added question about emojis to basic likes.

Session 2: A question was elaborated using 22 emojis that represent food in order to understand the consumer's perception of Umami the fifth basic taste, it was considered that the selected foods presented Umami in the perception of tastes even if in a small amount (table 2 ). To demonstrate Umami's non-association with food, an option none above was included. The participant was asked to mark all the food emojis that referred to the perception of UMAMI taste, (figure 2).

A session of the demographic experiment was presented to the participants to evaluate the participants regarding gender, average age and education.

**Table 2:** List of food emojis for analysis with basic Umami tastes.



## 2.2 Data analysis

Data referring to emojis were analyzed using Cochran's Q test, which was used to verify differences between basic tastes for each emoji. The statistical program used was the R version and the Senso MineR package (Husson & Cadoret, 2017).

Correspondence analysis (CA) was shown on the matrix containing the citation frequency of experienced emojis in relation to basic tastes, in order to determine the spatial configuration of emojis in relation to basic tastes. A two-dimensional representation of the samples and attributes that allowed determining the similarities and differences between products (Popoola et al., 2019). The statistical program used was Sensomaker.

In order to highlight food emojis with greater emphasis on Umami taste, a frequency range of emojis was plotted on a Pareto diagram with cumulative frequency on the vertical axis, with the number of repeated terms on the horizontal axis.



### 3 RESULTS AND DISCUSSION





























#### 3.1 Demographic characterization of participants

The survey was carried out by a total of 285 participants, of which 56.8% were between 18 and 30 years old, 31.6% were between 31 and 40 years old and 11.6% were over 40 years old. Furthermore, 76.8% were female and 23.2% were male. Regarding the level of education, 33.7% of the participants had a master's degree, followed by 27.4% with higher education and 22.1% with a completed doctorate.

#### 3.2 Cochran's Q test

According to Cochran's Q test (Table 3) all emojis were studied in relation to basic tastes.

**Table 3:** Cochran's Q test p-value for emoji.

Emotion	Valor p	Emotion	Valor p
	< 0.001*		< 0.001*
	< 0.001*		< 0.001*
	< 0.001*		< 0.001*
	< 0.001*		< 0.001*
	< 0.001*		< 0.001*
	< 0.001*		< 0.001*
	< 0.001*		< 0.001*
	< 0.001*		< 0.001*
	< 0.001*		< 0.001*
	< 0.001*		< 0.001*
	< 0.001*		< 0.001*
	< 0.001*		< 0.001*
	< 0.001*		< 0.001*
	< 0.001*		< 0.001*
















	< 0.001*		< 0.001*
	< 0.001*		< 0.001*
	< 0.001*		< 0.001*
	< 0.001*		< 0.001*
	< 0.001*		< 0.001*
	< 0.001*		< 0.001*
Nenhum acima < 0.001*			















\* Indicates significant difference at 5% ns: not significant

### 3.3 Correspondence Analysis – Basic Tastes

Figure 1 shows the Correspondence Analysis (CA) graph applied to the contingency table. According to Figure 1, which refers to the characterization of the attributes, the first and second dimensions represent approximately 82.36% of the variance of the experimental data, with 65.63% and 16.73%, respectively.











Salty, sweet, bitter, acidic and umami are the five basic tastes, perceived in different regions of the tongue by nerve receptors. The results of this research suggest that consumers perceive emoji searches as easy and not boring when they discover word searches.






Bitter taste was associated with the group of ten emojis: () , () , () , () , () , () , () , () , () , () , () , () , () , () and () . Thirteen emojis can be associated with feelings of sadness, doubt, disgust and amazement. There is an association of bitter taste with negative emotions that occurs since the individual's birth (Fierro et al., 2019). This type of response to bitter taste may be associated with biological effects administered during human evolution, when such a taste was characteristic of foods that could cause harm to health, for example spoiled or poisonous foods (Zhi, Cao & Cao, 2017). However, the bitter taste is present in most vegetables that bring great health benefits.

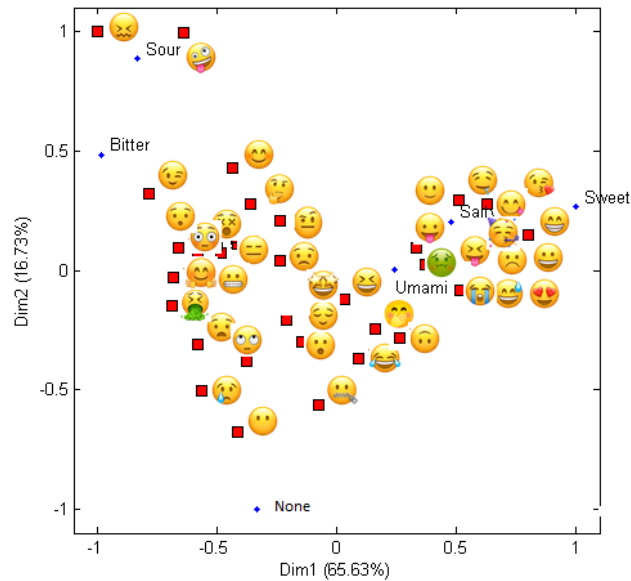
Sweet and Salty tastes were related to the same group of emojis () , () , () , () , () , () , () , () , () , () , () , () , () and () . The World Health

Organization (WHO) established that the maximum consumption of sugar for adults and children should be less than 5% of the total energy value of the diet. According to the 2018 Brazilian Family Budget Survey (POF), more than 60% of the population exceeds the recommended sugar consumption limit.

The group of sugary foods is among the most cited by people who experience emotions of anger and sadness, unlike salty foods, which are often consumed in moments of joy. It is noteworthy that consumer behaviors are associated not only with complex cognitive processing of multisensory signaling, but also with emotional experiences with what they eat or drink (Hou et al., 2013).

As for the emojis (, , , , , , , , ) and () were responsible for classifying the Umami taste. Being designated by emojis with characteristics of joy, happiness and sadness. Miyaki et al., (2016), reported strong evidence that umami compound increased overall satisfaction in chicken noodle soups. It increased the perception of positive emotions without affecting the perception of health.

Sour taste was rated specifically by emojis () and (), demonstrates dissatisfaction and discomfort. The term None was assigned to the following emojis (), () and exclusively by (). It is important to understand that self-reported emotions provide discrete information about emotional responses to the display, while facial expressions and emojis provide a continuous measurement. Previous research suggests that emotions measuring expressive expressions and emojis show a stronger relationship between negative emotions and disliked foods than positive emotions and liked foods (Samant, Chapko & Seo, 2017).

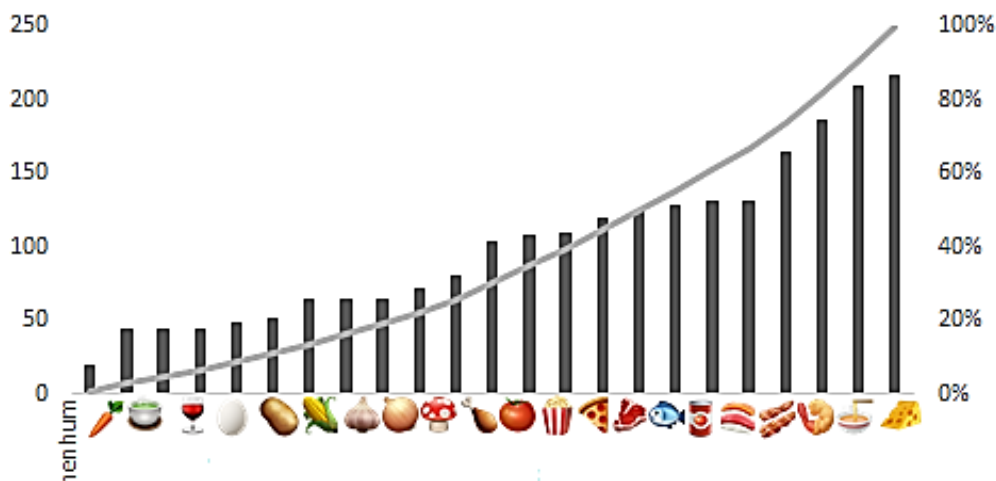


**Figure 1:** Representation of emojis and likes in the first and second dimensions of the correspondence analysis referring to the analysis of attributes.

### 3.4 Umami association to food emojis

Interest is growing to understand the well-being and emotions associated with foods and seasonings, little is known about the emotions perceived in relation to foods rich in umami compounds and the perception of health. To assess the relationship between umami taste and food emojis, a frequency analysis was used as a method to identify the emojis that were most correlated with umami taste. The frequency distribution of terms in the corpus is shown in the Pareto and frequency diagram (Figure 2). From the point of view of palatability, salty foods rich in umami are associated with greater consumer acceptance (Yang et al., 2022).

The most cited food emojis in reference to umami taste were cheese, instant noodles, shrimp and bacon.



**Figure 2:** Pareto diagram and frequency range of emojis associated with umami.

Umami tastes have long been perceived in many traditional foods and are naturally found in various food sources such as meats, cheeses, seafood and vegetables, as well as in their fermented products, although this flavor quality has only recently been officially recognized. time (Zhang et al., 2019). Thus, it became clear that the population has a perception of the umami taste in certain foods such as cheese, processed foods and meat.

The least associated with umami taste were carrot, green tea, wine, egg and potato. The word “umami” came from a Japanese word (うま味) meaning a “tasty taste” or “delicious”. Umami was recognized as the fifth basic taste in 2002 (after salty, sweet, and bitter) to describe a pleasant salty taste (Rocha et al., 2021). Two important characteristics of umami are synergism and pleasure with other flavors, for example, depression of bitterness (Istiqamah, Lioe and Adawiyah, 2019).

The Japanese word umami means delicious, and is used as a hallmark for the characteristic sensory properties of monosodium glutamate (Ikeda, 1908). In addition to glutamate, other substances can impart the umami taste, such as nucleotides (inosine-5'-monophosphate and guanosine-5'-monophosphate) (Kurihara, 2015).

These substances are naturally found in some foods such as fish, crustaceans, cured meats, certain vegetables (Chinese cabbage, ripe tomatoes, spinach, among others), mushrooms, green tea and fermented and matured products (cheese, yeast extract, soy sauce, among others) (Maluly; Ariseto-Bragotto & Reyes, 2017). In general, protein-rich foods such as breast milk, cheese, and meat contain large amounts of glutamate. However, despite their lower protein contents, vegetables tend to contain proportionately high levels of glutamic acid, especially peas, tomatoes, and potatoes (Akgün et al., 2019).

## 4 CONCLUSION

It is suggested that emojis can be matched to basic tastes consumers did not refuse difficulty in the association, with bitter being related to the largest group of emojis that express different emotions, umami was mainly named for emojis that showed dissatisfaction, while acid was only related to tolerant denomination emojis.

The results presented for the identification of umami in foods through emojis demonstrate that consumers have knowledge of which foods have the taste, with the cheese emoji being the most associated with umami. The present study contributes to the empirical understanding encouraged in the consumer, directing to emojis in relation to basic tastes and strengthening the understanding of emoji research in studies that include food.

The results may facilitate and simplify the application of sensory tests with basic tastes using emojis as responses. And also the possibility of using tests with children, because through emojis they would be able to evaluate the demonstration in relation to basic tastes. The importance of future studies exploring the meaning of emojis along with the association with basic tastes is highlighted.

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