FOOD STANDARDS
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Te Mana Kounga Kai - Ahitereiria me Aotearoa

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Supporting document 1

Health Star Rating Consumer Literature Review

P1067 Health Star Rating System

Executive summary

Food Standards Australia New Zealand (FSANZ) undertook a literature review to examine consumer use, understanding and trust of the Health Star Rating (HSR), as well as how the HSR may impact consumer perceptions and behaviours relating to food choices. The review incorporates 48 studies published between 2014 and 2025 (33 from Australia, 10 from New Zealand, and 5 including both Australian and New Zealand populations). Peer-reviewed articles published in academic journals and government commissioned reports were included. Thirty-eight studies were quantitative, 5 were qualitative, and 5 mixed methods. Quality assessments were undertaken on all studies. Nineteen studies were rated as high quality, 23 medium quality and 6 low quality.

Findings across studies were narratively synthesised and are summarised below by research question. Many studies tracked similar outcomes over time. Findings should be interpreted in the context of the HSR being present on <40% of products since its introduction in 2014, as well as the different samples and methodologies used. The ranges below reflect all studies that considered the outcome of interest in the general population across both Australia and New Zealand and not changes over time, unless otherwise specified.

Do Australian and New Zealand consumers use the HSR?

- Australian and New Zealand consumers report low to moderate use of the HSR. The most recent findings from 2024 indicate 37 – 39% of Australian and 25 – 44% of New Zealand shoppers use the HSR most or all of the time when shopping.
- Slightly more Australian consumers report that they would be likely to use the HSR in the future when buying food (61%), relative to 51% of New Zealanders.
- Use appears to have increased over time in both countries.
- Consumers commonly report using the HSR for its intended purpose of identifying healthier food choices when shopping.
- The simplicity of the HSR appears to facilitate use, with 60 – 77% of consumers across Australia and New Zealand agreeing that the HSR system makes identifying healthier products easier.
- Common reasons for being unlikely to use the HSR include prioritising other food considerations like cost, family food preferences, other nutrition information, or not believing the HSR is accurate.

- The low prevalence of the HSR on food packaging may also be a barrier to use. Qualitative results indicate consumers have a desire to see the HSR on all packaged food products.
- There was limited consistency in findings relating to HSR use across different demographics. Group differences that displayed some consistency across studies included that women, households with children and Asians in New Zealand were more likely to use or intend to use the HSR.
- Data relating to use of the HSR was all self-reported. This can be susceptible to social desirability and recall bias, which may overestimate consumer use of the HSR. Hence, results pertaining to consumer use of the HSR should be interpreted with caution.

Do Australian and New Zealand consumers understand the HSR?

- Subjective understanding of the HSR is moderate to high, with 59 – 72% of Australians and 58 – 63% of New Zealand consumers agreeing that the HSR is easy to understand, while 22 – 38% report that they do not know how to use the HSR.
- In experimental research, the HSR objectively helps consumers to identify the healthier food when comparing similar foods.
- Most (62 – 90%) consumers understand that more stars indicate a healthier product relative to a product with less stars.
- There was limited understanding of how the HSR is calculated and the extent to which industry and Government are involved in the system.
- Although most consumers (>68%) understood that the HSR could be used to compare similar products (i.e. yoghurt with yoghurt), understanding that it should not be used to compare different kinds of products (i.e. yoghurt with bread) was much lower (26%). One New Zealand study found that very few consumers (2 – 3%) report using the HSR to compare different kinds of products in practice.
- Consumers report preferring HSR formats that include both the star rating and information about individual nutrients. However, adding more information to the front of pack may increase the likelihood that consumers will use that information to choose products, rather than the overall star rating.
- Māori and Pacific Peoples appear to have a poorer understanding of the HSR relative to the general New Zealand population.

Do Australian and New Zealand consumers trust the HSR?

- Trust in the HSR is associated with people's attitude towards and potential use of the HSR.
- The most recent results from 2024 indicate that 59% of Australians and 50% of New Zealanders trust the HSR system.
- Trust in the HSR has generally been increasing over time in Australia but is somewhat lower and has remained more consistent in New Zealand.
- A range of factors appear to influence consumer trust in the HSR. Reasons for improved trust in the HSR include:
    - An understanding of the role of government in the system and/or that it is regulated.

    - A belief that the HSR is credible (due to being informed by science or other relevant expertise).
    - Perceived alignment between star ratings and consumer understanding of product healthiness, while perceived misalignment reduced trust.
    - Exposure to HSR education campaigns in Australia and New Zealand.
    - The placement of the HSR on trusted products.
- Reasons for reduced trust in the HSR include:
    - Limited knowledge about how the star rating is calculated, or how to interpret the ratings.
    - Believing the food industry can manipulate star ratings by making superficial changes rather than making products healthier.
    - Believing that industry is involved in determining the star rating or can purchase a favourable star rating.
    - The presence of nutrition content or health claims alongside low star ratings.
- There was limited evidence relating to trust in the HSR across different demographics. However, multiple surveys indicate that trust in the HSR may be substantially higher for Pacific Peoples with children under 14 (70% trust), relative to the general New Zealand population (40% trust).

How does the HSR impact Australian and New Zealand consumers' perceptions and behaviours relating to food choices?

- The HSR may impact how healthy a food is perceived to be and consumers' willingness to pay for a product.
    - When a star rating of less than 3 was applied, healthiness perceptions either declined or remained steady. The review did not identify any research testing the impact of a higher star rating on healthiness perceptions.
    - The HSR may increase consumer's willingness to pay for food products, including when the star rating is low, potentially indicating consumer value in the HSR label. However, another study found that the HSR did not impact consumer's willingness to buy food products.
    - One study suggested that global evaluations (incorporating elements such as taste, quality and value for money) were not significantly influenced by the presence of a low rated HSR.
- While consumers often report that the HSR has influenced their purchasing decisions, typically to encourage healthier choices, real-world data suggests the impact of the HSR (as currently implemented) on purchasing may be minimal.
- Lab based experimental research suggests that the presence of the HSR increases the likelihood of consumers choosing healthy foods and decreases the likelihood of consumers choosing unhealthy foods. However, field experiments showed limited impact on purchasing decisions, except for those who were motivated to use the HSR.
- Two studies that considered the impact of the HSR on portion size choice showed either a decline or no impact in the amount of food participants chose to consume.

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Introduction

The HSR system is a voluntary front-of-pack nutrition labelling tool intended to support consumers to make healthier food choices by providing a simple summary of a food's overall nutritional profile. As of November 2024, the HSR was applied to an estimated 35% of intended products in Australia and 33% of intended products in New Zealand, well below the 50% target (Department of Health, Disability and Ageing 2025). As a result, in July 2024 Food Ministers asked FSANZ to undertake preparatory work on the potential mandating of the HSR system to inform future decision-making should the final uptake target (70% of intended products) not be met.

As part of this preparatory work, FSANZ undertook a literature review synthesising the evidence on Australian and New Zealand consumer use, understanding and trust of the HSR system, and the influence of the HSR on consumer perceptions and behaviours relating to food choices.

The review investigated the following four research questions:

1. **Do Australian and New Zealand consumers use the HSR?**
    a. What proportion of the populations use the HSR?
    b. How frequently do they use it?
    c. What do they use it for?
    d. What are the characteristics of people who use or don't use the HSR?
    e. What factors beyond individual characteristics influence consumers' use of the HSR?

2. **Do Australian and New Zealand consumers understand the HSR?**
    a. Do consumers think they understand the HSR (subjective understanding)?
    b. Do consumers objectively understand the HSR?
    c. What are the characteristics of people who understand or don't understand the HSR?
    d. What factors beyond individual characteristics influence consumers' understanding of the HSR?

3. **Do Australian and New Zealand consumers trust the HSR?**
    a. What proportion of the population trust/distrust the HSR?
    b. What are the characteristics of people who do or don't trust the HSR system?
    c. What factors beyond individual characteristics influence consumer trust of the HSR?

4. **How does the HSR impact Australian and New Zealand consumers' perceptions and behaviours relating to food choices?**

This document outlines the methodological approach to the literature review and summarises the evidence that was available to answer each research question.

Methods

Literature search strategy

The review includes Australian and New Zealand peer reviewed articles and government commissioned reports. Literature was identified by:

- Searching online databases for peer-reviewed studies published between January 2014 and October 2024;

- Searching grey literature and known websites for relevant government commissioned reports;
- Searching reference lists from two recent literature reviews identified to be of high quality and relevance (Jones et al. 2019; Kelly et al. 2024).

During the literature review process, FSANZ conducted further research on the HSR that directly informed the research questions. This included the 2023 and 2024 Consumer Insights Tracker (CIT) as well as the 2024 HSR Monitoring Survey (FSANZ 2024; FSANZ 2025a; FSANZ 2025b). These assessed self-reported use, objective understanding and trust in the HSR. Findings from these studies were also incorporated into the report.

The literature search and screening process was conducted by three officers. Further details on the review methods are available in Appendix 1.

Study quality assessment

The quality of each included study was assessed using a revised version of the Quality Assessment Tool for Studies with Diverse Designs (QATSDD) (Sirriyeh et al. 2012). The QATSDD was chosen as eligible studies varied in design. The revised QATSDD consists of a total of 14 items (12 items for quantitative or qualitative studies, 14 items for mixed-design studies) that may be broadly categorised into the following themes/quality criteria:

- Theoretical/conceptual framework and research aims
- Sampling and recruitment methods
- Procedural details
- Data collection tools
- Data analyses
- Ethics
- Strengths and limitations identified.

Each item was rated according to the degree to which each quality criteria is met: 0 = no mention at all; 1 = very slightly met; 2 = moderately met; 3 = completely met (except for the ethical approval criteria which is rated on a dichotomous scale of 0 or 3). The revised QATSDD is further described in Appendix 2, and a full copy of the revised QATSDD is provided in Table A2.

Based on the revised QATSDD criteria, studies were evaluated as being “low,” “medium,” or “high” in overall quality. Low quality studies were those that rated poorly on many criteria (i.e. had a total rating of less than 50%[1]), and/or had missing methodological details or inadequately reported results, which made it difficult to have confidence in the findings. Medium quality studies were those that rated poorly on some criteria, but there were no major concerns regarding the methodology or reporting of results, and therefore it was possible to have some confidence in the findings. These studies tended to have total ratings that were greater than 50%, but less than 70%. High quality studies rated highly on most criteria, and there were no concerns regarding the methodology or reporting of results, and therefore it was possible to have a high-level of confidence in the findings. These studies tended to have total ratings that were greater than 70%. High quality studies were relied on more heavily in drawing overall conclusions.

The quality evaluations of each study are reported in Appendix 3, along with an overview of general study characteristics. Quality assessments were conducted independently by 1 officer external to FSANZ, and 1 FSANZ officer checked to ensure a high level of agreement.

[1] Total ratings for each study were calculated by summing the ratings of each criteria and dividing this by the maximum possible total rating and multiplying by 100 (as described in Sirriyeh et al. 2012).

Evidence synthesis

The evidence from each study was collated thematically under the research questions to present a narrative overview of the available evidence. In addition to the overall study quality rating, the relevance of the evidence to answer each research question is described using a narrative approach. In doing this, considerations were given to the general principles of the GRADE approach (Guyatt et al. 2011) including the quality of the individual studies (as assessed by the revised QATSDD), the consistency of findings across studies, and the directness of the measures (e.g. self-reported hypothetical measures of behaviour lack directness). Individual study methodologies that directly impacted the findings or that may explain inconsistent findings are also narratively described where relevant.

A narrative comparison of changes in consumer use, understanding and trust in the HSR over time has been provided where possible. However, due to differences in sample populations and question wording, caution is needed when drawing conclusions about these trends.

Write-up and synthesis of the results was conducted by 4 officers. The draft literature review was internally reviewed by FSANZ staff members. External peer review was then undertaken by a member of FSANZ's Social Science and Economics Advisory Group.

Results

Overview of study characteristics

Forty-eight publications were eligible for inclusion, ranging in publication date from 2014 to 2025. This included 35 peer reviewed articles, and 13 government commissioned reports. Of these, 33 were conducted in Australia, 10 in New Zealand and 5 included findings from both Australia and New Zealand. Most studies were quantitative in nature (n = 38), while 5 were purely qualitative studies, and 5 were mixed methods.

The HSR stimuli format used and the context it was presented in (i.e. on a product or not) varied across studies (Table 1). The most common presentation was the HSR star rating with individual nutrients presented alongside in a 'tail' (HSR + tail, or C in Figure 1). This was followed by the star rating graphic alone (HSR only, or A in Figure 1). All these variations of the HSR are currently permitted on eligible food and drink products.

Table 1. Summary of stimuli used in publications included in the literature review.

	Label context		
HSR format	**On products**	**Not on products**	**TOTAL**
HSR only	8	5	**13**
HSR only and HSR with tail	8	0	**8**
HSR with tail	14	3	**17**
All three formats	2	3	**5**
TOTAL	**32**	**11**	**43**

NB: three studies did not use stimuli, and two studies did not report the HSR stimuli used, hence n = 43 total.

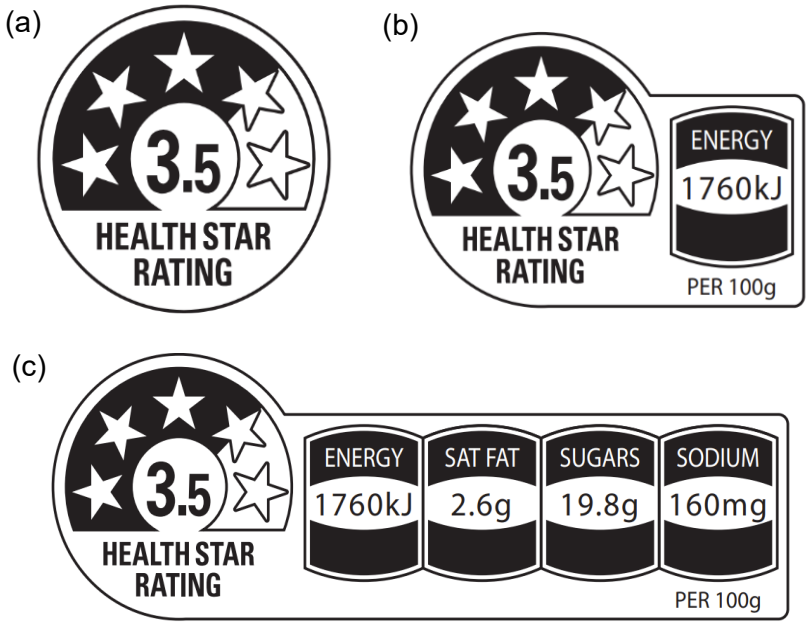

Figure 1. Examples of the HSR formats including (a) HSR only, (b) HSR + energy and (c) HSR + tail.

Half of the publications (n = 23; 48%) were of medium quality according to the revised QATSDD. Nineteen were high quality (40%) and 6 (13%) were low quality.[2] Common reasons for low quality ratings were that the studies were missing methodological information, as well as poor representativeness of the general population in the country sampled.

Appendix 3 summarises study characteristics in more detail.

[2] The publication by Thomas, Seenivasan and Wang (2021) included 4 individual studies. Each of these were rated as low quality. In this summary, the publication has been counted only once.

Research Question 1: Do Australian and New Zealand consumers use the HSR?

Overview of key findings

Research question 1 sought to understand Australian and New Zealand consumer use of the HSR system.

The review identified 13 peer-reviewed articles (Acton et al. 2023; Bhawra et al. 2022b; Neal et al. 2017; Pelly et al. 2020; Pettigrew et al. 2017; Pulker et al. 2019; Reilly et al. 2018; Riley et al. 2018; Russell et al. 2016; Stuthridge et al. 2022; Talati et al. 2016a, 2016b, 2019a) and 12 government commissioned reports (Colmar Brunton 2016a, 2016b, 2018; FSANZ 2025a, 2025b; National Heart Foundation 2017, 2019; The Navigators 2024; Pollinate Research 2015, 2016, 2017; TNS New Zealand 2015) that had findings relating to consumer use of the HSR. Most government reports were quantitative cross-sectional surveys, with one mixed method (FSANZ 2025b). Of the peer-reviewed articles, 8 were quantitative and 5 were qualitative (Stuthridge 2022; Talati et al. 2016a, 2016b; Pulker et al. 2019; Pelly et al. 2020).

Most studies were of medium (n = 12)[3] or high quality (n = 10)[4], with 3 studies assessed as low quality.[5] Some degree of consistency in the findings within similar populations and timepoints (regardless of quality) increases confidence in the findings relating to consumer use of the HSR. However, caution is advised in interpretation, as studies used self-reported measures of behaviour which may not necessarily correspond to actual behaviour. Results were not specific to any HSR format.

Studies indicate that HSR use is low to moderate. In 2024, 25 – 44% percent of New Zealanders and 37 – 39% of Australians used the HSR always or most of the time when shopping for food in the supermarket (The Navigators 2024; FSANZ 2025a, 2025b). While different question framing and base samples prevents a direct comparison, this appears to be an increase from 2015, where an estimated 10% of New Zealanders agreed that they had used the HSR to choose a packaged food (Colmar Brunton 2016a), and 2018, where 23% of Australians reported using the HSR often or all the time when deciding to buy a food product (Acton et al. 2023).

Consumers are more likely to report that they intend to use the HSR in the future, or in scenarios where the HSR is more widely applied to food labels. About 50% percent of New Zealanders reported that they would be likely to use the HSR next time they see it on a product they're thinking of buying (Colmar Brunton 2018; FSANZ 2025b). Between 40 – 50% of Australians reported that they would use the HSR if it was available on most product labels (Pollinate 2015, 2016, 2017), while 61% reported they would be likely to use the HSR in the future when buying food (FSANZ 2025b).

Consumers are mostly using the HSR for its intended purpose of comparing the relative healthiness of products and generally find it easy to use. Reported barriers to use include that consumers place greater emphasis on competing factors such as cost, taste and other nutrition information (for example, to meet specific dietary requirements), accuracy concerns, and potentially the low prevalence or visibility of the HSR on food packaging. Enablers include that the HSR is generally perceived as making it easier to identify healthier products (60 – 77%) and is of relevance (43 – 60%) and importance (59 – 61%) to many people.

[3] Pelly et al. 2020; Pettigrew et al. 2017; Reilly et al. 2018; Talati et al. 2016a,2016b, 2019a; Colmar Brunton 2016a, 2016b, 2018; National Heart Foundation 2017, 2019; The Navigators 2024.
[4] Acton et al. 2023; Bhawra et al. 2022b; Neal et al 2017; Pulker et al. 2019; Riley et al. 2018; Russell et al. 2016; Stuthridge et al. 2022; TNS New Zealand 2015; FSANZ 2025a, 2025b.
[5] Pollinate Research 2015,2016, 2017.

There was limited consistency in findings relating to the demographics of consumers who use or intend to use the HSR more or less frequently. Group differences that displayed some consistency across studies included that:

- More women than men report being likely to use the HSR.
- Asians in New Zealand were more likely to use the HSR than the overall population.
- Households with children, compared to those without children, were more likely to report that they use the HSR and that it helps them choose healthier food.
- Greater self-reported knowledge of the HSR was associated with higher self-reported use.

Trust in the HSR system appears to be related to consumers' use of the system. In one study, levels of trust in the HSR independently explained 8 – 27% of the variance in likelihood of using the HSR across different demographic groups.

What proportion of the population use the HSR and how frequently do they use it?

Three articles and 6 government commissioned reports asked questions that allowed the proportion of the population that use or don't use the HSR to be quantified (summarised in Table 2 and Table 3). All of these studies used self-report measures, which may differ from actual use as they are subject to recall and social desirability bias. Interpretation of results relating to use should also consider that the HSR has only been present on <40% of products since its introduction (Department of Health, Disability and Ageing 2025).

The most recent Australian findings from 2024 indicate 37 – 39% of shoppers use the HSR most or all of the time when shopping (FSANZ 2025a, 2025b). These two studies give a general indication that surveys in the same or similar years give close estimates, suggesting that the change across years is meaningful and not simply measurement variability. When compared with previous findings, it appears use of the HSR is increasing. Findings from 2020, 2019 and 2018 reported that 27%, 26% and 23% of consumers respectively, use the HSR often or all the time when deciding to buy a food product (Acton et al. 2023) (Table 2). Although the results between 2018 and 2024 are somewhat comparable as the question wording and representativeness of sample were similar, no testing was undertaken to determine if there was a statistically significant increase.

Table 2. Self-reported use of the HSR in Australia.

Year of finding	Population	Question	Finding	Reference
2018	12,418 Australian adults, quotas for age and sex	How often do you use this type of food label when deciding to buy a food product? Never/Rarely/Sometimes/ Often/All the time	23% of participants reported using the HSR often or all of the time.	Acton et al. 2023
	3,901 Australian adults, quotas for age and sex	How often do you use this type of food label when deciding to buy a food product? Never/Rarely/Sometimes/ Often/All the time	Mean use of HSR was 2.9/5 (slightly below midpoint between rarely and sometimes).	Bhawra et al. 2022b (subset of Acton et al. 2023 data)
2019	12,418 Australian adults, quotas for age and sex	How often do you use this type of food label when deciding to buy a food product? Never/Rarely/Sometimes/ Often/All the time[1]	26% of participants reported using the HSR often or all of the time.	Acton et al. 2023
2020	12,418 Australian adults, quotas for age and sex	How often do you use this type of food label when deciding to buy a food product? Never/Rarely/Sometimes/ Often/All the time	27% of participants reported using the HSR often or all of the time.	Acton et al. 2023
2024	1,231 Australian adults, nationally representative	How often do you look for the Health Star Rating when shopping for food in the supermarket? Always/Most of the time/Sometimes/Rarely/ Never/Unsure	37% of participants reported using the HSR most or all of the time.	FSANZ 2025a
2024	1,554 Australians, nationally representative	How often do you look for the Health Star Rating when shopping for food in the supermarket? Always/Most of the time/Sometimes/Rarely/ Never/Unsure	39% of participants reported using the HSR most or all of the time.	FSANZ 2025b

The most recent New Zealand findings from 2024 reported that 25 – 44% of consumers use the HSR always or most of the time when shopping for food in the supermarket (FSANZ 2025a, 2025b, The Navigators 2024). Findings from 2015 reported that 27% of New Zealand shoppers who were aware of the HSR (or ~10% of the full sample, including those unaware of the HSR) had used it to choose a packaged food product (Colmar Brunton 2016a). This increased to 37% of those aware of the HSR in 2018 (or ~28% of the full sample). These results suggest that use may have increased over time. Although these findings all come

from representative samples of the New Zealand population, comparisons should be interpreted with caution as question wording did not specify the same context of HSR use (i.e. buying a product for the first time versus ever using the HSR) (Table 3).

Table 3. Self-reported use of the HSR in New Zealand.

Year of finding	Population	Question	Finding	Reference
2015	Representative sample of 1,678 New Zealand adult shoppers.	Have you ever personally used the Health Star Rating system to help you choose a packaged food product? Yes/No/Don't know	27% of participants that were aware of the HSR (38%, n = 401) said they've used it to help them choose a packaged food. ~10% of the full sample.	Colmar Brunton 2016a
2018	1,645 New Zealand shoppers (boosted for Māori, Pacific Peoples and low-income shoppers with children under 14 years)	Have you ever personally used the Health Star Rating system to help you choose a packaged food product? *Yes/No/Don't know*	37% of consumers who had seen or heard of the HSR (50%, n = 798) say they have used the HSR to help them choose a packaged food. ~28% of the full sample.	Colmar Brunton 2018
2024	Representative sample of 1,602 New Zealanders aged 15 or more years (included boosted samples for Māori and Pacific Peoples)	When buying a packaged food or drink for the first time, how often do you refer to the following labelling information? Always/Most of the time/About half of the time/Occasionally/Never/ Don't know	44% of consumers report always or most of the time using the HSR when buying packaged food for the first time.	The Navigators 2024
2024	Representative sample of 884 New Zealand adult shoppers	How often do you look for the Health Star Rating when shopping for food in the supermarket? Always/Most of the time/Sometimes/Rarely/ Never/Unsure	25% of shoppers reported using the HSR most or all of the time.	FSANZ 2025a
2024	Representative sample of 696 New Zealand adult shoppers	How often do you look for the Health Star Rating when shopping for food in the supermarket? Always/Most of the time/Sometimes/Rarely/ Never/Unsure	28% of shoppers reported using the HSR most or all of the time.	FSANZ 2025b

Eight government commissioned reports asked how likely consumers believe they would be to use the HSR in the future, including in a scenario where the HSR was on most packaged foods. Results for Australian and New Zealand consumers are summarised in Table 4 and Table 5, respectively.

In 2024, 61% of Australians indicated the HSR would be likely to influence future food purchasing decisions, potentially indicating an intention to use the system (FSANZ 2025b). Over 2015 to 2017, between 40 – 50% of Australian consumers reported they would be likely to use the HSR on a regular basis if the HSR was on most packaged food (Pollinate Research 2015, 2016, 2017). In qualitative survey questions undertaken in Australia between 2015 and 2019, 13 – 17% of people said they would not use the HSR (National Heart Foundation 2017, 2019). In a 2015 study only 15% of Australian consumers said they would use the HSR to guide their choice of a new breakfast cereal, which suggests use of the HSR by Australian consumers may have increased since that study (Riley et al. 2016).

Table 4. Australian consumers self-reported likelihood of using the HSR in the future.

Year of finding	Population	Question	Finding	Reference
2014	Nationally representative sample of 1,000 Australian adult shoppers	If the Health Star Rating was on most packaged foods in your supermarket, how likely would you be to use it on a regular basis? 11-point scale with 0 = never use, 10 = extremely likely to use	40% consumers say they would be likely[1] to use the HSR.	Pollinate Research 2015
2015	Stratified sample of 3,005 South Australians 15+ years	Which of the following on a food package would you use to guide your decision to purchase a new breakfast cereal? (please choose any that apply) 1. A statement on the front of the pack about how the food effects health. 2. The statement on the back of the pack about nutrient content (the Nutrition Information Panel). 3. The health star rating on the front of the pack. 4. None of the above 5. I don't use information on food packaging 6. I don't buy breakfast cereal 7. Don't know 8. Refused	15% of participants said they would use the HSR.	Riley et al. 2016
	Nationally representative sample of 1,000 Australian adult shoppers	If the Health Star Rating was on most packaged foods in your supermarket, how likely would you be to use it on a regular basis? 11-point scale with 0 = never use, 10 = extremely likely to use	47% consumers say they would be likely[1] to use the HSR.	Pollinate Research 2015
	Nationally representative sample of 1,084 Australian adult shoppers	How would you use the Health Star Rating system? Open verbatim	14% of Australian respondents stated they would not use the HSR.	National Heart Foundation 2017

Year of finding	Population	Question	Finding	Reference
2016	Nationally representative sample of 1,007 Australian adult shoppers	If the Health Star Rating was on most packaged foods in your supermarket, how likely would you be to use it on a regular basis? 11-point scale with 0 = never use, 10 = extremely likely to use	50% of consumers say they would be likely[1] to use the HSR.	Pollinate Research 2016
	Nationally representative samples of 1,213 (February) and 1,335 (July) Australian adult shoppers	How would you use the Health Star Rating system? Open verbatim	February: 17% of respondents stated they would not use the HSR. July: 15% of respondents stated they would not use the HSR.	National Heart Foundation 2017
2017	Nationally representative sample of 1,052 Australian adult shoppers	If the Health Star Rating was on most packaged foods in your supermarket, how likely would you be to use it on a regular basis? 11-point scale with 0 = never use, 10 = extremely likely to use	44% of consumers say they would be likely[1] to use the HSR.	Pollinate Research 2017
2018	Nationally representative sample of 6,233 Australian adult shoppers	How would you use the Health Star Rating system? Open verbatim	When asked how they would use the HSR system,13% of Australian respondents stated they would not use the HSR.	National Heart Foundation 2019
2024	Nationally representative sample of 1,554 Australian adult shoppers	How likely or unlikely is the Health Star Rating to influence choices you make in the future when buying food? 7-point scale, where 1 = “Very unlikely”, 4 = “Neutral”, and 7 = “Very Likely”	61% of consumers say they would be likely to use the HSR.	FSANZ 2025b

[1] A rating of >7 was counted as likely to use the HSR.

Approximately half (49 – 51%) of New Zealand shoppers say they’re at least quite likely to use the HSR the next time they see it on a product they’re thinking of buying. These results have remained stable since 2015 (Colmar Brunton 2016a, 2018, FSANZ 2025b) (Table 5). As the Australian and New Zealand reports specified different contexts when investigating consumers’ likelihood of using the HSR (i.e. the next time they see it on a product they’re thinking of buying versus using it on a regular basis if available on most packaged food), comparisons between likelihood of use between the countries cannot be made.

Table 5. New Zealand consumers self-reported likelihood of using the HSR in the future.

Year of finding	Population	Question	Finding	Reference
2015	1,678 New Zealand shoppers with quotas for age, gender, region, low-income[1], Māori and Pacific Peoples	How likely or unlikely are you to use the Health Star Rating the next time you see it on a product you're thinking of buying? Very likely/Quite likely/Neither likely nor unlikely/Quite unlikely/Very unlikely/Don't know	51% of shoppers in the general population say they're at least quite likely to use the HSR in future.	Colmar Brunton 2016a
2016	1,658 New Zealand shoppers with quotas for age, gender, region, low-income, Māori and Pacific Peoples		49% of shoppers in the general population say they're at least quite likely to use the HSR in future.	Colmar Brunton 2016b
2018	1,645 New Zealand shoppers with quotas for age, gender, region, low-income, Māori and Pacific Peoples		50% of shoppers in the general population say they're at least quite likely to use the HSR in future.	Colmar Brunton 2018
2024	Representative sample of 696 New Zealand adult shoppers	How likely or unlikely is the Health Star Rating to influence choices you make in the future when buying food? 7-point scale, where 1 = "Very unlikely", 4 = "Neutral", and 7 = "Very Likely"	51% of consumers say they would be likely to use the HSR.	FSANZ 2025b

What do consumers use the HSR for?

This section considers the ways consumers use the HSR, as identified by 7 government commissioned reports and 2 peer-reviewed articles. It does not discuss whether consumers are using the HSR correctly (see Research Question 2).

Consumers commonly report using the HSR for its intended purpose of identifying healthier food choices when shopping. For example, when Australian consumers were asked to describe in their own words 'How would you use the Health Star Rating system?' in 2015, 2016 and 2018, the most common use of the HSR across all years was to compare products or to help make better/healthier choices (30%, 25% and 27%, respectively) (National Heart Foundation 2017, 2019). Some consumers in Australia (38%) compare the HSR to other nutritional information on the pack (Pollinate Research 2016). In 2018, 65% of Australian respondents agreed or strongly agreed that HSR 'helps me make decisions about what to buy' (National Heart Foundation 2019). This has increased since 2017, where 60% of Australians agreed that the HSR 'helps me make decisions about which foods to buy' (Pollinate Research 2017). Results were similar for New Zealand in 2018, with 59% of respondents agreeing the HSR can help them make food shopping decisions for themselves or their family (Colmar Brunton 2018). Just over half (54%) of Australians and New Zealanders in the 2024 CIT agreed the HSR 'Helps me make decisions about which foods to buy' (FSANZ 2025a). How the HSR influences purchase decisions is described further under Research Question 4.

Talati et al. (2016a) conducted focus groups with adults (n = 50) in Perth, Western Australia to explore reactions to different FoPL, including the HSR.[6] This study was conducted soon after the HSR began appearing on products. Participants thought that they would use the HSR to compare similar products, as well as to evaluate the overall healthiness of individual products. A common heuristic was products with a rating of 2 or fewer stars were generally considered unhealthy overall, whereas those with 3 or more stars were seen as healthier. Some participants voiced that they would not buy the products they deemed unhealthy based on their HSR. An unintended use of the HSR was highlighted by a small subset of participants who suggested they would use the HSR to gauge the tastiness of the product, due to the assumption that a lower healthiness rating equated to a better-tasting product (Talati et al. 2016a).

One study investigated if and how primary school canteen managers in New South Wales, Australia, use the HSR (Reilly et al. 2018). Of the 35 managers interviewed, 40% (n = 14) said they use the HSR when selecting foods to sell in canteen. Participants were also asked to complete a theoretical scenario where they selected products to sell. In this, the percentage of canteen managers that stated they had used the HSR to select foods for their canteens remained at 40%. This experiment was performed over the phone and no images of the HSR were shared.

New Zealand shoppers were asked to think about the last time they used the HSR to help choose a packaged food product, and indicate what type of product it was (Colmar Brunton 2018). Most reported using it to select breakfast cereals (74% in 2016 and 68% in 2018) or muesli bars (27% in 2016 and 39% in 2018). Under 10% of consumers reported looking for the HSR on meat products, milk or confectionery (Colmar Brunton 2018). These results may reflect which products the HSR is most prevalent on, or the products where participants seek nutrition information to guide their food purchasing decisions. These results align with focus group findings from Talati et al. (2016a) where Australian participants stated that they would avoid looking at nutrition information on discretionary foods because they are purchased for non-health-related reasons. In contrast, a small subset of participants desired the HSR on discretionary foods so that they could make healthier decisions (Talati et al. 2016a).

The 2024 HSR Monitoring Survey asked Australian and New Zealand shoppers to select the most common scenario they use the HSR in (FSANZ 2025b). There was an even split with 45% of shoppers selecting ‘I frequently look out for the Health Star Rating on food products I buy’ and 45% selecting ‘I only look out for the Health Star Rating when I am buying a new food product or brand for the first time’ Few consumers said they look out for the HSR on certain food types (3%) (FSANZ 2025b).

What are the characteristics of people who use or don’t use the HSR?

This section explores whether any demographics, household characteristics or knowledge are related to using the HSR. Two studies explicitly explored a difference between Australian and New Zealand consumers (FSANZ 2025a; 2025b).

Demographics

Limited information was found regarding demographics of those more likely to use the HSR. Most results came from subgroup analyses conducted in New Zealand Government commissioned reports. Any reported differences (e.g. those ‘more likely’) are statistically significant at the 95% confidence level unless otherwise stated. Government reports undertook comparisons across most demographic variables reported below. Non-significant

[6] Focus groups were also held with children aged 10-17 years (n = 35) but results explicitly linked with these groups were excluded in this review.

differences from government commissioned reports are not reported here due to the large number of non-significant findings.

Gender

In Australia, women were more likely than men to report they would use the HSR when choosing a breakfast cereal in the future (Riley et al. 2018).[7]

In New Zealand, women were more likely than men to report they would be at least quite likely to use HSR in future (54% compared with 45% of men; Colmar Brunton 2016a; Colmar Brunton 2018).

Age

In Australia, consumers aged 55 years and older were more likely than younger consumers to report the HSR helps them to identify healthier options (80% compared to 76% of consumers under 54 years) (National Heart Foundation 2019).

There were mixed findings relating to age and use of the HSR in New Zealand. In 2015, New Zealand shoppers aged 60 years or more were more likely to use HSR (59% compared with 47% under 60; Colmar Brunton 2016a). In 2016 in the Pacific population in New Zealand, shoppers aged 40 and over were more likely to use the HSR compared to those aged under 40 (65% compared to 46%; Colmar Brunton 2016b). However, in 2018, people aged 18 – 29 years in New Zealand were more likely to use the HSR compared to the general population (43% versus 28% overall; Colmar Brunton 2018).

Across Australia and New Zealand, using the HSR 'always', 'most of the time' and 'sometimes' (compared to 'rarely/never') was associated with being younger (FSANZ 2025a). However, in the 2024 HSR Monitoring survey, this association was only found for those who 'sometimes' (compared to 'rarely/never') used the HSR (FSANZ 2025b).

Ethnicity

There were no data specifically pertaining to ethnicity, including Aboriginal and Torres Strait Islander Peoples, and use of the HSR in Australian research.

In 2018, 33% of Māori shoppers reported using the HSR system to help choose a packaged food product (Colmar Brunton 2018). This significantly increased from 6% in 2015 (Colmar Brunton 2018). Similar trends were seen for Pacific Peoples, where self-reported use increased from 25% in 2015 to 39% in 2018 (Colmar Brunton 2018). When asked how likely they were to use the HSR the next time they see it on a product they are thinking of buying, 46% of Māori and 62% of Pacific Peoples reported being at least quite likely, relative to 50% of the general population (Colmar Brunton 2018).[8]

In 2016, compared to the general population, Asians in New Zealand were more likely to use the HSR (54% compared with 31% overall; Colmar Brunton 2016b). This was also seen in a 2024 survey (58% compared with 44% overall; The Navigators 2024).

Location

In the 2015 survey by Riley et al. (2018), those in Australia living in a metropolitan area were more likely to report they would use the HSR to choose a breakfast cereal, than those living rurally.[9]

Using the HSR 'always', 'most of the 'time' and 'sometimes' (compared to 'rarely/never') was associated with being from Australia compared to New Zealand (FSANZ 2025a, 2025b).

[7] Sex ($\beta = 0.404$, $p = <0.001$)
[8] Differences between Māori, Pacific Peoples and the general population were not tested for significance.
[9] Metro/rural ($\beta = -0.341$, $p = 0.008$)

Income

In Australia, those with a higher annual income (greater than $50,000 compared to less than $50,000) were significantly more likely to report that the HSR helps them to make decisions about which foods to buy (67% versus 63%), and that the HSR assists them in identifying healthier foods (78% versus 75%) (National Heart Foundation 2019).

In contrast, in 2016 New Zealand respondents from lower income households were more likely to use the HSR compared to higher income households (46% amongst those earning up to $30k compared to 29% for those earning over $30k) (Colmar Brunton 2016b). The proportion of New Zealand respondents from lower income households reporting using the HSR to choose a packaged food increased from 14% in 2015 to 36% in 2018 (Colmar Brunton 2018). At least 53% of respondents from low-income households reported being likely to use the HSR in the future (Colmar Brunton 2018).

Household composition

In Australia, those with children are more likely to agree that the HSR assists them in identifying healthier options, than households without children (79% versus 76%) (National Heart Foundation 2019). One study assessed Australian parents use of the HSR through a discrete choice experiment (Russell et al. 2016). In this study, parents of fussy eaters were less likely to use the HSR than other parents. In addition, parents who were concerned about their children being underweight were less likely to use the HSR when making their decisions, while parents concerned about their child being overweight were more likely to choose the product displaying a HSR (Russell et al. 2016).

In New Zealand, people in the general population who have children under 14 years were more likely to use the HSR compared to those who don't (34% versus 28% overall) (Colmar Brunton 2018).

Shopping and health behaviours

In 2015, 2016 and 2018, New Zealanders from the general population who were more likely to use HSR in the future were those: that check the healthiness of products at least some of the time (58% compared with 36% who do not); and those who have used the HSR before (77% compared with 40% who have not) (Colmar Brunton 2016a; 2016b; 2018). Those in the general population in New Zealand who never or rarely check the healthiness of products were less likely to use the HSR (5% compared with 31% who check at least sometimes) (Colmar Brunton 2016a). The underlying drivers of checking the healthiness of products (or not) was not discussed.

Knowledge

Two studies investigated whether there was a link between knowledge of the HSR and its level of use. Using the HSR 'always' and 'most of the time' (compared to 'rarely/never') was associated with having greater self-rated knowledge of the HSR (know a lot vs know a little/know nothing/haven't seen it; and know a fair amount vs little/know nothing/haven't seen it) (p values <.05) (FSANZ 2025a, 2025b).

Trust

Trust appears to be related to consumers' use of the HSR. In a 2015 New Zealand survey, trust was the most important predictor of intent to use the HSR in the future (Colmar Brunton 2016a). After controlling for a range of demographic, behavioural and attitudinal factors (including experience checking the healthiness of products and beliefs about health and food) trust in the HSR uniquely accounted for 8 – 27% of the variance in likelihood of using the HSR, across different demographic groups. In a 2018 New Zealand survey, 77% of those who trusted the HSR were likely to use it in the future, compared to just 15% of those who

did not trust the HSR (Colmar Brunton 2018). Recent findings also support this, with using the HSR ‘always’, ‘most of the time’ or ‘sometimes’ (compared to ‘rarely/never’) associated with having greater trust in the HSR (FSANZ 2025b). While these findings imply a relationship, it is unclear whether higher trust causes greater use of the HSR.

Trust in the HSR and its determinants are discussed further in Research Question 3.

What factors influence consumers’ use of the HSR?

Barriers

The review identified a range of factors beyond individual characteristics that may decrease or increase consumers’ use of the HSR. Barriers to use can be broadly categorised into 1) external factors to the HSR, such as other influences that impact food choice; and 2) factors related to the HSR itself.

External barriers to using the HSR

Consumers may choose not to use the HSR due to competing factors having a greater influence over their food choices. For example, a 2015 study found that low-income respondents reported choosing to buy what their kids will eat instead of using the HSR (TNS New Zealand 2015). This was also identified as a key competing factor for Māori and Pacific Peoples in 2018 with 33% and 37%, respectively, selecting they ‘buy based on what they know their family will eat’ as a reason they would be unlikely to use the HSR. In contrast, only 12 – 28% of the general New Zealand population, and 20% of the general Australian population, viewed that as a barrier to using the HSR (Colmar Brunton 2018; FSANZ 2025b).

Cost is also a key factor that influences purchasing decisions, with 44% of Māori and 46% of Pacific Peoples selecting what they buy based on price as a reason they are unlikely to use the HSR, relative to 19% of the general New Zealand population (Colmar Brunton 2018). In 2024, 36% of the general New Zealand population and 26% of the general Australian population selecting cost as a barrier (FSANZ 2025b). In addition, Stuthridge et al. (2022) used semi-structured interviews and focus groups to investigate how New Zealand consumers understand, perceive, and use nutrition content and health claims on food labels. Participants in this study had an awareness of FoPLs, including the HSR, but in general reported not using them when shopping, with factors like price reported as having a greater influence on food choices. This barrier may be entwined with consumer perceptions that packaged foods with the HSR are more expensive than foods without it (see Research Question 2 – Understanding that more stars indicate a healthier product).

In 2015, 2016, 2018, and 2024 prioritising other nutrition information was the top reason why New Zealand survey participants would be unlikely to use the HSR, reported by 50%, 46%, 49% and 52% of the general population, respectively (Colmar Brunton 2016a, 2016b, 2018; FSANZ 2025b). It was also the top reason (60%) why Australian participants reported they would be unlikely to use the HSR (FSANZ 2025b). Fourteen to 18% of participants (2018 to 2024) also selected ‘I have specific dietary requirements, and I buy based on those’ (Colmar Brunton 2018; FSANZ 2025b). This provides one potential explanation for why other nutrition information is more important for a subset of participants. The proportion of participants who selected ‘I’m the best judge of what’s healthy for me and my family’ as a barrier to HSR use significantly decreased from 29% in 2015 to 17% in 2018 (Colmar Brunton 2018). However, this appeared to increase back to 29% in 2025, although this difference was not statistically tested (FSANZ 2025b).

Other consumer attitudes towards the HSR may also act as barriers, with 47% and 43% of Australian and New Zealand participants selecting that they would be unlikely to use the HSR as they ‘don’t think the HSR is accurate’ and/or ‘think the HSR is a marketing tool’ (FSANZ 2025b).

Intrinsic barriers to using the HSR

Factors relating to the HSR itself that may be barriers to use include its lack of prevalence. In an Australian randomised control trial (RCT) where consumers were shown FoPLs by scanning food product barcodes, those that saw the HSR had a desire to see it on all products (Neal et al. 2017). Frustration with inconsistent application was echoed in focus groups of Australian parents, where participants repeatedly expressed the view that the government needed to make the HSR mandatory to facilitate use and to ensure it is effective (Pulker et al. 2019). Many participants from a further Australian focus group study also voiced that the HSR system should be compulsory across all packaged products, to increase transparency and the ability to compare foods (National Heart Foundation 2019). Of those in New Zealand that said they would be unlikely to use the HSR, 15% selected 'there are not enough products with Health Stars on them, so I cannot compare ratings' as a barrier to use (Colmar Brunton 2018). In 2024, only 10% of Australian and New Zealanders selected this as a reason they would be unlikely to use the HSR (FSANZ 2025b).

HSR visibility on the food pack/label may also impact use. Less than half of Australians (45%) agreed 'it really grabs my attention' (Pollinate Research 2017). In addition, in 2018, on average Australian consumers slightly agreed that the HSR label does not stand out (M = 5/9, with 9 being strongly agree) (Talati et al. 2019a). In 2016, 24% of Australian consumers agreed the HSR is hard to see on the package (National Heart Foundation 2017). In 2017 – 2018, 61% of Australian consumers agreed the HSR stands out on the pack (Pollinate Research 2017) and 62% of New Zealand consumers agree that it's easy to find the HSR on packaged foods (Colmar Brunton 2018).

Enablers

Ease of use

The simplicity of the HSR system appears to facilitate use. For example, a cross-sectional survey of Australian adults (n = 1,558) and children (n = 500) asked participants to select their preferred FoPL from 3 options, including the HSR (Pettigrew et al. 2017). Forty four percent (n = 897) of all respondents identified the HSR as their preferred FoPL (42% of adults and 50% of children). Of those who preferred the HSR, ease of use was the most frequently mentioned reason for their preference (41% overall, 38% of adults and 51% of children; Pettigrew et al. 2017). In focus groups with Australians, consumers perceived the HSR to be quick and easy to use (Talati et al. 2016b) and practical (Pelly et al. 2020). Focus group participants felt that the nature of the HSR as a summary indicator contributed to ease of use by decreasing the time and effort involved in choosing the healthier product (Talati et al. 2016a).

Government commissioned reports commonly asked participants if they agreed the HSR system is easy to use, and if it makes it easier to identify healthier options (Table 6) (Pollinate Research 2015, 2016, 2017, Colmar Brunton 2018, National Heart Foundation 2017, 2019). The proportion of participants that agree with each of these statements has fluctuated over time but consistently remains greater than 50%. The most recent results suggest that 77% of Australian and 61% of New Zealand consumers agree that the HSR system makes identifying healthier products within a category easier (National Heart Foundation 2019; Colmar Brunton 2018).

Of note, actual self-reported use (as reported in Table 2) is much lower than the percentage of consumers that agree the HSR is easy to use and makes identifying healthier products easier. This suggests that some consumers who find the HSR easy to use are choosing not to use it for other reasons. This was supported by 2018 results that highlighted only 13% of New Zealand consumers would be unlikely to use the HSR due to not knowing how to use it (Colmar Brunton 2018).

Table 6. Consumer reported ease of using the HSR and ability to identify healthier products using the HSR.

Year of finding	Proportion agreeing the HSR system is easy to use	Reference	Proportion agreeing HSR makes it easy to identify healthier options	Reference
2015	65% – AU	Pollinate Research 2015	70% – AU	Pollinate Research 2015
	58% – NZ	Colmar Brunton 2018	60% – NZ	Colmar Brunton 2018
2016	71% – AU	Pollinate Research 2016	68% – AU	Pollinate Research 2016
	72% – AU	National Heart Foundation 2017	75% – AU	National Heart Foundation 2017
2017	70% – AU	Pollinate Research 2017	67% – AU	Pollinate Research 2017
2018	63% – NZ	Colmar Brunton 2018	61% – NZ	Colmar Brunton 2018
			77% – AU	National Heart Foundation 2019

Relevance

Over half of consumers appear to perceive the HSR as relevant to them, which in turn may impact use, although no association was directly tested. In 2015 and 2016, approximately 60% of Australians agreed they found HSR personally relevant for themselves and/or their family (National Heart Foundation 2017). In 2016 and 2017, approximately 55% of Australians believed the HSR was aimed at someone like them; while only about 20% said the HSR was not relevant to them (Pollinate Research 2016, 2017).

Research by Colmar Brunton (2018) indicated a lower percentage of the New Zealand population agreed the HSR was ‘made for people like me’ (43% in 2018, with no significant change since 2015; Colmar Brunton 2018).

Importance

Consumer perceptions of the importance of the HSR may impact their use of it. In 2023 and 2024, 59% and 61% of Australians and New Zealanders, respectively, generally found the HSR important when making choices about purchasing packaged food or drink for the first time (FSANZ 2025a). The mean level of importance for the HSR in 2024 was 4.78 which did not differ significantly from 2023 (mean = 4.70) ($p > .05$) (FSANZ 2025a).

Research Question 2: Do Australian and New Zealand consumers understand the HSR?

Overview of key findings

Research question 2 sought to answer whether Australian and New Zealand consumers understand the HSR system. This included whether consumers think they understand the HSR (subjective understanding) and whether their understanding matches a factually correct response (objective understanding). Studies considering objective understanding looked at consumer understanding of how the HSR score is determined and applied; whether consumers understood when to use the HSR (i.e. only using it to compare similar food products), how to interpret it (i.e. more stars indicate a healthier product) and their ability to use it (i.e. does it help consumers to identify healthier products). Research question 2 also considered the characteristics of people who do and don't understand the HSR, and barriers and enablers to understanding.

The review identified 19 peer-reviewed articles (Talati et al. 2016a, 2016b 2017a, 2018b, 2019a; Neal et al. 2017; Ni Mhurchu et al. 2017; Pettigrew et al. 2017, 2020a, 2020b, 2023; Anderson and O'Connor 2018; Egnell et al. 2018; Pulker et al. 2019; Pelly et al. 2020; Thomas et al. 2021; Bhawra et al. 2022a; Stuthridge et al. 2022; Acton et al. 2023) and 11 government reports (TNS New Zealand 2015; Pollinate Research 2015, 2016, 2017; Colmar Brunton 2016a, 2016b, 2018; National Heart Foundation 2017, 2019; FSANZ 2025a, 2025b) that examined how consumers understood different aspects of the HSR. All government reports were quantitative cross-sectional surveys. Of the peer-reviewed articles, 14 were quantitative, with 5 qualitative studies. Most publications were of medium quality (n = 15)[10], with 10 high quality[11] and 5 low quality.[12] Some degree of consistency in the findings within similar populations and timepoints (regardless of quality) increases confidence in the results relating to consumer understanding of the HSR.

Overall, subjective understanding of the HSR is moderate to high, with 59 – 72% of Australians and 58 – 63% of New Zealand consumers agreeing that the HSR is easy to understand. The most recent results from 2024 indicate 37 – 45% of Australian and 33 – 39% of New Zealanders report knowing at least a fair amount about the HSR. Self-report measures should be interpreted with caution, as people's perception of their own understanding is not always accurate.

Objective measures provide more reliable insights into understanding. Overall, objective understanding varies depending on the aspect considered. There was evidence that the presence of the HSR objectively helps consumers select the overall healthier product when comparing similar foods, and that 62 – 90% of consumers understand that more stars indicate an overall healthier product. Although over two thirds (> 68%) of consumers understood that the HSR could be used to compare similar products, understanding that it should not be used to compare different kinds of products was much lower (26%). There was also limited understanding of how the HSR is calculated and the extent to which industry and Government are each involved.

The format of the HSR appears to influence consumers' ability to identify healthier products (those with a higher star rating). Consumers report preferring HSR formats that include the star rating and information about individual nutrients. However, qualitative findings indicate

[10] Talati et al. 2016a, 2016b, 2017a, 2018b, 2019a; Pettigrew et al. 2017, 2020b, 2023; Anderson and O'Connor 2018; Pelly et al. 2020; Colmar Brunton 2016a, 2016b, 2018; National Heart Foundation 2017, 2019.
[11] Neal et al. 2017; Ni Mhurchu et al. 2017; Egnell et al. 2018; Pulker et al. 2019; Bhawra et al. 2022a; Stuthridge et al. 2022; Acton et al. 2023; TNS New Zealand 2015; FSANZ 2025a, 2025b.
[12] Pettigrew et al. 2020a; Pollinate Research 2015; Pollinate Research 2016; Pollinate Research 2017; Thomas et al. 2021.

that adding more information to the front of pack may increase the likelihood that consumers will use that information to choose products, rather than the overall star rating.

Subjective understanding of the HSR

Self-reported knowledge

In 2024, 37 – 45% of Australians self-rated that they knew at least a fair amount about the HSR (FSANZ 2025a, 2025b). Only 2 – 3% had never seen or heard of it (FSANZ 2025a, 2025b). No research looked at self-reported knowledge of the HSR in Australia prior to this.

In the most recent findings in New Zealand, 33 – 39% of consumers self-rated that they knew at least a fair amount about the HSR, with only 3 – 6% who had never seen or heard of it (FSANZ 2025a, 2025b). New Zealand consumer self-reported knowledge of the HSR appears to be increasing. In 2018, only 14% of the general population reported they knew at least a fair amount about the HSR, which had increased significantly from 5% in 2015 (Colmar Brunton 2018). In 2018, 18% reported being aware of the HSR but knowing nothing about it while 24% reported not being aware of the HSR at all (Colmar Brunton 2018).

Ease of understanding

Across 6 studies between 2015 and 2020, 59 – 72% of Australians reported finding the HSR easy to understand (Table 7). There was no clear trend of an increase or decrease in understanding over this time (Pollinate Research 2015, 2016, 2017; National Heart Foundation 2017, 2019; Acton et al. 2023). Two studies suggested that on average, Australians found the HSR easy to understand, i.e. mean 6.5 out of 9 (with 9 being 'strongly agree' that the HSR is easy to understand), and 3.68 (Standard Deviation [SD] ± 0.97) out of 5 (with 5 being 'very easy to understand') (Talati et al. 2019a; Bhawra 2022a). In Australian focus groups, participants also felt that the HSR was easier to understand compared to other nutritional information (Talati et al. 2016a).[13] Between 2015 and 2018, only a small percentage of Australians (14 to 19%) agreed or strongly agreed that the HSR was confusing (Pollinate Research 2015, 2016, 2017; National Heart Foundation 2017). In 2016 and 2017, 28% of Australian consumers didn't feel the HSR added value and reported that it makes shopping confusing (National Heart Foundation 2019).

A similar proportion of New Zealanders agreed that the HSR is easy to understand, significantly increasing from 58% to 63% of respondents between 2015 and 2018 (Colmar Brunton 2016a, 2016b, 2018) (Table 8). However, despite reported ease of understanding, just under half of respondents (47%) of the general population in New Zealand in 2018 agreed that they felt confident using the HSR to choose packaged foods (Colmar Brunton 2018).

[13] The type of nutritional information was not mentioned.

Table 7. Australian consumer self-rated ease of understanding the HSR.

Year of finding	Question	Finding	Reference
2015	The HSR is easy to understand True/False	**66%** agree the HSR is easy to understand	Pollinate Research 2015
2016	The HSR is easy to understand True/False	**69%** agree the HSR is easy to understand	Pollinate Research 2016
2017	The HSR is easy to understand 5-point Likert scale, 1 - strongly disagree to 5 - strongly agree	**72%** agree or strongly agree the HSR is easy to understand	National Heart Foundation 2017
	The HSR is easy to understand True/False	**70%** agree the HSR is easy to understand	Pollinate Research 2017
2018	How easy do you find this information [the HSR] to understand? 5-point Likert scale, 1 - very hard to 5 - very easy	**59%** find the HSR easy or very easy to understand	Acton et al. 2023
2019	How easy do you find this information [the HSR] to understand? 5-point Likert scale, 1 - very hard to 5 - very easy	**61%** find the HSR easy or very easy to understand	Acton et al. 2023
	The HSR is easy to understand 9-point Likert scale from 1 - strongly disagree to 9 - strongly agree	Mean agreement HSR is easy to understand 6.5/9	Talati et al. 2019a
2020	How easy do you find this information [the HSR] to understand? 5-point Likert scale, 1 - very hard to 5 - very easy	**62%** find the HSR easy or very easy to understand	Acton et al. 2023
2022	How easy do you find this information [the HSR] to understand? 5-point Likert scale, 1 - very hard to 5 - very easy	Mean positive self-reported understanding 3.68 SD ± 0.97 out of 5	Bhawra et al. 2022a

Table 8. New Zealand consumer self-rated ease of understanding the HSR.

Year of finding	Question	Finding	Reference
2015	It is easy to understand *Strongly agree, somewhat agree, neither agree nor disagree, somewhat disagree, strongly disagree, don't know*	**58%** agree or strongly agree the HSR is easy to understand	Colmar Brunton 2016a
2016		**61%** agree or strongly agree the HSR is easy to understand	Colmar Brunton 2016b
2018		**63%** agree or strongly agree the HSR is easy to understand	Colmar Brunton 2018

Objective understanding of the HSR

Understanding of how the HSR score is determined and applied

Consumer understanding of how HSRs are calculated is low. When Australian shoppers were asked "In your opinion, how is the number of stars on a product determined?", approximately one third (32 – 35% across 2015 and 2016) of respondents provided an open-ended response that indicated the number of stars on a product is determined by nutritional analysis, while an additional third were unsure (29 – 33% across 2015 and 2016) (National Heart Foundation 2017). A very small percentage of respondents in that survey believed that the HSR was determined by food manufacturers (1 – 3%) (National Heart Foundation 2017). In Australian focus group discussions, there was also a poor understanding that the HSR is a voluntary system that was developed by government in collaboration with industry, public health and consumer groups (National Heart Foundation 2019). Some focus group participants believed that manufacturers pay a licence to have the HSR on their products (National Heart Foundation 2019) or could pay for a more favourable rating (TNS New Zealand 2015).

Similarly, New Zealand respondents consistently had a poor understanding of how the HSR was developed. Only 32 – 33% correctly identified that the HSR was developed by food experts and 23 – 31% correctly identified that the HSR system is backed by the Government (Colmar Brunton 2018). Thirty-four to 49% of New Zealand respondents incorrectly believed that all packaged foods require a HSR (Colmar Brunton 2016a, 2016b, 2018).

Understanding of which products can be compared using the HSR

Consumers generally recognised that the HSR can be used to compare similar food products (i.e. yoghurt with yoghurt). However, there is widespread misunderstanding about whether the HSR should be used to compare different kinds of foods (i.e. yoghurt with bread).

During focus groups, Australians generally understood that the HSR should only be used to compare similar products (National Heart Foundation 2019). Australian survey respondents also generally agreed that the HSR made it easier to compare products in the same category (72 – 74% between 2015 and 2018) (National Heart Foundation 2019), and easier to compare products in the same supermarket section (68 – 70% between 2015 and 2017)

(Pollinate Research 2015, 2016, 2017). In 2024, slightly fewer Australian and New Zealand consumers (61%) agreed the HSR allows them to compare the healthiness of similar foods (FSANZ 2024a). When tested using mock product comparisons, 80% of Australians correctly understood the HSR can be used to compare similar food products (FSANZ 2025b). However, 42 – 58% of Australian consumers incorrectly agreed that the HSR makes it easier to compare products in different categories/sections in the supermarket (National Heart Foundation 2017, 2019, Pollinate Research 2015, 2016, 2017). Findings were similar in 2024, with 57% of Australians and New Zealanders agreeing that the HSR allows them to compare the healthiness of different kinds of foods (FSANZ 2025a). It is not clear whether consumers who did not think that the HSR enables comparison of different kinds of products felt this way because they understood that the HSR is not designed to be used across categories, or for another reason (e.g. it is not physically practical to compare products in different sections of the supermarket). However, when tested with mock product comparisons, 63% of Australian consumers did not understand that the HSR can't be used to compare dissimilar food products, reinforcing that this is poorly understood by consumers (FSANZ 2025b).

Colmar Brunton (2018) tested New Zealand consumer understanding of which products could be compared using the HSR using mock product comparisons. Most respondents correctly understood that the HSR could be used to compare breakfast cereals to other breakfast cereals (78 – 81%) and breads to other breads (79% significantly decreasing to 68% between 2015 and 2018) (Colmar Brunton 2018). However, only one third of New Zealand respondents correctly understood that baked beans and breakfast cereals (27% in 2015 significantly increasing to 36% in 2016 and 33% in 2018) and yoghurt and juice (30 – 33%) could not be compared because they are not similar products (Colmar Brunton 2018). When a similar comparison was undertaken in the 2024 HSR Consumer Monitoring Survey, 73% of consumers correctly understood that the HSR can be used to compare similar products, while only 26% correctly identified that the HSR cannot be used to compare dissimilar food products (FSANZ 2025b). In New Zealand focus groups, participants also noted confusion with the definition of a category for similar products and whether the HSR should be used to compare within or between categories (TNS NZ 2015). However, one study found that, in practice, most New Zealand shoppers reported using HSR to compare similar types of food products (80% decreasing to 75% between 2015 and 2018) with only 2 – 3% using the HSR to compare different types of products (Colmar Brunton 2018).[14]

Understanding that more stars indicate a healthier product

Qualitative survey questions suggest that approximately one-half to two-thirds of consumers across both Australia and New Zealand have a general understanding of how to use the HSR. Statements indicating accurate understanding included things similar to: "the more stars the better", "provides a health rating/shows how healthy a product is", "can be used to compare with similar products or brands", and "helps to make healthier choices" (Colmar Brunton 2016a, 2016b, 2018; Pollinate Research 2015, 2016, 2017; National Heart Foundation 2017, 2019).

Quantitative survey questions suggest an even greater proportion of consumers understand more stars indicate a healthier product. Most Australians (74 – 76% between 2015 and 2016) and New Zealanders (62 – 72% between 2015 and 2018) agree that a product with more stars means that it is a healthier option compared to a similar food product with fewer stars (National Heart Foundation 2017; Colmar Brunton 2018). Further, most Australians also understand that a product with five stars is the healthiest option (83 – 88% between 2015 and 2018), and that a product with one star is the least healthy option (84 – 89% between 2015 and 2018; National Heart Foundation 2019). When consumers were asked to select the

[14] Participants were asked "Did you use the Health Star Rating to compare this product with another one? What type of product did you compare it to?" Option responses: (1) A similar type of product, (2) A different type of product, (3) Did not compare to another product, and (4) Can't remember.

healthier of two HSR labels (not displayed on products), the majority of consumers (54 – 90%) selected the label with more stars, regardless of HSR format (FSANZ 2025b). This range was impacted by the HSR format and is described further under Research Question 2 – What factors influence consumers' understanding of the HSR.

Under the HSR system, while more stars indicate a healthier product relative to a similar product with fewer stars, a high star rating does not necessarily indicate that a product is inherently 'healthy'. This distinction was not well understood, with 60 – 63% of Australians incorrectly believing that a product with more stars is inherently healthy[15] (National Heart Foundation 2017).

One Australian focus group (n = 15) reported that the framing of the label as a 'Health Star Rating' was potentially confusing, as participants felt this indicated there is an absolute health value to any food with a rating (Pelly et al. 2020). However, in an online experiment with 249 Australians, participants were not more likely to choose a product with a HSR over a product without a HSR, suggesting that they did not interpret the presence of the HSR as an indicator of a healthier product compared to a product without a HSR (Anderson & O'Connor 2018).

Some consumers also hold varying views around what the stars indicate. Around a quarter of Australians agreed that more stars indicate that a product is more expensive (21 – 26%) or doesn't taste as good as products with fewer stars (10 – 14%) (National Heart Foundation 2017). In one New Zealand focus group study, respondents commented that more stars could indicate that a product is higher quality, more expensive, or could be eaten in larger quantities (TNS NZ 2015). In 2018, 29% of New Zealanders believed packaged foods with the HSR tend to be more expensive than foods without it, a significant increase from 24% in 2015 (Colmar Brunton 2018).

In cross-sectional surveys, a small proportion of both Australian and New Zealand respondents incorrectly understood that more stars meant you could eat as much as you wanted (13 – 17% of Australians and 7 – 21% of New Zealanders) (National Heart Foundation 2017, Colmar Brunton 2016a, 2016b, 2018). This misunderstanding was particularly common for Pacific Peoples, with 57 – 64% misunderstanding that having 5 stars means you can eat as much of the food as you like (Colmar Brunton 2018) This is further explored in Research Question 2 – What are the characteristics of people who understand or don't understand the HSR?

Ability to use the HSR to identify the overall healthier product relative to no FoPL

Studies suggest that displaying the HSR on similar products can assist consumers to identify the overall healthier product compared to when products have no HSR (Talati et al. 2017a; Pettigrew et al. 2023; Egnell et al. 2018). Research in this section defined the 'healthier product' as the one with a higher HSR. However, it is noted that consumers have different health needs, which may impact what factors determine healthiness for them.

In an Australian online experiment, consumers could better discriminate between healthy and unhealthy versions of pizza, cookies, cornflakes and yoghurt when a HSR was present, compared to when there was no FoPL (mean difference 0.22 on a scale of 1 – 5, 95% confidence interval [CI]: 0.11, 0.33). They were also significantly better at discriminating between moderately healthy and unhealthy versions of these food products when a HSR was present (mean difference 0.13, 95% CI: 0.02, 0.24) (Talati et al. 2017a).

When asked to identify the healthiest and unhealthiest version of breakfast cereals, pizzas and cakes, 33 – 36% of Australian participants who were originally incorrect when no FoPL

[15] How strongly do you agree or disagree that a product with more stars means…? - It is healthy
Strongly agree, Agree, Neither agree nor disagree, Disagree, Strongly disagree, Unsure

was present were correct when the same products were shown with a HSR (Pettigrew et al. 2023).

Additionally, in an international randomised controlled trial that included Australian participants, the HSR was associated with 1.86 times greater ability to correctly rank a products overall healthiness compared to no FoPL (p = 0.02) (Egnell et al. 2018).

What are the characteristics of people who understand or don't understand the HSR?

Demographics

The few studies that considered who was more or less likely to understand the HSR offered mixed findings across most demographics (Colmar Brunton 2016a, 2016b, 2018; Talati et al 2017a). However, Māori and Pacific Peoples appear to have a poorer understanding of the HSR relative to the general New Zealand population (Colmar Brunton 2016a, 2016b, 2018). Any reported differences within population groups over time are statistically significant at the 95% confidence level unless otherwise stated. Non-significant differences from government commissioned reports are not reported here due to the large number of non-significant findings.

Gender

One study did not identify significant differences in gender between Australian respondents that did or did not understand the HSR (Talati et al. 2017a).

Colmar Brunton (2018) asked New Zealand shoppers to describe how the HSR could be used when purchasing food products. Responses were coded into 'accurate understanding' and 'other responses'.[16] In 2015 and 2018, men were less likely to provide a comment that suggested an accurate understanding of the HSR (44% compared with 53% of women; Colmar Brunton 2016a, 2018).

Age

Talati et al. (2017a) did not identify significant differences in age between Australian respondents that did or did not understand the HSR.

Adults aged 60 years or more in New Zealand were less likely to provide a comment that suggested an accurate understanding of the HSR across all study years (2015 to 2018; Colmar Brunton 2016a, 2016b, 2018). Results from 2018 suggest 41% of shoppers over 60 had an accurate understanding of the HSR compared with 52% of those under 60 (Colmar Brunton 2018). Within Māori shoppers with children under 14 in 2015, those aged 18 to 29 were less likely to display accurate understanding (38% compared with 59% of those 30+; Colmar Brunton 2016a).

Education

New Zealanders with no formal education beyond a tertiary certificate or diploma were less likely to provide a comment that suggested an accurate understanding of the HSR in 2015 compared to those with a bachelor or post-graduate degree within the general New Zealand population (45% compared with 61% of those with a bachelor or post-graduate degree;

[16] Comments were categorised into the following themes that constituted 'accurate understanding': The higher the rating the healthier the product; Compare with other products/choose between brands; I would buy items with a higher star rating; Quick to check health/rating at a glance, easier than checking ingredients; It shows how healthy/good something is; The more stars the better; To choose healthier products; Helps me decide if I'll buy it or not; Judge by the number of stars; I wouldn't buy items with few stars; Would make choosing/shopping faster/easier; As a guide/indication of contents; Fewer stars mean it's less healthy; Like the energy star rating.

Colmar Brunton 2016a). This was also true for Pacific shoppers with children under 14 (29% with no formal education beyond a tertiary certificate, compared with 50% of those with a bachelor or post-graduate degree) and Māori shoppers with children under 14 (51% compared with 65% of those with a bachelor or post-graduate degree) (Colmar Brunton 2016a).

Ethnicity

There were no data specifically pertaining to ethnicity, including Aboriginal and Torres Strait Islander Peoples, and understanding of the HSR in Australian research.

Colmar Brunton investigated whether Māori and Pacific shoppers' understanding of the HSR improved between 2015 and 2018 (Colmar Brunton 2016a; 2016b; 2018). No statistical analyses were conducted to assess if there were differences between Māori and Pacific Peoples and the general population. However, results for the general population are provided below for reference alongside statistically significant differences over time.

Māori with children under 14 years of age

In 2018, 14% of Māori shoppers with children under 14 reported they knew at least a fair amount about the HSR, an increase from 4% in 2015 (Colmar Brunton 2018). Comparable increases were seen in the general population (5% in 2015 to 14% in 2018). A similar proportion of Māori parents indicated they didn't know how they would use the HSR (35% in 2015 to 46% in 2018) compared to the general population (34% in 2015 to 38% in 2018) (Colmar Brunton 2018).

Between 2015 and 2018, Māori parents had a similar understanding of which products can be compared using the HSR, relative to the general New Zealand population (Māori parents versus general population (range: 2015 – 2018), respectively: 2 breakfast cereals between 74 – 77% versus 78 – 81%, 2 breads between 77 – 84% versus 68 – 79%; Colmar Brunton 2018). There were small differences in understanding of which products cannot be compared using the HSR (Māori parents versus general population, respectively: baked beans and breakfast cereal between 22 – 27% versus 27 – 36%, yoghurt and juice between 22 – 27% versus 30 – 33%; Colmar Brunton 2018). When asked directly, between 5 – 7% of Māori parents in 2015 and 2018 indicated they would use the HSR to compare different types of products compared to 2 – 3% in the general population (Colmar Brunton 2018). There were no substantive differences in reported ease of understanding between the Māori parents (59 – 63%) and general population (58 – 63%) between 2015 and 2018 (Colmar Brunton 2018).

Māori parents were somewhat less likely to understand that a product having 5 stars does not mean you can eat as much of it as you like (70 – 73%), compared to the general population (79 – 81%). There was a significant increase in Māori parents correctly understanding that not all packaged foods require a HSR between 2015 and 2018 (27 – 45%). This was compared to an increase from 34 – 49% in the general population (Colmar Brunton 2018).

Māori (including those without children under 14) were significantly less likely to understand that more stars indicate a healthier option (60% answered correctly compared with 68% of the general population) (Colmar Brunton 2018). However, Māori with children under 14 were more comparable to the general population (65% in 2018).

Overall, noting differences between Māori and the general population were not always statistically compared, these results suggest that Māori may have a slightly poorer understanding of how to interpret the HSR compared to the general New Zealand population.

Pacific Peoples with children under 14 years of age

In 2018, 26% of Pacific shoppers with children under 14 reported that they knew at least a fair amount about the HSR, compared to 14% of the general population. This was an increase for Pacific shoppers from 8% in 2015 (Colmar Brunton 2018). Fewer (27 – 32%)

Pacific parents, however, provided an accurate statement of understanding for how to use the HSR compared to the general population (49 – 51%; Colmar Brunton 2018). A higher proportion of Pacific parents responded that they didn't know how they would use the HSR (51 - 61%) compared to the general population (34 – 38%) in 2015 and 2018 (Colmar Brunton 2018).

There were no substantial differences between Pacific parents and the general population between 2015 and 2018 in correctly identifying products that can be compared using the HSR (Pacific parents versus general population, respectively: 2 breakfast cereals between 79 – 83% versus 78 – 81%, 2 breads between 79 – 81% versus 68 – 79%). However, fewer Pacific respondents correctly identified products that cannot be compared (baked beans and breakfast cereal between 6 – 10% versus 27 – 36%, yoghurt and juice between 10 – 12% versus 30 – 33%; Colmar Brunton 2018). When asked directly, 10 – 17% of Pacific shoppers between 2015 and 2018 indicated they would use the HSR to compare different types of products compared to 2 – 3% in the general population (Colmar Brunton 2018). This suggests that Pacific parents are more likely to use the HSR to incorrectly compare different kinds of products than the general population.

In 2015, 24% of Pacific parents (compared to 15% of the general population) selected a bread product with the HSR + tail (rated 3 stars) as healthier compared to a similar bread product with the HSR only format (also 3 stars), possibly indicating that the additional information led them to perceive the product as healthier (Colmar Brunton 2016a). A difference between these groups remained for all study years (27% compared with 20% in 2016 and 21% compared to 15% in 2018; Colmar Brunton 2016b, 2018).

In contrast, a greater proportion of Pacific parents reported finding the HSR easy to understand (75 – 80%) compared to the general population (58 – 63%) in 2015 and 2018 (Colmar Brunton 2018).

Pacific parents were less likely to understand that a product having 5 stars does not mean you can eat as much of it as you like (36 – 43%) compared to the general population (79 – 81%) between 2015 and 2018 (Colmar Brunton 2018). Similarly, fewer Pacific shoppers correctly understood that not all packaged foods require a HSR (15 – 22% versus 34 – 49% in the general population; Colmar Brunton 2018).

Overall, although Pacific Peoples self-report greater knowledge of the HSR relative to the general population, objective understanding appears to be lower.

Household composition

New Zealand consumers without children under 14 years of age were less likely to provide a comment that suggested an accurate understanding of the HSR in 2018 (45%), compared with 59% of those with children under 14 (Colmar Brunton 2018).

Income

Talati et al. (2017a) conducted a RCT where Australian consumers rated the perceived healthiness of mock food product images that varied according to nutritional profile (healthy (4.5 stars), moderately healthy (3 stars), unhealthy (1.5 stars) presented in the HSR + tail format. They did not identify significant differences in socio-economic status between respondents that did or did not understand how to use the HSR to rate product healthiness.

In contrast, New Zealand surveys suggest that lower income earners may have reduced understanding relative to higher income earners. Shoppers in the general population in New Zealand with an annual household income up to $30,000 in 2015 and 2016 and $50,000 in 2018 were less likely to provide a response that demonstrated accurate understanding of the HSR compared to higher income earners (Colmar Brunton 2016a, 2016b, 2018). Further, shoppers with an annual household income up to $50,000 in 2016 were less likely to understand that more stars indicate a healthier option (62% compared with 70% receiving a

higher income; Colmar Brunton 2016b). Similar trends were seen for Māori or Pacific parents who had lower incomes. Māori parents with an annual household income up to $50,000 were less likely to provide a comment that suggests an accurate understanding of the HSR in 2018 compared to those receiving a higher income (39% compared with 55% receiving a higher income; Colmar Brunton 2018). Pacific parents with an annual household income up to $50,000 were less likely to provide a comment that suggests an accurate understanding of the HSR across all years (in 2018 this was 25% compared with 51% receiving a higher income; Colmar Brunton 2016a, 2016b, 2018).

Results within low-income shoppers with children <14 years

Colmar Brunton investigated whether New Zealand low-income shopper's (with children under 14 years) understanding of the HSR had improved between 2015 and 2018 (Colmar Brunton 2016a, 2016b, 2018). No statistical analyses were conducted to assess if there were significant differences between low-income parents and the general population. However, results for the general population are provided below for reference alongside statistically significant differences over time.

Low-income parents' self-reported understanding of the HSR significantly increased from 8% reporting they know at least a fair amount in 2015 to 22% in 2018. This was comparatively higher than the general population, noting this was not statistically tested (14% reported knowing at least a fair amount in 2018; Colmar Brunton 2018). However, the proportion who understood that more stars indicate a healthier option did not greatly differ between the general population (68% correct in 2018) and low-income parent respondents (69% correct in 2018; Colmar Brunton 2018). A similar proportion of low-income parents indicated they didn't know how they would use the HSR (36 – 43%) compared to the general population (34 – 38%) (Colmar Brunton 2018).

Results were similar between low-income parents and the general population between 2015 and 2018 in correctly identifying products that can be compared using the HSR (low-income versus general population, respectively: 2 breakfast cereals between 76 – 83% versus 78 – 81%, 2 breads between 66 – 80% versus 68 – 79%). Similarly, there were no substantial differences in understanding which products cannot be compared using the HSR (low-income versus general population, respectively: baked beans and breakfast cereal between 24 – 38% versus 27 – 36%, yoghurt and juice between 27 – 38% versus 30 – 33%; Colmar Brunton 2018). In practice, between 4 – 6% of low-income parents between 2015 and 2018 indicated they would use the HSR to compare different types of products compared to 2 – 3% in the general population (Colmar Brunton 2018). There were no substantial differences between low-income parents (54 – 69%) and the general population (58 – 63%) for reported ease of understanding between 2015 and 2018 (Colmar Brunton 2018).

Low-income parent shoppers were slightly less likely than the general population to understand that a product having 5 stars does not mean you can eat as much of it as you like (70 – 74% versus 79 – 81%; Colmar Brunton 2018). There was no substantial difference in understanding that not all packaged foods require a HSR compared to the general population (38 – 43% versus 34 – 49%).

Overall, while low-income parent shoppers may have higher perceived understanding of the HSR relative to the general population, the level of perceived understanding was low for both groups. Actual understanding was similar to the general New Zealand population across most indicators.

Shopping and health behaviours

New Zealand consumers who jointly make shopping decisions were less likely to demonstrate accurate understanding of the HSR in 2016 (45% compared to 53% of those who make these decisions themselves; Colmar Brunton 2016b). In addition, shoppers who never check how healthy products are or check how healthy products are all of the time or most of the time were less likely to understand that the product with more stars is generally

the healthier option, compared with those who check rarely or sometimes. (Colmar Brunton 2016b). Similar trends were seen for low-income and Māori groups (Colmar Brunton 2016a). In addition, spending less time selecting a healthier label out of two choices[17], having a medical related dietary influence, or having a lower level of health consciousness was associated with accurate understanding of the HSR[18] for Australians and New Zealanders (FSANZ 2025b).

Knowledge

Nutrition knowledge

In an Australian RCT participants were randomised to view either a HSR, nutrition information panel (NIP) or one of three other FoPL label systems. In the HSR condition, self-reported understanding of the label was more consistent across higher and lower levels of nutrition knowledge, relative to the other conditions (specific results and the question assessing nutrition knowledge were not reported as this was not a key outcome variable for the study) (Neal et al. 2017). In a similar New Zealand RCT, respondents were significantly more likely to report that their nutrition knowledge (0 = minimal; 10 = very good) improved as a result of using the HSR compared to those who only viewed the NIP (Ni Mhurchu et al. 2017). This limited self-report evidence suggests that perceived understanding of the HSR may not be impacted by nutrition knowledge, but HSR use may potentially improve self-reported nutrition knowledge.

What factors influence consumers' understanding of the HSR?

HSR presentation and format

Some studies identified that elements of the HSR design (large size, familiarity of logo, simple design) enabled understanding (Pettigrew et al. 2017; National Heart Foundation 2017; National Heart Foundation 2019; Pelly et al. 2020). However, details surrounding these findings were sparse.

The format that the HSR is presented in also appears to influence consumer understanding. Several studies considered the impact of format on consumers' objective ability to identify the healthier product (Colmar Brunton 2018; National Heart Foundation 2017; Pettigrew et al. 2020a; Pettigrew et al. 2020b; FSANZ 2025b). It appears that when additional nutritional information is provided in the tail, consumers try to take this into account when attempting to identify the healthier option, leading to a greater proportion of people selecting the label with less stars, relative to when viewing HSR only formats.

HSR only

In surveys undertaken in 2015 and 2016, 89 – 93% of Australians correctly identified the overall healthier label when both were presented as a HSR only format (1 versus 2 stars and 2.5 versus 3.5 stars, not applied to products) (National Heart Foundation 2017). This is similar to results in the 2024 HSR Consumer Monitoring Survey, where 90% of Australians and New Zealanders correctly selected the healthier of two HSR only labels (FSANZ 2025b).

In earlier New Zealand surveys, a lower proportion (59 – 71%, which was a significant increase between 2015 and 2018) correctly identified the overall healthier product when both products had a HSR only format (3 stars vs 4 stars, applied to margarine products). In this comparison, a NIP was also visible. This additional information may have influenced

[17] Consumers were asked to select the HSR label that indicated the healthier product out of two labels of the same format. This was done for the HSR only, HSR + energy and HSR + tail formats. Each selection was timed.
[18] As demonstrated by selecting the HSR label with a higher HSR rating out of two options.

participants decision making, potentially leading to the lower accuracy relative to Australia and more recent studies (Colmar Brunton 2018).

In a RCT where only the front of pack was shown, New Zealanders had 1.89 times higher odds (95% CI: 1.06, 3.35, $p = 0.03$) of understanding a product as healthier if the HSR was presented as the HSR only relative to the HSR + tail (Pettigrew et al. 2020b). However, there was no significant difference in understanding between the HSR only and HSR + tail formats in Australia (1.2 times higher odds of understanding in the HSR only condition, $p = 0.435$) (Pettigrew et al. 2020a). In a more recent study, significantly more respondents selected the label with more stars when presented with two HSR only labels, relative to two HSR + energy or HSR + tail labels, across both Australia and New Zealand (FSANZ 2025b).

HSR + tail

In 2015 and 2016 studies, participants were presented two HSR + tail labels and were asked to choose which they thought was healthier. The labels were not applied to a product and were both 4 stars, but one product had healthier levels of all nutrients except for protein. Twenty-three to 33% of Australians identified they were the same, while 54 – 67% selected the option with lower negative nutrients as the healthier option (National Heart Foundation 2017). This report did not clarify which of these options they deemed the 'correct' answer. More recent findings demonstrated that when the star rating and tail values differed, only 55% of Australians were able to select the overall healthier label, defined as the label with the higher star rating, between two HSR + tails not applied to products (FSANZ 2025b).

In 2016 and 2018 studies, 74 and 73% of New Zealanders correctly identified the overall healthier product when both products had a HSR + tail format (2 stars vs 4 stars, applied to juice products) (Colmar Brunton 2018). The NIP was visible in this comparison. While this proportion is higher than the 59 – 71% of New Zealanders who correctly identified the overall healthier product with the HSR only format, this may have been due to the larger nutritional differences between the products (margarine with 1 star difference vs juice with a 2 star difference) rather than differences in format. The exact nutritional information presented to participants was not provided (Colmar Brunton 2018). In contrast, a more recent survey demonstrated only 51% of New Zealanders correctly selected the healthier of two HSR + tail labels (FSANZ 2025b). Of note, the tails contained conflicting information, with the higher HSR label also displaying a greater amount of sugar relative to the lower star rating. When Australians and New Zealanders were asked why they selected the label they did, 84% of those that chose incorrectly (30% of total) indicated they used information in the tail to decide (FSANZ 2025b).

Where two labels had the same star rating and the same nutrients presented in a HSR + tail format but one tail included HIGH and LOW nutrient markers, 78 – 87% of Australians correctly indicated they were equally healthy, suggesting that these markers do not distort healthiness perceptions when the label contain the same information (National Heart Foundation 2017). However, HSR + tail labels containing the exact same information is unlikely to occur in the real world. No studies considered the influence of HIGH/LOW nutrient markers in other scenarios.

Comparing different HSR formats (HSR only compared to HSR + tail)

In a comparison of breads where the star rating was equal, but one HSR format included a tail, 64 to 66% of New Zealanders correctly identified that the products were equally healthy (Colmar Brunton 2018). This proportion is in a similar range to the accuracy rates when comparing HSR only formats in the same study (59 – 71%) but is not directly comparable due to there being no difference in the nutritional profile of the products (Colmar Brunton 2018). Additionally, no NIP was presented in this comparison, while it was visible in the HSR only comparison.

When asked to compare a HSR + tail (2 stars) and HSR only (2.5 stars) labels that were not applied to products, 80 – 83% of Australian respondents correctly identified the healthier option as the label with a higher star rating (National Heart Foundation 2017). In contrast a smaller proportion of New Zealanders (49% – 61%), correctly identified the healthier option as the product with a higher star rating when selecting between a HSR + tail (3 stars) and a HSR only (4 stars) (Colmar Brunton 2018). No NIP was displayed in this comparison, and the specific nutrient profile included in the tail was not reported. It is therefore unclear whether specific nutrient values may have made this comparison more challenging for consumers, relative to the Australian example.

Consumer attitudes towards the different HSR formats

In 2017/18, Australian consumers were most likely to self-report that the HSR + tail was the easiest to understand out of all format options (15%), closely followed by the HSR only (12%) (National Heart Foundation 2019). However, more recent findings suggest that consumers found it significantly easier to undertake a comparison task when the HSR only was displayed, relative to the HSR + energy and HSR + tail, although all formats were rated as easy to understand overall[19] (FSANZ 2025b).

Consumers were most likely to choose the HSR + tail when asked which logo provides sufficient information (20%), followed by the HSR only (5%) (National Heart Foundation 2019). This aligns with recent findings where Australian and New Zealand consumers had a significantly higher level of agreement that the HSR + tail "provides me with the information I need to make a healthy food choice" relative to the HSR + energy and HSR only (FSANZ 2025b). However, participants on average felt that all HSR formats provided them with enough information to make a healthy food choice[20] (FSANZ 2025b). Interestingly, consumers were also more likely to agree that the HSR + tail provides too much information relative to the other formats, although on average participants disagreed that it provided too much information (FSANZ 2025b).

Participants on average trusted the three different HSR formats but trusted the HSR + tail significantly more than the HSR + energy and HSR only (FSANZ 2025b). This may align with the fact that 63% of Australians preferred the HSR + tail format overall, followed by the HSR only (21% prefer) (National Heart Foundation 2019). However, the HSR only was most likely to be voted 'easiest to recognise' (18%) followed by the HSR + tail (9%) (National Heart Foundation 2019).

Presence of claims

In focus groups with New Zealand food shoppers, participants expressed confusion and mistrust in labelling when nutrition content claims (e.g. "High protein", "98% fat free") were presented alongside a low star rating (Stuthridge et al. 2022). Discrepancies between claims and HSR ratings were also noted by both adult and child participants in Australian focus groups which explored reactions to FoPLs (including the HSR) and nutrition claims (Talati et al. 2016b). In this study, participants indicated that if a discrepancy was detected between a claim and a FoPL, only the FoPL would be used, as this was considered a more reliable source of information (Talati et al. 2016b).

[19] How easy or hard was it to answer this question? [Following selecting the healthier of two HSR labels] 1-7 scale, where 1 = "Very hard", 4 = "Neutral", and 7 = "Very easy".
[20] Please indicate how much you agree or disagree with the following statements: "This label provides me with the information I need to make a healthy food choice". 1-7 scale, where 1 = "Strongly disagree", and 7 = "Strongly agree".

Time

In a 2019 survey, Australian consumers generally disagreed that the HSR + tail format took too long to understand (mean 3.9 out of 9, 99% CI: 3.4, 4.3;[21] Talati et al. 2019).[22] New Zealand focus group participants also suggested that the HSR is a useful and time-saving element regardless of whether the respondents understood how the HSR was calculated (TNS NZ 2015). One study objectively assessed how the presence of the HSR only format impacted time taken to choose the healthier product (Thomas et al. 2021).[23] The timed eye tracking experiment indicated that the presence of the HSR significantly reduced the total fixation time spent reviewing nutrition information compared to products without the HSR (11.08 seconds versus 15.06 seconds, p <0.05) (Thomas et al. 2021). Recent findings demonstrated that the median time participants took to select the healthier label increased as the HSR format increased in amount of information provided. The median (interquartile range) time taken to choose the healthier of two HSR labels increased from 9.0s (6.0) for the HSR only to 12.6s (9.0) for the HSR + energy, to 18.6s (18.0) for the HSR + tail. Overall, this suggests that the HSR may be a time-saving tool to facilitate consumer understanding of the relative healthiness of similar food products, but the format can impact this.

[21] Mean and CI extracted from figure within paper using webplotdigitizer.com.

[22] 987 Australians were asked on a 9-point scale from strongly disagree to strongly agree whether “this label [HSR] took too long to understand”. This was part of a larger international study of 12,015 participants from 12 countries exploring consumer perceptions and understanding of different front-of-pack labelling formats.

[23] 103 participants reviewed and selected the healthiest cookies with four possible alternates (with and without negatively correlated nutrients for sodium and fat) on a screen while an infrared camera tracked eye movements. The total time to review six elements (protein, sodium, star rating, sugar, carbohydrate and fat) was recorded.

Research Question 3: Do Australian and New Zealand consumers trust the HSR?

Overview of key findings

Research question 3 sought to understand Australian and New Zealand consumer trust in the HSR system. This included what consumers' level of trust in the HSR is; the proportion of the population that trust the HSR; who is more likely to trust the HSR; and factors that influence consumer trust of the HSR. The review identified 5 peer-reviewed articles and 13 government commissioned reports that had findings related to consumer trust in the HSR. Three articles were qualitative studies (Pelly et al. 2020, Pulker et al. 2019, Stuthridge et al. 2022), while the remaining 2 articles (Reilly et al. 2018, Talati et al. 2019a) and 12 government reports were quantitative (Colmar Brunton 2016a, 2016b, 2018; National Heart Foundation 2017, 2019; The Navigators 2024; Pollinate Research 2015, 2016, 2017; TNS New Zealand 2015; FSANZ 2025a, 2024) and one mixed methods (FSANZ 2025b).

Most of the publications were assessed as medium quality (n = 9)[24], with 6 high quality[25] and 3 low quality.[26] Some degree of consistency in the findings within similar populations and timepoints (regardless of quality) increases confidence in the findings relating to consumer trust of the HSR.

Studies indicate that trust in the HSR is an important factor in determining people's attitude toward using it, or their willingness to make a purchase based on a products HSR rating.

Trust in the HSR has generally been increasing over time in Australia, while in New Zealand it is somewhat lower than in Australia and has remained more consistent over time.. The most recent quantitative findings suggest 59% of Australians and 50% of New Zealanders agree they trust the HSR.

Qualitative findings highlight that limited knowledge of the HSR or confusion interpreting it may negatively impact consumers' trust in the HSR. Similarly, the perception that the system is not independent and/or that the system is funded or manipulated by industry may also contribute to distrust. Quantitative results suggest that only 29% of New Zealanders believe that the HSR is backed by the Government, and 40% of Australians believe the HSR to be independent.

Some focus group participants, particularly those with an interest in nutrition, sometimes disagreed with the star ratings which led them to question the system's credibility. Similarly, seeing nutrition content or health claims alongside a low star rating reduced trust. Exposure to education campaigns, an understanding of the government's role in the system, believing the HSR is credible, and seeing the HSR on trusted products increased trust in the system.

Limited available evidence suggests that there may be a small association between trust in the HSR and being university educated, having a higher income, speaking a language other than English, living in a metro area and having children in your household. However, these results are drawn from a single government report and differences between groups are not large. In contrast, several New Zealand surveys indicate that trust in the HSR may be substantially higher for Pacific Peoples with children under 14, relative to the general New Zealand population (70% versus 40% respectively).

[24] Talati et al. 2019a; Pelly et al. 2020; Reilly et al. 2018; Colmar Brunton 2016a, 2016b, 2018; National Heart Foundation 2017, 2019; The Navigators 2024.
[25] Pulker et al. 2019; Stuthridge et al. 2022; TNS New Zealand 2015; FSANZ 2025a, 2025b, 2024.
[26] Pollinate Research 2015; Pollinate Research 2016; Pollinate Research 2017.

What proportion of the population trusts the HSR?

This section summarises findings on trust, as well as related concepts such as credibility, believability and confidence in the HSR. The terminology below reflects that used by the original studies, rather than any defined differences between the concepts.

Trust in the HSR system

In Australia, trust in the HSR has consistently increased since its implementation, but levels remain moderate. In a series of surveys undertaken between 2014 and 2018, trust in the HSR increased from 34% to 58%[27] (National Heart Foundation 2019). Significance testing undertaken between 2016 and 2017 demonstrated a significant increase in trust in that year (48% versus 54%, $p = 0.002$) (National Heart Foundation 2017). Similar increases were seen in cross-sectional surveys with Australians in 2015, 2016 and 2017, where 37%, 44% and 48% agreed that they trusted[28] the HSR, respectively (Pollinate Research 2015, 2016, 2017). In these surveys, differences between years were not tested for significance, and response options were not provided (Pollinate Research 2015, 2016, 2017). The most recent results indicate that 59% of Australians agree they trust the HSR, while 18% disagree and 23% were neutral (FSANZ 2025b). A study by Talati et al. (2019a) demonstrated that, on average, Australians tended to trust the HSR, with an estimated marginal mean for trust of 6.0 (on a 9-point scale with 9 being strongly agree), adjusted for age, gender, socio-economic status, grocery buyer status, level of education, diet, and nutrition knowledge.[29] In a telephone interview study with 91 Australian canteen managers, 71% of those who had heard of the HSR system trusted it as a measure of the healthiness of a food (Reilly et al. 2018).

In contrast, New Zealand trust in the HSR has remained more consistent over time and is slightly lower than in Australia, with Australians significantly more likely to agree that they "trust the Health Star Rating system" compared to New Zealanders (4.7 vs 4.5, p <.001) (FSANZ 2025b). In evaluation surveys undertaken in 2015, 2016 and 2018, the proportion of New Zealanders who strongly agreed or agreed that they trusted the HSR remained steady at 40%[30] (Colmar Brunton 2018). In a 2024 survey, 22% of New Zealanders reported completely trusting the HSR, 58% somewhat trusted it, 14% did not trust, and 6% did not know (The Navigators 2024). The most recent results indicate 50% of New Zealanders agree they trust the HSR, 22% disagree and 28% were neutral (FSANZ 2025b). Differences in response scales prevents comparison between these surveys.

The FSANZ CIT combined the responses from Australians and New Zealanders. In 2023, 55% of consumers trusted the HSR, 20% distrusted it and 26% were neutral[31] (FSANZ 2024). Results did not significantly differ in 2024 (FSANZ 2025a).

Credibility of the HSR system

When asked whether HSR was a credible system[32], 55%, 60% and 62% of Australians agreed or strongly agreed in 2015/16, 2016/17 and 2017/18 respectively (National Heart Foundation 2019). In addition, just over half of respondents in 2016 agreed that the HSR is a reliable system (55%) and is open and transparent (52%) (National Heart Foundation 2017).

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[27] Those who agreed or strongly agreed to the question: "How strongly do you agree or disagree that the Health Star Rating system…? a. is a system I trust; Response options: *Strongly agree, Agree, Neither agree nor disagree, Disagree, Strongly disagree, Unsure*.

[28] Participants were asked to rate their agreement with [HSR] "Is a system I trust"; response options not provided.

[29] 99% CI 0.34; extracted using webplotdigitizer.com.

[30] "I trust the Health Star Rating" Response options: *Strongly agree, Somewhat agree, Neither agree nor disagree, somewhat disagree, Strongly disagree, Don't know.*

[31] Q: How much do you feel you can trust the following information on packaged foods and drink? (1 = "Cannot trust at all" and 7 = " Can trust completely")

[32] "How strongly do you agree or disagree that the Health Star Rating system…? g. is a credible system. Response options: *Strongly agree, Agree, Neither agree nor disagree, Disagree, Strongly disagree, Unsure*.

In 2016, a small number (17%) of Australians agreed that the HSR has a poor reputation (National Heart Foundation 2017). More recent results suggest that 28% of Australians and New Zealanders agreed that the HSR has a poor reputation (FSANZ 2025b). However, in this survey, perceptions of the HSR system were positive on average, being above the midpoint of 4 for positive traits (trust, accuracy/honesty, increasing trust in food product/company) and below the midpoint for negative traits (poor reputation) (FSANZ 2025b).

Belief and confidence in the HSR system

Consumer's belief in or confidence in the HSR system is also moderate, consistent with trust and credibility measures.

Over half (54%) of Australians agreed or strongly agreed that the HSR is believable in 2017 (Pollinate Research 2017). Over two thirds (67%) of Australians had high/somewhat high confidence in the HSR system in 2018 (National Heart Foundation 2019). Confidence increased significantly from 12% in 2016 to 51% in 2017 (National Heart Foundation 2019). However, in a focus group with a small number of Australian shoppers (n = 15), although consumers viewed the HSR as practical to use, there was an overall lack of confidence in the HSR to reduce purchase of unhealthy products due to its positive framing (Pelly et al. 2020).

Thirty-two percent of New Zealanders who said they would be unlikely to use the HSR in 2018 (n = 222) reported that this was because they 'don't believe the HSR' (Colmar Brunton 2018). Between 2015 and 2016, the proportion of the low-income group in New Zealand reporting "I don't believe in the HSR" as the reason they are unlikely to use the HSR rose significantly, from 20% to 53% (Colmar Brunton 2018).

What are the characteristics of people who do or do not trust the HSR system?

Demographics

This section explores demographics that are related to consumer trust in the HSR. Any reported differences are statistically significant at the 95% confidence level unless otherwise stated.

Age

In 2017, Australian respondents aged 35 – 54 years were significantly more likely to view the HSR system as trustworthy compared to other age groups (57% compared to 53% of those under 35 and those 55 or over) (National Heart Foundation 2017). However, age was not related to trust in a follow up 2019 survey (National Heart Foundation 2019).

Gender

Australian males (compared to females) were significantly more likely to trust the HSR system in 2017 and 2018 (56% of males, 53% of females in 2017, 61% of males, 56% of females in 2018) (National Heart Foundation 2019). However, in New Zealand males 30 – 49 years (15%) and males 65+ years (9%) were significantly more likely to not completely trust the HSR compared to the general population (The Navigators 2024).

Ethnicity

Trust in the HSR significantly increased over time for Māori with children under 14 (29 – 39% over 2015–2018) (Colmar Brunton 2018). In contrast, trust remained relatively stable over time for Pacific Peoples with children under 14 (73 to 70% trust the HSR over 2015 – 2018); Although no statistical tests were conducted between groups, trust in the HSR appears

substantially higher for Pacific Peoples, relative to Māori and the general New Zealand population (40% trust the HSR, over 2015 – 2018) (Colmar Brunton 2018).

There were no data specifically pertaining to ethnicity, including Aboriginal and Torres Strait Islander Peoples, and trust of the HSR in Australian research.

Education

Those who were university educated in Australia (compared to high school or TAFE/diploma) were significantly more likely to trust the HSR system (high school 56%, university educated 63%) (National Heart Foundation 2019).

Household composition

Those with children at home in Australia (compared to households without children) were significantly more likely to trust the HSR system (children at home 61%, no children at home 57%) (National Heart Foundation 2019).

Language

Those that speak a language other than English in Australia (compared to English speaking households) were significantly more likely to trust the HSR system in 2017 and 2018 (English language 52%, other language 64% in 2017; English language 56%, other language 66% in 2018) (National Heart Foundation 2019).

Location

Those that live in metropolitan regions in Australia (compared to rural regions) are significantly more likely to trust the HSR system (metro 60%, non-metro 56%) (National Heart Foundation 2019).

Being born in Australia/New Zealand (compared to being born outside Australia/New Zealand in an English-speaking country) was significantly associated with having a higher level of trust in the HSR (FSANZ 2024).

Income

There were mixed results related to income. Those with higher household income in Australia (greater than $50k compared to less than $50k) were significantly more likely to trust the HSR system (income <$50k 57%, >$50k 61%) (National Heart Foundation 2019). In contrast, having a lower household income in Australia and New Zealand was associated with a higher level of trust in the HSR (FSANZ 2024).

Knowledge

Understanding of the HSR appears to impact trust in the system. In a focus group study with 37 participants conducted by Pulker et al. (2019), some parents exhibited a lack of trust towards the HSR, particularly those who were confused about how to interpret it. This was demonstrated through quotes such as “It just says more nutritious, but what does it actually take to get a 5-star rating?” and “What does more nutritious mean?”.

Attitudes

Trust in industry and Government

Consumers level of trust in industry, combined with their knowledge of how the HSR is determined, appears to impact trust in the HSR.

In 2023, having a higher level of trust in professions/institutions more broadly, and having a higher level of trust in food manufacturers/producers and food retailers were significantly

associated with having a higher level of trust in the HSR (p <0.05). The strongest predictors were trust in professionals and institutions more broadly (β = 0.20) and trust in food retailers (β = 0.13) (FSANZ 2024).

Participants in Australian focus groups by Pelly et al. (2020) (n = 15) had suspicion around the evidence base underpinning the HSR algorithm. Some participants voiced concern around the food industry's involvement in boosting a food product's rating. Concerns were also raised regarding food companies changing the nutritional makeup of their products to increase their HSR in superficial ways, rather than making the food healthier, as evidenced through quotes such as *"...companies will just manipulate it. They will make subtle changes. Add things, take things out for their product to exploit the algorithm*" (Pelly et al. 2020).

Another focus group study with Australian parents (n = 37) reported a general lack of trust in food manufacturers in helping them to select healthy foods, due to the profit-driven nature of food manufacturing, instead trusting supermarkets and the government (Pulker et al. 2019). As these participants learnt more about the government's involvement in the HSR system, their trust in it increased (Pulker et al. 2019).

Similar findings arose from another Australian focus group (National Heart Foundation 2019). In that study, once participants had a greater understanding that the system was developed by governments in collaboration with industry, public health and consumer groups, and that the HSR was not licenced and paid for by industry, they felt it should be compulsory across all packaged products (National Heart Foundation 2019).

However, quantitative research suggests that only 36 – 40% of Australian consumers believe the HSR is independent (Pollinate Research 2016, 2017). This aligns with recent qualitative findings from open ended survey responses, which highlighted that a key reason for distrust in the HSR across Australians and New Zealanders is the perception the system is not independent and/or that the system is funded or manipulated by industry (FSANZ 2025b).

A similar discourse was heard in focus groups of New Zealanders with lower income, Māori and Pacific Peoples, conducted shortly after the HSR was introduced (TNS New Zealand 2015). These participants suspected the HSR was determined by companies paying the government for a favourable star rating. Quantitative surveys suggest that the proportion of New Zealanders who believe the HSR is just a marketing tool has remained steady at around 44% across 2015, 2016, and 2018, and only 29% believed the HSR is backed by government in 2018 (Colmar Brunton 2018). This differed slightly across some sub-populations, with 34% of low-income, 27% of Māori and 41% of Pacific participants with children under 14 believing the HSR was backed by government (Colmar Brunton 2018).

Attitudes towards accuracy

Participants in four Australian focus groups (6 – 8 per group) undertaken in 2018 generally trusted the HSR system, noting that it provided a quick easy reference to the healthiness of a product (National Heart Foundation 2019). However, participants also questioned the HSR's credibility, particularly those who had an interest in nutrition and had their own views on what constitutes a healthy food. These participants disagreed with the star rating for some products as the rating differed to their own understanding of a healthy/unhealthy product. For example, one participant felt that the star rating for yoghurt was too low, while the star rating for certain breakfast cereals was too high, as they classified these foods as healthy and unhealthy respectively (National Heart Foundation 2019). Similarly, in focus groups with 15 Australian adults, participants voiced distrust of the HSR due to a perceived lack of transparency in the process used to determine the ratings, and because there was a disconnect between their own perception of the healthiness of some products and the number of stars (Pelly et al. 2020). Recent qualitative findings highlighted similar reasons for distrust across Australians and New Zealanders, including perceptions that the HSR is not accurate (e.g. a product's star rating conflicted with their perception of what was healthy), that the HSR is not comprehensive, and not knowing enough about the HSR, particularly

how it is calculated (FSANZ 2025b). However, of participants that trusted the HSR, a key reason for trust was a perception that the HSR is helpful, that it is a regulated system, and that it is accurate and credible (due to being informed by science or other relevant expertise) (FSANZ 2025b).

In 2024, of Australians and New Zealanders who said they would be unlikely to use the HSR in the future (n = 408), the second and third most selected reasons for this was because they don't think the HSR is accurate (47%) and/or they think the HSR is a marketing tool (43%) (FSANZ 2025b).

What factors influence consumer trust of the HSR?

There were limited findings on factors beyond individual characteristics that directly influence consumer trust in the HSR. In Australian focus groups, some participants highlighted that the placement of the HSR on products they trust is the reason they trust the HSR system (National Heart Foundation 2019).

In New Zealand, shoppers that had seen a 2018 HSR education campaign (45% of respondents) were more likely to trust the HSR (43% versus 37% who had not seen the campaign) (Colmar Brunton 2018). Similarly, those that saw an education campaign in Australia (17% of respondents) were more likely to trust the HSR than those who had not seen the campaign, 69% versus 48% (Pollinate Research 2017).

The presence of other food labelling elements also appears to interact with trust in the HSR. In focus groups with New Zealand food shoppers, participants expressed confusion and mistrust in labelling when nutrition content claims were presented alongside a low star rating (Stuthridge et al. 2022). The 2024 Consumer Monitoring Survey also identified that trust differs across HSR formats. On average, Australian and New Zealanders trusted the three different HSR formats, with scores all above the midpoint of 4 on a seven-point scale[33]. However, respondents trusted the HSR + tail (M= 4.9, SD = ±1.4) significantly more than the HSR + energy (4.7, ±1.5) ($p < .001$) and HSR only (4.7, ±1.5) $p < .001$).

[33] Q: Please indicate how much you agree or disagree with the following statements: I trust this label (1-7 scale, where 1 = "Strongly disagree", and 7 = "Strongly agree").

Research Question 4: How does the HSR impact Australian and New Zealand consumers' perceptions and behaviours relating to food choices?

Research question 4 sought to understand whether the presence of a HSR on food labels changes consumer perceptions and/or behaviours relating to food choices. This was defined as perceptions and behaviours related specifically to food products, such as perceptions about the healthiness of food and food purchase and consumption decisions. Findings have been grouped according to consumer perceptions, food purchasing behaviour and food consumption behaviour respectively.

Impact of the HSR on consumer perceptions

Overview of key findings

The review identified 5 peer reviewed articles examining how the HSR impacts consumer perceptions related to food choices (Talati et al. 2016c, 2017b; Cooper et al. 2020; Jauregui et al. 2021; Thomas et al. 2021). This included perceptions of a product's healthiness, global evaluations (e.g. taste, quality, value for money) and willingness to buy/pay for a product with the HSR. All studies were quantitative in nature and undertaken in Australia. Two were discrete choice experiments (Talati et al. 2017b; Cooper et al. 2020), two were RCTs (Jauregui et al. 2021; Talati et al. 2016c) and one was a small exploratory experiment (Thomas et al. 2021). Two studies were high quality (Cooper et al. 2020; Jauregui et al. 2021); 2 medium (Talati et al. 2016c, 2017b), and 1 low quality (Thomas et al. 2021). It is noted that many studies in this section considered the impact on consumer perceptions of applying the HSR to a single product, which does not necessarily reflect the intent of the HSR as a comparative tool.

Overall, the available evidence suggests that when a HSR is present with a star rating of less than 3, perceptions of healthiness either decline (Jauregui et al. 2021; Thomas et al. 2021) or remain steady (Talati et al. 2016c). Studies presenting the HSR only rather than extended formats (i.e. HSR + energy or HSR + tail) were more likely to show improved accuracy in perception of how healthy a product is. However, the effect may also be influenced by product type, as these varied across studies. No studies looked at the impact of HSR scores greater than 3 on healthiness perceptions.

One study suggested that global evaluations (incorporating elements such as taste, quality and value for money) were not significantly influenced by the presence of a low rated HSR label (Talati et al. 2016c).

There were conflicting results around whether the HSR would increase willingness to buy or pay for food products. One RCT suggested it would not influence consumers' willingness to buy a product (Talati et al. 2016c). However, more complex discrete choice experiments suggested that the HSR may increase consumers' willingness to pay for products (Talati et al. 2017c; Cooper et al. 2020). One study indicated that this was the case even when the star rating was low (Talati et al. 2017b).

Perceived healthiness

A RCT with a representative sample of 3,964 Australians found that the presence of a simple HSR with a 0.5 star rating significantly lowered healthiness perceptions for a sweetened fruit drink product (M = 2.8) measured on a 7-point scale (1 – very unhealthy to 7 – very healthy), relative to a no FoPL control condition (M = 3.5) ($p < 0.01$) (Jauregui et al. 2021). Participants only assessed a single product, and only one star rating (0.5) and were not provided with a NIP or an ingredient list, so it is unclear how the HSR impacts healthiness perceptions for

other products, different star ratings, or when other sources of nutritional information are available (Jauregui et al. 2021).

In contrast, in an online RCT with 1,984 Australians aged over 10 years old, Talati et al. (2016c) found that the presence of 1 or 1.5 star HSRs with tail and HIGH/LOW text did not significantly influence healthiness perceptions for cookies, cornflakes, or pizzas. Healthiness was measured by two items with five-point scales (1 = unhealthy/non-nutritious to 5 = healthy/nutritious). Only healthiness perceptions for yoghurts with a 1 star rating were significantly reduced (M = 3.4 for HSR vs 3.6 for control, p <0.01). When product categories were combined, there was no significant effect on perceptions of healthiness.

A small exploratory experiment with 171 Australian students found that the presence of a HSR (HSR only format) may assist consumers to interpret the healthiness of a product when that product has conflicting nutrients (e.g. low fat but high sodium[34]) in comparison to when a HSR is not present on the same product (Thomas et al. 2021). In that study, when the HSR was absent, respondents perceived the healthiness of a muesli bar to be higher in a conflicting nutrients condition (low salt and high fat, M = 5.0) compared to a no conflicting nutrient condition (low salt and low fat, M = 4.4) (p <0.1); even though the overall healthiness (i.e. number of stars) of the product was lower in the conflicting condition (3 stars versus 3.5 stars)[35]. In contrast, in the presence of the HSR, the muesli bar that was healthier (i.e. higher number of stars) was perceived as healthier even when the nutrients conflicted. The mean rating was 4.7 for the conflicting nutrients but higher number of stars (3.5) in comparison to 4.2 with no conflicting nutrients but lower number of stars (3). In addition, the same muesli bar with conflicting nutrients was perceived to be less healthy when the HSR was present (M = 4.3), compared to when it was absent (M = 5.0) (p <0.05), suggesting that the presence of the HSR may also reduce healthiness perceptions for muesli bars. This study was small and only analysed healthiness perceptions for those who had correctly chosen a healthier muesli bar in an earlier part of the study (N not disclosed). Missing methodological details also reduced confidence in the results.

Willingness to buy or pay

Two studies looked at the influence of a HSR of 1 or 1.5 stars displayed via the HSR + tail format with HIGH/LOW text on participants willingness to buy or pay (Talati et al. 2016c, 2017b).

In an online RCT with 1,984 Australians aged 10 years and older, the presence of the HSR did not significantly change consumers' willingness to buy a product (cookies, cornflakes, pizzas or yogurt), compared to when the HSR was not displayed (Talati et al. 2017c). Consumers' willingness to buy was not significantly different between products tested except for yoghurt, where willingness to buy was lower when a HSR of 1 star was displayed (mean willingness to buy 2.9/5 for HSR versus 3.1/5 for no HSR control, p = 0.01)[36].

In contrast, Talati et al. (2017b) used a discrete choice experiment to understand the dollar amount 2,069 Australian consumers would be willing to pay if a HSR was applied to unhealthy, moderately healthy, or healthy food products relative to no FoPL.[37] Results showed that the presence of a HSR significantly increased willingness to pay for unhealthy food products (cookies, pizzas and yoghurts), but not cornflakes (p <0.05). The additional monetary amount consumers were willing to pay ranged from 0 to 36 cents. Willingness to pay for moderately healthy and healthy products all significantly increased, with healthier

[34] High fat = 9%, Low fat = 5%, High sodium = 10%, Low sodium = 5%
[35] Noting, in this condition participants did not see the star rating.
[36] Willingness to buy was measured on a 5-point scale using the item: "Assuming you were interested in purchasing this type of food, how likely would you be to buy this specific item?" Scale response options were not reported.
[37] HSR ratings considered healthy, moderately healthy and unhealthy varied by product type. E.g. Cookies: unhealthy = 1 star, moderately healthy = 2 star, healthy = 3 star; Yoghurt: unhealthy = 1.5 star, moderately healthy = 3 star, healthy = 4.5 star.

products valued more highly. The additional monetary amount consumers were willing to pay for moderately healthy ranged from 62 cents up to $1.40, and for healthy ranged from 97 cents to $1.90. Overall, regardless of the healthiness of the product consumers were willing to pay more for the presence of a HSR, suggesting they perceive some value in the HSR information. The higher willingness to pay for healthier products may suggest that consumers value this information more on healthy products.

In a discrete choice experiment with 1,024 Australian adult primary shoppers, Cooper et al. (2020) estimated consumer's willingness to pay for the HSR to be displayed on cookies. On average, consumers were willing to pay 11 cents (or 3.7% of the initial product price without the HSR) to have the HSR applied. Thirty-six percent of the sample were not willing to pay any additional money for the product with a HSR displayed. Twenty-seven cents was the maximum amount consumers were willing to pay, with only 3% willing to pay this amount. Those who agreed that the HSR would help to make selections when shopping, and who perceived their current diet to be healthy were willing to pay more for the HSR. Socio-demographic variables including gender, age, family size, education, income level and food security status were not significantly associated with willingness to pay. Participants in this study were shown a format of the HSR that includes all components of the current formats (HSR + tail, with additional nutrients and HIGH/LOW text), but in a different visual style, as the survey was run prior to the current design being finalised. It is therefore unclear how applicable these results are to current formats.

Other perceptions

Talati et al (2016c)'s online RCT with 1,984 Australians aged over 10 years old also investigated whether the presence of the HSR impacted global evaluations[38] of products. The presence of the HSR did not lead to any significant differences in these global evaluations, compared to a no-HSR control ($p < 0.05$). The results for the individual rating scales underpinning the 'global evaluation' measure were not reported.

Impact of the HSR on purchasing behaviour

Overview of key findings

The review identified 16 peer reviewed articles and 7 government reports relating to the HSR and consumers' food purchasing behaviour. The majority were quantitative studies, one mixed methods (FSANZ 2025b), and one qualitative (Talati et al. 2016a). Seven were high quality[39], 10 medium quality[40] and 6 were low quality[41]. The studies used a variety of methods to understand the impact of the HSR on purchasing, including self-report (via focus groups and surveys), experimental designs (such as RCTs and discrete choice experiments), and real-world purchasing (such as field experiments and shopping data analysis).

The number of consumers reporting that their purchasing had been influenced by the HSR varied widely depending how the question was asked and the sample assessed. Of consumers who had purchased a product with the HSR previously, between 38% (2015) and 66% (2024) agreed that the HSR had influenced their purchasing decision in some way.

[38] Global evaluation was assessed by taking the average of nine five-point adjective rating scales: Not tasty at all–Tasty, Low quality–High quality, Poor value for money–Good value for money, Inconvenient–Convenient, Boring–Interesting, Unpopular–Popular, Expensive–Cheap, Undesirable–Desirable, and Unappealing–Appealing

[39] Bablani et al. 2022; Billich et al 2018; Neal et al. 2017; Ni Mhurchu et al. 2017; Russel et al. 2017; Talati et al 2019b; FSANZ 2025b.

[40] Anderson & O'Connor 2018; Colmar Brunton 2018; Hamlin & McNeil 2016 and 2018; National Heart Foundation 2017, 2019; Reilly et al. 2018; Talati et al. 2016a, 2017b, 2018a.

[41] Hallak et al. 2021; Pettigrew et al. 2020a; Pollinate 2015, 2016, 2017; Thomas et al. 2021.

However, self-report measures can be susceptible to social desirability and recall bias, which may overestimate the impact of the HSR.

Lab-based experimental research suggests the presence of the HSR increases the likelihood of consumers choosing healthy foods and decreases the likelihood of consumers choosing unhealthy foods. Three studies found that the HSR did not increase the healthiness of purchasing decisions, however, in all cases this may be attributable to the study design. Two studies reported in three papers suggest that the HSR may encourage healthier choices even in the presence of other marketing attributes, such as claims. However, its influence on purchasing decisions may be stronger when claims are not present. Lab experiments also highlighted that the level of star rating, the product type, consistency of application of the HSR across products and the HSR format may all impact how influential the HSR is on purchasing decisions. However, limited studies systematically tested these contextual factors making it difficult to draw definitive conclusions.

Real world data suggests that the impact of the HSR may be minimal in a more realistic setting. A meta-analysis of two large field experiments where consumers could scan product barcodes to view a HSR found no statistically significant difference between the healthiness of product choices if consumers saw the HSR compared to the NIP. However, there was an improvement in the healthiness of purchasing decisions for those motivated to use the HSR information. Analysis of actual purchasing data also suggested that the HSR had no impact on consumer purchasing decisions.

Self-report

Seven government commissioned reports, and two peer-reviewed studies asked consumers whether the HSR influenced their food purchasing decisions. This included asking in focus groups (Talati et al. 2016a), and in online-cross sectional surveys (National Heart Foundation 2017, 2019; Pollinate 2015, 2016, 2017; Colmar Brunton 2018; Hallak et al. 2021; FSANZ 2025b). The studies asked about the HSR's influence in a variety of ways and used different sampling strategies, preventing direct comparisons of proportions. Self-report measures are also generally susceptible to social desirability and recall bias, which may lead results on reported label influence to be higher than actual influence.

Table 9 outlines results from self-report measures in surveys which looked at the proportion of the population that had been influenced by the HSR. Proportions differed depending how the question was asked. For example, of consumers who had purchased a product with the HSR previously, between 38% (2015) and 66% (2024) agreed that the HSR had influenced a purchasing decision in some way Pollinate 2017, National Heart Foundation 2019, FSANZ 2025b). In contrast when asked if they had avoided a product because of its HSR, 14% agreed they had (Pollinate 2015).

Table 9. Quantitative self-report findings on the proportion of consumers influenced by the HSR.

Year of finding	Population	Question	Finding	Reference
2015/16	Nationally representative sample of 3,966 Australian adult grocery shoppers. Collected in 4 surveys across 2015 and 2016.	"Please indicate how strongly you agree or disagree that the Health Star Rating system…makes me want to buy healthier products." Strongly agree, Agree, Neither agree nor disagree, Disagree, Strongly disagree, Unsure	Between 55% and 62% agree or strongly agree across the 4 surveys.	National Heart Foundation (2017)

Year of finding	Population	Question	Finding	Reference
2015, 2016, 2017	1,000 1,007 1,052 Nationally representative samples of Australian adult grocery shoppers.	The Health Star Rating makes me want to buy healthier products. Question wording and response options not published.	2015: 55% agree 2016: 58% agree 2017: 59% agree	Pollinate (2015, 2016, 2017)
2015, 2016, 2017	1,000 1,007 1,052 Nationally representative samples of Australian adult grocery shoppers.	Thinking about the Health Star Rating, have you… Avoided a product because of its Health Star Rating? Question wording and response options not published.	2015: 14% yes 2016: 24% yes 2017: 25% yes	Pollinate (2015, 2016, 2017)
2015, 2016, 2017	419 534 609 Australian adult grocery shoppers who reported purchasing a product with a HSR displayed (timeframe unknown). Nationally representative.	Did the Health Star Rating influence your choice to purchase this product? Yes – It had a lower HSR than my usual product Yes – It had a higher HSR than my usual product No – I just noticed that it has a HSR displayed Not sure Other	Yes – It had a higher HSR than my usual product: 2015: 38% 2016: 38% 2017: 40%	Pollinate (2015, 2016, 2017)
2015/16, 2016/17, 2017/18	1,115 3,358 4,330 Australian adult grocery shoppers who reported purchasing a product with a HSR in the past three months. Nationally representative.	“Did the Health Star Rating system on the product influence your choice?” Yes/No/Unsure	2015/16 58% Yes 34% No 8% Unsure 2016/17 64% Yes 29% No 7% Unsure 2017/18 64% Yes 29% No 7% Unsure	National Heart Foundation (2019)
2021	808 Australian and 213 New Zealander’s who eat out at cafes, restaurants and take aways. Nationally representative.	“I would purchase healthy drinks if the product had a health star rating on its label” 1 = Strongly Disagree to 7 = Strongly Agree	55% Agree or Strongly Agree	Hallak et al. (2021)
2024	1,023 Australian 372 New Zealand Adult grocery shoppers who reported purchasing a product with a HSR in the past	“Did the Health Star Rating system on the label influence your choice?” Yes/No	Australia: 66% Yes 34% No New Zealand: 58% Yes 42% No	FSANZ (2025b)

Year of finding	Population	Question	Finding	Reference
	three months. Nationally representative.		Total: 64% Yes 36% No	

The National Heart Foundation (2019) found that Australian males (68% versus 61% females), Aboriginal and/or Torres Strait Islander Peoples (73% versus 64% non-indigenous), those with a university education (71% versus 59% high school and 61% Diploma/TAFE) and with a healthy body mass index (66% versus 64% with overweight and 55% with obesity) were more likely to report that the HSR had influenced their product choice. Those in metropolitan regions (67% versus 56% non-metro), that speak a language other than English at home (77% versus English 59%), and who had a higher annual income (66% versus 62% <$50,000) were also significantly more likely to be influenced by the HSR (National Heart Foundation 2019). In 10 focus groups with 85 adults and children (aged 10-17) from Western Australia, participants felt that the presence of the HSR would influence their purchasing decisions, particularly those who described themselves as health conscious, or who did not usually actively seek out nutrition information (Talati et al. 2016a).

Table 10summarises results from self-report measures in surveys which sought to understand how consumers' purchasing decisions were influenced by the HSR. Differences in question framing and the base sample questions were asked to prevent direct comparisons. However, results suggest that the majority (>80%) of New Zealand consumers who had used the HSR to compare products were encouraged to purchase products with higher star ratings (Colmar Brunton 2018). This may have led over 50% of those who had used the HSR to switch to a healthier product (Colmar Brunton 2018). Very few consumers (1% – 5%) appear have been encouraged to choose lower star rated products (Colmar Brunton 2018; Pollinate 2015, 2016, 2017; FSANZ 2025b), although some questions did not present this as a response option.

In Australia, 23% of consumers may have been encouraged to switch to a healthier product (National Heart Foundation 2019). These questions asked consumers to think about a specific instance of purchasing a product displaying a HSR, so are limited in their ability to understand how consumers may be influenced by the HSR more broadly. Response options also did not provide all possible contexts in which the HSR might be used.

More recent results suggest that of the 64% Australians and New Zealanders influenced by the HSR in the last 3 months, 55% bought a product because it had more stars compared to other products, 23% bought the product because it had a high star rating, but didn't compare it to other products, and 18% bought the product because it had a HSR on the label, while others did not (FSANZ 2025b).

Table 10. Quantitative self-report findings on how the HSR influenced purchasing decisions.

Year of finding	Population	Question	Finding	Reference
2015, 2016, 2017	419 534 609 Australian adult grocery shoppers who reported purchasing a product with a HSR displayed (timeframe unknown). Nationally representative.	Did the Health Star Rating influence your choice to purchase this product? Yes – It had a lower HSR than my usual product Yes – It had a higher HSR than my usual product No – I just noticed that it has a HSR displayed Not sure Other	Yes it had a lower HSR than my usual product: 2015/16/17: 5% Yes it had a higher HSR than my usual product 2015/16: 33% 2017: 35% No – I just noticed that it has a HSR displayed 2015/17: 49% 2016: 52%	Pollinate (2015, 2016, 2017)
2015, 2016, 2018	306 211 113 'General population' sample of New Zealand adult grocery shoppers who reported having used the HSR.	Think about the last time you used the Health Star Rating system to help you choose a packed food product… how did the Health Star Rating help you decide to buy this product? It confirmed I should buy my usual product It encouraged me to try a product I don't normally buy It helped me in another way	It confirmed I should buy my usual product: 2015: 37% 2016: 40% 2018: 34% It encouraged me to try a product I don't normally buy: 2015: 55% 2016: 57% 2018: 59% (No significant difference across years)	Colmar Brunton (2018)
2015, 2016, 2018	88 170 237 'General population' sample of New Zealand adult grocery shoppers who reported having used the HSR to compare products.	And which product did you choose? The one with more stars The one with fewer stars Neither I chose more than one product from the ones I compared Can't remember	The one with more stars 2015: 83% 2016: 85% 2018: 88% The one with fewer stars 2015: 1% 2016: 5% 2018: 4% (No significant difference across years)	Colmar Brunton (2018)
2017/18	Nationally representative sample of 6,223 Australian adult grocery shoppers.	How did it [the HSR] influence your choice? It confirmed I should buy my usual product I chose a product with more	70% purchased a product with a HSR. Of these: 46% did not change their purchase:	National Heart Foundation (2019)

Year of finding	Population	Question	Finding	Reference
		stars that I don't often buy I chose a product with more stars that I've never tried before I chose not to buy my usual product because it had fewer stars than other options	- 25% were not influenced by the HSR, -21% had the HSR confirm their usual purchase. 23% purchased a product with more stars.	
2024	674 Australian 217 New Zealand Adult grocery shoppers who reported the HSR influenced their purchasing decision in the past three months. Nationally representative.	How did it influence your choice? (Single response option) I bought the product because it had more stars compared to other products I bought the product because it had a high star rating, but didn't compare it to other products I bought the product because it had a Health Star Rating on the label, while others did not I bought the product because it had a low star rating Other	I bought the product because it had more stars compared to other products: AU – 55% NZ – 57% Total – 55% I bought the product because it had a high star rating, but didn't compare it to other products: AU – 24% NZ – 19% Total – 23% I bought the product because it had a Health Star Rating on the label, while others did not: AU – 18% NZ – 18% Total – 18% I bought the product because it had a low star rating: AU – 2% NZ – 3% Total – 3% Other: AU – 1% NZ – 3% Total – 1%	FSANZ (2025b)

Experimental research

Eleven experimental studies, including 7 RCTs, 3 discrete choice experiments and 1 other experiment, provide more rigorous evidence around how the HSR may influence purchasing compared to self-report measures. This section considers results from studies where consumers were asked to make a product choice without being instructed to choose in a specific way (e.g. they were not instructed to choose a healthier product). Consumers' ability to use and understand the HSR to make a healthier choice is discussed in Research Question 2.

Seven studies suggested that the presence of the HSR may lead to healthier food purchasing decisions.

In an online RCT, 994 Australian consumers aged 18 to 34 years were asked to choose a beverage from 15 options which varied in their HSR ratings from 1 – 5 stars (Billich et al. 2018). Consumers were randomised to either see a HSR only on the front of pack, or no FoPL. The presence of the HSR significantly reduced the number of participants who chose a sugar sweetened beverage (44% HSR versus 64% Control, p <0.001) and significantly increased the number choosing a high HSR rated drink (3.5 stars or above) (36% HSR versus 16% Control, p <0.05). However, there was no difference between the HSR and control conditions on the proportion of the group who reported considering the healthiness of the beverage in their choice (32% HSR versus 27% Control, p >0.05), suggesting that HSR may not have consciously prompted more consumers to consider healthiness (Billich et al. 2018).

In a telephone interview based RCT with 91 Australian canteen managers, participants were either told or not told the HSR rating of 12 common food products sold in canteens, and were asked whether they would sell the products (Reilly et al. 2018). Those who were told the HSR ratings were significantly more likely to report that they would make the six healthier products (HSR > 3.5) available compared to those who were not told the ratings. Odds ratios ranged from 3.1 and 3.4 greater odds of selling ($p \leq 0.036$ for each). However, there was no statistically significant difference between groups in the likelihood of selling any of the six 'less healthy' products (Reilly et al. 2018). This suggests that the HSR may have a stronger impact in terms of encouraging healthy purchasing decisions, opposed to discouraging unhealthy decisions.

In a RCT with a convenience sample of 249 Australians, Anderson & O'Connor (2018) considered the impact of comparative context (i.e. whether the HSR was present or not on products to be compared) on the effect of the HSR on food choices. Participants were asked to choose between two breakfast cereals in conditions with either no HSR label on both products, HSR on only one product, or HSR on both products. Results showed that when the HSR was on both products, significantly more participants chose the healthy product (5 stars) than would be expected by chance (65%, p <.001). When the HSR was only present on one label, participants were more susceptible to choosing a less healthy product (2 stars). These results suggest the HSR is more likely to influence consumers to purchase healthier products when it is consistently available. Participants in this study could choose to view the NIP. However, only up to 30% of participants in each condition did so.

In a small exploratory experimental study with 171 Australian students, Thomas et al. (2021) investigated the impact of the HSR on muesli bars with conflicting nutrients, defined as when a food has a desirable level of one nutrient (e.g. low fat), but an undesirable level of another nutrient (e.g. high sodium), as shown in a NIP.[42] Participants were asked to choose a real muesli bar as a reward for participating in research, which either had a HSR-only format on the label or not, and had conflicting nutrients or not. Results showed that the main effect of the HSR was not significant (p > 0.10), but the main effect of the nutrient conflict was significant (p <0.01). That is, participants were less likely to choose the healthier option, as determined by the HSR, when the nutrients were conflicted. There was also a significant interaction effect (p <0.01) such that more participants chose the healthier muesli bar when the HSR was present and the nutrients were conflicted (72%), compared to when no HSR was present and the nutrients were conflicted (32%). These results suggests that the presence of the HSR, namely the HSR-only format, may assist consumers to overcome potential confusion created by conflicting nutrients displayed in the NIP. However, the small sample and missing methodological information reduces confidence in the results (Thomas et al. 2021).

[42] High Fat = 9%, Low Fat = 5%, High sodium = 10%, Low sodium = 5%

In a follow up online experiment with 820 Australians, participants were asked to select which product they would choose from four options of the same product (cereals, mayonnaise, salad dressings or pizzas) (Thomas et al. 2021). Significantly more participants chose the healthiest option, as determined by the HSR, when a HSR-only was on the label, compared to when there was no HSR (93% versus 78%, p <.001). This was consistent across product categories. Participants who chose incorrectly were asked why in an open-ended question. Responses indicated that they had made their comparison based on a single nutrient, typically lower fat, as viewed in a NIP (Thomas et al. 2021).

In an online discrete choice experiment with 2,069 Australian consumers, participants were asked to choose between 4 products which either had or did not have one of 3 FoPLs (one of which was a HSR with tail), had claims or no claims, and varied in healthiness and price (Talati et al. 2017b, 2018a). When a HSR was displayed, significantly more respondents chose the healthiest product (40%) than a moderately healthy product (33%) or a less healthy (23%) product in the choice set, compared to other FoPLs (Daily Intake Guide and Multiple Traffic Light) (Talati et al. 2017b). In particular, the condition with a HSR and no claims led to choices most closely aligned with objective healthiness, as determined by the Nutrient Profiling Score Criterion (i.e. fewer respondents chose the less-healthy variants) (Talati et al. 2018a). The NIP could be viewed in this study, however this was only done for 7% of mock packages across the study. There was no control condition with no FoPL.

In another discrete choice experiment with Australian parents of children aged between 5 and 11 years old (Russell et al. 2017), participants were asked to choose between 4 cereals. The cereals varied in whether a HSR was displayed (HSR-only highlighted with an arrow, HSR with tail + fibre, Tail + fibre with no star rating graphic, or No HSR), the presence of claims, product visuals (e.g. cartoon characters or colour of the cereal), price and product healthiness, as determined by the HSR. No NIP was available for participants, so the only source of nutrition information was the HSR and the tail. Participants were more likely to choose cereals displaying a 5-star rating, over 2-star or no HSR products (all p <0.001). This preference for high star rated products was irrespective of format, including whether the HSR was further magnified by an arrow drawing attention to the star rating. Overall, the star rating accounted for 19% of the variance in the model predicting participant's choices, while the tail contributed a further 16%. These were the second and third most influential factors behind product visuals, which contributed 58%. Combined with Talati et al. (2017b, 2018a), these results suggest that the HSR can increase healthier choices, even in the presence of other marketing attributes such as claims. However, the impact of the HSR on purchasing decisions may be stronger when claims are not present.

In contrast, 3 studies suggested that the HSR did not increase the healthiness of purchasing decisions.

In an international within-subjects RCT which included 987 Australians, Talati et al. (2019b) asked participants to make a series of product choices (cereals, cakes and pizzas) without any FoPLs. Participants were then randomised to view one of several FoPLs on the same products (including the HSR + tail), and were asked if it would change their choice. Australia specific results were not reported numerically, however there was no statistically significant change in consumer choices (across all countries) when the HSR + tail was applied (p <0.05). The difference between these results and the broader literature is likely due to study design. Presenting the HSR after a product choice has already been made is not the context consumers typically engage with the label and may have led to confirmation bias (where participants seek information that confirms their existing decisions or beliefs). This is supported by the fact that approximately 80% of participants in all groups across the broader study did not change their choice.

In a supermarket intercept study with 1,200 participants in Dunedin, New Zealand, participants were asked which of two cereal products they would buy (Hamlin & McNeil 2016). In each of two choice sets, participants saw a comparison cereal with no HSR, and

another cereal which had either a HSR with tail (yellow and red in colour: either 2-star or 5-star) or no HSR. No NIP was provided on either product, so participants only had nutrition information available when the HSR was on pack. Results showed that the HSR significantly decreased the number of participants choosing both the 2- and 5-star rated cereals in comparison to the product with no HSR (p = 0.05). The study did not explore the reasons behind consumers' choices, but may suggest that the presence of nutrition information reduced the appeal of products. The HSR was not present on both cereals in any condition, preventing its ability to be used as intended to compare the healthiness of products. The study also did not reflect the colours that the HSR is designed to be displayed in, which may have impacted consumers' interpretation. The study was undertaken in 2014 when the HSR had only recently been introduced and consumer familiarity was low. The sample from a single site also limits generalisability of the results.

In a follow up study undertaken in 2016, Hamlin and McNeil (2018) repeated the same design with 2,600 participants across supermarkets in Dunedin and Christchurch, New Zealand. This time, however, a blue coloured HSR was utilised. This study found no significant effect of the HSR, and no differential effect of the 2- or 5-star labels. Again, this result may have been due to the study design, which did not allow the HSR to be used to compare products as it was only present on one of the two products.

Finally, Pettigrew et al. (2020a) provides further insights into the impact of the HSR format on purchasing decisions. In a RCT, 1,033 Australian adults were asked to select which of four cereals with different nutritional profiles they would prefer to buy (1, 3 and 4.5 star, and no HSR). They were randomised to view the cereals with one of four HSR formats. However, only the two formats that are currently permitted are in scope for this review: HSR-only black and white and HSR + tail black and white. There was no significant difference in the odds of selecting the 4.5-star product between these two formats (p = 0.755). There was no control condition with no FoPL so this study does not provide insight into the impact of applying the HSR.

Real world purchasing

Three studies looked at real world purchasing to evaluate the impact of the HSR on consumer behaviour (Bablani et al. 2022; Ni Mhurchu et al. 2017; Neal et al. 2017). This included two studies which undertook field (aka non-lab-based) RCTs, and one study that analysed panel purchasing data. Studies using panel purchasing data were only included where the change in consumer behaviour could be isolated. For example, studies which looked at the effect of the HSR on the healthiness of products purchased, which could be attributed to either consumer behaviour change or product reformulation, were excluded.

Bablani et al. (2022) linked product nutrition and purchasing data from New Zealand to investigate the association between the HSR and consumer purchasing, and whether this association changes according to the star rating displayed and product category. They also looked at the impact of the HSR on nutrient purchasing, including energy, sodium, sugars, saturated fat, fibre and protein. To control for general purchasing trends, the study looked at the difference in purchasing between products that applied the HSR between 2013 to 2019, and those that did not change (either had HSR throughout or did not). The outcome measures were the volume of the product purchased in grams or millilitres, multiplied by the nutrient density of those purchases (i.e. grams/millilitres). This allowed for the effects of both consumer purchasing changes and product reformulation to be captured in an overall measure of change in nutrient purchasing. Overall, the results suggested that the HSR had no effect on consumer purchasing behaviour. There was no association between the application of the HSR and overall volumes purchased (0.1% change, 95% CI: −1.0% to 1.2%). There was also no association between purchase volumes and any particular HSR score, i.e. purchasing did not go up or down for higher scoring products or lower scoring products. When looking at purchasing changes across 43 different product types, no consistent pattern in purchasing was observed after application of the HSR. Only 3 food

groups showed a statistically significant (p <0.05) change, with cheese purchasing increasing and breads and dessert purchasing decreasing after application of the HSR. A change in 3 out of 43 product categories is consistent with chance.

Ni Mhurchu et al. (2017) conducted a field RCT in New Zealand to test the effects of the HSR on the healthiness of food purchased over a 4-week period. Participants included 1,357 adult household shoppers (89% female) who self-referred to the trial after seeing advertisements. In the study, participants were encouraged to use a smartphone application to scan the barcodes of foods as they were shopping and were randomised to see either a HSR (n = 443) or a NIP control (n = 455). The HSR + tail format was used. The primary outcome variable was the average healthiness of all packaged foods and drinks purchased over a 4-week period, as defined by the FSANZ Nutrient Profiling Scoring Criterion (NPSC). The extent that the application was used was also recorded.

Across the whole sample, the mean difference in NPSC scores between the HSR and the NIP control was small and non-significant (p = 0.36), suggesting that the ability to view the HSR via the smartphone app did not improve the healthiness of purchasing (Ni Mhurchu et al. 2017). There was also no evidence that effects varied by age, ethnicity, education, frequency of grocery, shopping, household size, self-reported diet rating, self-reported interest in healthy eating, self-reported nutrition knowledge, or self-reported usual label use (all p > 0.05). There were significant interactions by sex and income, with the NIP control group resulting in significantly healthier NPSC scores for low-income participants (p = 0.006) and men (p = 0.047), compared to the HSR. However, these effects may have been due to chance or low sample sizes for these sub-populations. There was also no significant difference in the amount spent on food in the HSR condition, compared to the NIP (p = 0.26).

A limitation of Ni Mhurchu et al. (2017) is that the HSR labels were not applied directly to products, so participants had to scan the barcode to access the information. This additional barrier is likely to have reduced their influence on purchasing decisions. On average, participants scanned the barcodes of a mean of 34 products (SD = 55) over the 4 weeks, and this did not significantly differ between the NIP and HSR condition (p <0.05). To understand the interaction between use and influence on purchasing, Ni Mhurchu et al. (2017) analysed results for participants who scanned the barcodes more frequently than average. In contrast to the results across the entire sample, those who scanned to view the HSR more than average (n = 151) did purchase foods with significantly healthier NPSC profiles than those who scanned to view the NIP more than average (n = 127), (p = 0.01). This suggests that the HSR may help to improve the healthiness of packaged food and drink purchases for those who are motivated to use it.

Participants were also asked how often the study labels caused them to buy a different food, answering on a 10-point Likert scale where 0 = never and 10 = very often. The average rating was significantly higher for the HSR condition compared to the NIP control (difference of 0.72 points, p = 0.001). However, the average scores were not reported, so it is not possible to say whether participants generally perceived that they had or had not been influenced to change their purchasing.

In a sister trial to Ni Mhurchu et al. (2017) conducted in Australia with similar methodology, (Neal et al. 2017), 1,578 adult household shoppers (84% female) were randomised to view either the HSR (n = 315), NIP control (n = 318), or one of three other labelling interventions when they scanned a product barcode. Reflecting the New Zealand results, there was no significant difference in NPSC scores of purchased products between those who viewed the HSR and those who viewed the NIP (p = 0.39). Nor was there a significant difference in the amount spent on food in the HSR condition, compared to the NIP (p = 0.07). On average participants scanned an average of 31 products (SD ± 56). Neal et al. (2017) also conducted a meta-analysis of their results combined with Ni Mhurchu et al. (2017) and found no significant result (p = 0.590).

Impact of the HSR on consumption behaviour

Overview of key findings

Two peer reviewed Australian articles considered how the HSR influences consumption behaviours, namely, choice of portion size (Brown et al. 2017; Talati et al. 2018b). These studies were both quantitative RCTs, with medium quality ratings. The studies had conflicting results. One study that asked participants to serve themselves from a fake buffet indicated that the HSR had no significant impact on chosen portion size, while an online experiment with pre-determined options for portion sizes that participants could select indicated that the HSR significantly reduced portion size. This discrepancy is likely due to the less realistic setting and the pre-determined portion sizes in the online experiment. These studies also did not ask participants to use the HSR to compare similar products, and as such do not necessarily reflect the intent of the HSR system.

Portion size

Brown et al. (2017) undertook an in-person RCT with young adults from an Australian university community, which aimed to identify if the presence of a HSR on food labels influenced the portion sizes they would serve themselves from a fake food buffet. Participants were randomised to see either no label, kJ/100 g information or an HSR label, and were asked to serve themselves an adequate portion of breakfast cereal, fruit salad and chocolate, plus a three-component meal (chicken, fries and mixed vegetables). It is unclear what format the HSR label was in or how it was presented on the foods in the buffet. Results showed no significant difference between the HSR and no label control condition in the portion sizes served, indicating that the HSR did not influence portion size.

Talati et al. (2018b) explored the influence of the HSR on portion size choice in an online RCT. The sample included 1,505 Australian adults, with a skew towards those living in low socio-economic neighbourhoods. Participants were randomised to one of four FoPL conditions (including the HSR or a no FoPL control condition) and were shown mock packages of unhealthy variations of pizzas, cookies, yoghurts and cornflakes. The nutritional profiles of the products reflected real world examples and ranged from 1 to 1.5 stars. The HSR + tail format was used, with the addition of HIGH/LOW text as per the nutrient profile for the specific product. As part of a broader study, participants were asked to rate the mock product on a number of dimensions and could click to view the NIP. They were then presented with images and text descriptions in grams of different portion sizes for that product and were asked, “If you were going to eat this product, how much should you eat at one time?”. For pizzas and cookies, 8 portion size options were available (1 to 8 slices of pizza and 1 to 8 cookies). For yoghurts and cornflakes, 4 portion size options were available (depicting 100 g, 200 g, 300 g and 400 g servings and 15 g, 30 g, 45 g and 60 g servings, respectively). Compared with the no FoPL control, the HSR resulted in a small but significant reduction in the portion size selected for pizzas and cornflakes (p <0·05), but not for yoghurts and or cookies. Given that a 1-point difference in portion size on the scale was represented by 1 slice of pizza (645 kJ) and 15 g of cornflakes (244 kJ), the average differences were equivalent to a decrease of 44 and 129 kJ per serving with the HSR, for cornflakes and pizzas respectively.

Limitations

The purpose of this review was to examine the evidence on consumer use, understanding, trust and behavioural impact of the HSR. All results pertained to Australian and/or New Zealand consumers. However, there was limited evidence relating specifically to priority

populations defined in the HSR Monitoring framework.[43] In particular, there were limited findings relating to Aboriginal and Torres Strait Islander Peoples. The Māori and Pacific populations that were explored were also only representative of shoppers with children under 14 years, limiting the generalisability of the results.

The studies in the review varied in quality. Of the 45 publications, 53% were medium quality, 33% were high quality and 13% were low quality. Of the 10 government reports, most were medium (60%) or low quality (30%). Included reports presented results in the form of descriptive statistics, and generally did not include in-depth or adjusted analyses. Typically, these were percentages of respondents selecting particular responses, occasionally broken down by demographics or other collected variables. However, they were assessed using the same approach and criteria as the peer-reviewed literature. Interpretation of findings should be approached with caution, as the analyses often did not account for covariates or confounding or provided little detail on the analytical approach.

Additionally, data relating to use of the HSR was all self-reported. Self-report measures can be susceptible to social desirability and recall bias, which may overestimate consumer use of the HSR. Hence, results pertaining to Research Question 1 should be interpreted with caution. Contextually, it is important to note that the HSR has only appeared on <40% of products in Australia and New Zealand since its inception in 2014. This may influence findings, i.e. consumers may not use the HSR as it is not present to use on the products they buy. Regarding consumer understanding of the HSR, identifying labels with higher stars relative to other labels was considered ‘correct’ understanding, as that is the intention of the HSR system. However, it is acknowledged that the higher star rating may not necessarily align with the health goals of all consumers. In particular, studies that used the HSR + tail format may have potentially exposed consumers to other nutrient information (e.g. quantity of sugar, sodium or saturated fat) that they may have based the “healthiness” of a label on.

A narrative comparison has been provided where possible of changes in consumer use, understanding and trust in the HSR over time. However, due to differences in sample populations and question wording, caution is needed when drawing conclusions about these trends.

The methodological approach of this review is also not without limitations. Firstly, relevant literature was found from searching databases that were available to FSANZ. It is therefore possible that additional relevant literature was missed from other databases. However, this possibility was mitigated by searching for further literature via the references of two relevant and recent systematic reviews, which returned 4 additional studies (Appendix 1). Secondly, it is acknowledged that only one officer screened and extracted data for each study (i.e. no study was double coded). This was necessary to provide a timely evidence synthesis. Having only one reviewer screen and extract data from each study is a commonly used approach when conducting rapid systematic reviews (Tricco et al. 2015).

[43] Priority groups refer to populations of low socio-economic status (SES), Aboriginal and Torres Strait Islander peoples and Multicultural populations in Australia, and Pacific Peoples and Māori in New Zealand.

References

Acton RB, Rynard VL, Adams J, Bhawra J, Cameron AJ, Contreras-Manzano A, Davis RE, Jáuregui A, Sacks G, Thrasher JF, Vanderlee L, White C and Hammond D (2023) 'Awareness, use and understanding of nutrition labels among adults from five countries: Findings from the 2018-2020 International Food Policy Study', *Appetite*, 180:106311, https://doi.org/10.1016/j.appet.2022.106311

Anderson CL, and O'Connor EL (2019) 'The effect of the health star rating on consumer decision-making', *Food Quality and Preference*, *73*: 215-225, https://doi.org/10.1016/j.foodqual.2018.11.005

Bablani L, Ni Mhurchu C, Neal B, Skeels CL, Staub KE, and Blakely T (2022) 'Effect of voluntary Health Star Rating labels on healthier food purchasing in New Zealand: longitudinal evidence using representative household purchase data' *BMJ Nutrition, Prevention & Health*, 5(2): 227-234, https://doi.org/10.1136/bmjnph-2022-000459

Bhawra J, Kirkpatrick S, Hall MG, Vanderlee L, Thrasher JF and Hammond D (2022a) 'Correlates of Self-Reported and Functional Understanding of Nutrition Labels across 5 Countries in the 2018 International Food Policy Study', *Journal of Nutrition*, 152(Suppl 1), 13s-24s, https://doi.org/10.1093/jn/nxac018

Bhawra J, Kirkpatrick S, Hall MG, Vanderlee L, Thrasher JF, De la Mota AJ and Hammond D (2022b) 'A five-country study of front- and back-of-package nutrition label awareness and use: patterns and correlates from the 2018 International Food Policy Study', *Public Health Nutrition*, 26(1): 275-286. https://doi.org/10.1017/s1368980022002257

Billich N, Blake MR, Backholer K, Cobcroft M, Li V and Peeters A (2018) 'The effect of sugar-sweetened beverage front-of-pack labels on drink selection, health knowledge and awareness: An online randomised controlled trial', *Appetite*, 128: 233-241, https://doi.org/10.1016/j.appet.2018.05.149

Brown HM, De Vlieger N, Collins C and Bucher T (2017) 'The influence of front-of-pack nutrition information on consumers' portion size perceptions' *Health Promotion Journal of Australia*, 28(2): 144-147, https://doi.org/10.1071/He16011

Colmar Brunton (2016a) *Health Star Rating Monitoring and Evaluation*, Health Promotion Agency, Wellington, accessed October 2024

Colmar Brunton (2016b) *Health Star Rating Monitoring and Evaluation Year One Follow-up Research Report*, Health Promotion Agency, Wellington, accessed October 2024

Colmar Brunton (2018) *2018 Health Star Rating monitoring and evaluation: Year 2 follow-up research report*, Health Promotion Agency, Wellington, accessed October 2024

Department of Health, Disability and Ageing (2025) *Uptake of the Health Star Rating system as at November 2024,* accessed January 2025

Department of Health and Aged Care (2023) *Health Star Rating system Post Five-Year Review Monitoring Framework*, accessed January 2025

Egnell M, Talati Z, Hercberg S, Pettigrew S and Julia C (2018) 'Objective Understanding of Front-of-Package Nutrition Labels: An International Comparative Experimental Study across 12 Countries' *Nutrients*, 10(10): 1542, https://doi.org/10.3390/nu10101542

Fenton L, Lauckner H and Gilbert R (2015) 'The QATSDD critical appraisal tool: comments and critiques', *Journal of Evaluation in Clinical Practice,* 21(6): 1125-1128, https://doi.org/10.1111/jep.12487

FSANZ (Food Standards Australia New Zealand) (2024) *Consumer Insights Tracker 2023 - Technical Report*, accessed October 2024

FSANZ (Food Standards Australia New Zealand) (2025a) *Consumer Insights Tracker 2024 - Technical Report*, accessed June 2025

FSANZ (Food Standards Australia New Zealand) (2025b) *Health Star Rating – 2024 Monitoring Consumer Research Report*, accessed June 2025

Guyatt G, Oxman AD, Akl EA, Kunz R, Vist G, Brozek J, Norris S, Falck-Ytter Y, Glasziou P, derBeer H, Jaeschke R, Rind D, Meerpohl J, Dahm P and Schünemann HJ (2011) 'GRADE guidelines: 1. Introduction—GRADE evidence profiles and summary of findings tables', *Journal of Clinical Epidemiology*, 64(4): 383-394. https://doi.org/10.1016/j.jclinepi.2010.04.026

Hallak R, Lee CG and Onur I (2021) 'Health Star Ratings and Beverage Purchase Intentions: A Study of Australian and New Zealand Hospitality Consumers', *Foods*, 10(11): 2764, https://doi.org/10.3390/foods10112764

Hamlin R and McNeill L (2016) 'Does the Australasian "Health Star Rating" Front of Pack Nutritional Label System Work?' *Nutrients*, 8(6): 327, https://doi.org/10.3390/nu8060327

Hamlin R and McNeill L (2018) 'The Impact of the Australasian 'Health Star Rating', Front-of-Pack Nutritional Label, on Consumer Choice: A Longitudinal Study', *Nutrients*, 10(7): 906, https://doi.org/10.3390/nu10070906

Jáuregui A, White CM, Vanderlee L, Hall MG, Contreras-Manzano A, Nieto C, Sacks G, Thrasher JF, Hammond D and Barquera S (2022) 'Impact of front-of-pack labels on the perceived healthfulness of a sweetened fruit drink: a randomised experiment in five countries', *Public Health Nutrition*, 25(4): 1094-1104, https://doi.org/10.1017/S1368980021004535

Jones A, Thow AM, Ni Mhurchu C, Sacks G and Neal B (2019) 'The performance and potential of the Australasian Health Star Rating system: a four-year review using the RE-AIM framework', *Australian and New Zealand Journal of Public Health*, 43(4): 355-365, https://doi.org/10.1111/1753-6405.12908

Kelly B, Ng SH, Carrad A and Pettigrew S (2024) 'The potential effectiveness of front-of-pack nutrition labeling for improving population diets'. *Annual Review of Nutrition* 44: 405-40, https://doi.org/10.1146/annurev-nutr-011224-030917

Moher D, Liberati A, Tetzlaff J and Altman DG (2010) 'Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement', *International Journal of Surgery*, 8(5): 336-341. https://doi.org/10.1016/j.ijsu.2010.02.007

National Heart Foundation (2019) *Report on the monitoring of the implementation of the Health Star Rating system in the first four years of implementation: June 2014 to June 2018*

National Heart Foundation (2017) *Report on the monitoring of the implementation of the Health Star Rating system in the first two years of implementation: June 2014 to June 2016*

Neal B, Crino M, Dunford E, Gao A, Greenland R, Li N, Ngai J, Ni Mhurchu C, Pettigrew S, Sacks G, Webster J and Wu JHY (2017) 'Effects of Different Types of Front-of-Pack Labelling Information on the Healthiness of Food Purchases—A Randomised Controlled Trial' *Nutrients*, 9(12): 1284, https://doi.org/10.3390/nu9121284

Ni Mhurchu C, Volkova E, Jiang YN, Eyles H, Michie J, Neal B, Blakely T, Swinburn B and Rayner M (2017) 'Effects of interpretive nutrition labels on consumer food purchases: the Starlight randomized controlled trial', *American Journal of Clinical Nutrition*, 105(3): 695-704, https://doi.org/10.3945/ajcn.116.144956

Pelly FE, Swanepoel L, Rinella J and Cooper S (2020) 'Consumers' Perceptions of the Australian Health Star Rating Labelling Scheme' *Nutrients*, 12(3): 704, https://doi.org/ARTN 704 10.3390/nu12030704

Pettigrew S, Jongenelis MI, Talati Z, Dana LM, Hercberg S and Julia C (2023) 'The ability of five different front-of-pack labels to assist Australian consumers to identify healthy versus unhealthy foods', *Australian and New Zealand Journal of Public Health*, 47(1): 100017, https://doi.org/10.1016/j.anzjph.2022.100017

Pettigrew S, Dana LM, Talati Z, Tian MY and Praveen D (2020a) 'The role of colour and summary indicators in influencing front-of-pack food label effectiveness across seven countries' *Public Health Nutrition*, 24(11): 3566-3570, https://doi.org/10.1017/s1368980020004966

Pettigrew S, Dana L and Talati Z (2020b) 'Enhancing the effectiveness of the Health Star Rating via presentation modifications', *Australian and New Zealand Journal of Public Health*, 44(1): 20-21, https://doi.org/10.1111/1753-6405.12952

Pettigrew S, Talati Z, Miller C, Dixon H, Kelly B and Ball K (2017) 'The types and aspects of front-of-pack food labelling schemes preferred by adults and children', *Appetite*, 109: 115-123, https://doi.org/10.1016/j.appet.2016.11.034

Pollinate Research (2015) *Health Star Rating System: Campaign Evaluation and Report*, New South Wales, Pollinate Research.

Pollinate Research (2016) *Health Star Rating System: Campaign Evaluation and Report*. New South Wales, Pollinate Research.

Pollinate Research (2017) *Health Star Rating System: Campaign Evaluation and Report*. New South Wales, Pollinate Research.

Pulker CE, Li DCC, Scott JA and Pollard CM (2019) 'The Impact of Voluntary Policies on Parents' Ability to Select Healthy Foods in Supermarkets: A Qualitative Study of Australian Parental Views', *International Journal of Environmental Research and Public Health*, 16(18): 3377, https://doi.org/10.3390/ijerph16183377

Reilly K, Nathan N, Wu JHY, Delaney T, Wyse R, Cobcroft M, Wiggers J, Sutherland R, Buffett K, Yoong SL and Wolfenden L (2018) 'Assessing the potential impact of a front-of-pack nutritional rating system on food availability in school canteens: A randomised controlled trial'. *Appetite*, 121: 309-315, https://doi.org/10.1016/j.appet.2017.11.103

Riley MD, Bowen J, Krause D, Jones D and Stonehouse W (2016) 'A survey of consumer attitude towards nutrition and health statements on food labels in South Australia', *Functional Foods in Health and Disease*, 6(12): 809-821, https://doi.org/10.31989/ffhd.v6i12.306

Russell GC, Burke PF, Waller DS and Wei, E (2017) 'The impact of front-of-pack marketing attributes versus nutrition and health information on parents' food choices', *Appetite*, 116: 323-338, https://doi.org/10.1016/j.appet.2017.05.001

Sirriyeh R, Lawton R, Gardner P and Armitage G (2012) 'Reviewing studies with diverse designs: the development and evaluation of a new tool', *Journal of Evaluation in Clinical Practice*, 18(4): 746-752, https://doi.org/10.1111/j.1365-2753.2011.01662.x

Stuthridge L, Alexander D, Stubbe M, Eme P and Smith C (2022) '"It's All Just Marketing", a Qualitative Analysis of Consumer Perceptions and Understandings of Nutrition Content and Health Claims in New Zealand', *International Journal of Environmental Research and Public Health*, 19(6): 3510, https://doi.org/10.3390/ijerph19063510

Talati Z, Pettigrew S, Kelly B, Ball K, Dixon H and Shilton T (2016a) 'Consumers' responses to front-of-pack labels that vary by interpretive content', *Appetite*, 101: 205-213, https://doi.org/10.1016/j.appet.2016.03.009

Talati Z, Pettigrew S, Hughes C, Dixon H, Kelly B, Ball K and Miller C (2016b) 'The combined effect of front-of-pack nutrition labels and health claims on consumers' evaluation of food products', *Food Quality and Preference*, 53: 57-65, https://doi.org/10.1016/j.foodqual.2016.05.016

Talati Z, Pettigrew S, Dixon H, Neal B, Ball K and Hughes C (2016c) 'Do Health Claims and Front-of-Pack Labels Lead to a Positivity Bias in Unhealthy Foods?' *Nutrients*, 8(12): 787, https://doi.org/10.3390/nu8120787

Talati Z, Pettigrew S, Ball K, Hughes C, Kelly B, Neal B and Dixon H (2017a) 'The relative ability of different front-of-pack labels to assist consumers discriminate between healthy, moderately healthy, and unhealthy foods', *Food Quality and Preference*, 59: 109-113, https://doi.org/10.1016/j.foodqual.2017.02.010

Talati Z, Norman R, Pettigrew S, Neal B, Kelly B, Dixon H, Ball K, Miller C and Shilton T (2017b) 'The impact of interpretive and reductive front-of-pack labels on food choice and willingness to pay', *International Journal of Behavioral Nutrition and Physical Activity*, 14(1): 171, https://doi.org/10.1186/s12966-017-0628-2

Talati Z, Norman R, Kelly B, Dixon H, Neal B, Miller C and Pettigrew S (2018a) 'A randomized trial assessing the effects of health claims on choice of foods in the presence of front-of-pack labels', *American Journal of Clinical Nutrition*, 108(6): 1275-1282, https://doi.org/10.1093/ajcn/nqy248

Talati Z, Pettigrew S, Kelly B, Ball K, Neal B, Dixon H, Shilton T and Miller C (2018b) 'Can front-of-pack labels influence portion size judgements for unhealthy foods?' *Public Health Nutrition*, 21(15): 2776-2781, https://doi.org/10.1017/s1368980018001702

Talati Z, Egnell M, Hercberg S, Julia C and Pettigrew S (2019a) 'Consumers' Perceptions of Five Front-of-Package Nutrition Labels: An Experimental Study Across 12 Countries', *Nutrients*, 11(8): 1934, https://doi.org/ARTN 1934 10.3390/nu11081934

Talati Z, Egnell M, Hercberg S, Julia C and Pettigrew S (2019b) ‘Food Choice Under Five Front-of-Package Nutrition Label Conditions: An Experimental Study Across 12 Countries’ *American Journal of Public Health*, 109(12): 1770-1775. https://doi.org/10.2105/Ajph.2019.305319

The Navigators (2024) *Consumer Food Safety Insights Survey: Perceptions, knowledge & behaviours,* New Zealand Food Safety Ministry for Primary Industries, accessed October 2024

Thomas D, Seenivasan S and Wang D (2021) ‘A nudge toward healthier food choices: the influence of health star ratings on consumers' choices of packaged foods’ *European Journal of Marketing*, 55(10): 2735-2768 https://doi.org/10.1108/Ejm-11-2019-0851

Tricco AC, Zarin W, Antony J, Hutton B, Moher D, Sherifali D and Straus SE (2016) ‘An international survey and modified Delphi approach revealed numerous rapid review methods’, *Journal of Clinical Epidemiology*, 70: 61-67, https://doi.org/10.1016/j.jclinepi.2015.08.012

TNS New Zealand (2015) *Health Star Rating Consumer Research and Message Testing,* Wellington, accessed October 2024,

Appendices

Appendix 1: Literature review methods

All decisions regarding inclusion/exclusion criteria were made prior to the literature search commencing, except where otherwise stated.

Inclusion criteria
The review included studies that examined:

- Materials published since 2014 (HSR introduced in June 2014)
- Published in English
- Materials with original quantitative and qualitative empirical data
- Peer-review publications
- Government commissioned reports
- Literature focusing on consumer use, understanding, trust or barriers and enablers to using, understanding or trusting the HSR
- Studies on HSR impact on consumer perceptions and behaviours related to food choice

Exclusion criteria

- Studies on the HSR conducted outside Australia and New Zealand
- Studies that combine Australian and New Zealand data with results from other countries
- Studies conducted only with children and adolescents <18 years
- Reviews
- Protocols
- Editorials and commentaries not containing original analysis (e.g. media pieces)
- Grey literature other than government-commissioned reports
- Materials focusing on industry behaviour in response to the HSR (e.g. reformulation)
- Materials that do not include the HSR as a main focus
- Studies with HSR labels that significantly differ from the current HSR format or context of use (e.g. added to restaurant menu boards, colour added. Labels with minor visual discrepancies from the current style guide are included).
- Interventions to improve understanding and use of the HSR

Online database searches
Six online databases were searched via EBSCO Discovery (available through the FSANZ library):

- Science Direct
- Food Science Source
- FSTA - Food Science and Technology Abstracts
- MEDLINE with Full Text
- SocINDEX with Full Text
- EconLit with Full Text

In addition, the Web of Science database was searched. Online database searches were undertaken using simple Boolean search term combinations. Searches were undertaken in September 2024 using the following search string:

(“health star rating*”) AND (use OR purchase intent* OR behavio* OR understanding OR knowledge OR perception OR barrier* OR difficult* OR challeng* OR problem OR obstacle OR enable* OR facilitat* OR help* OR assist*) AND consumer*

Other sources/grey literature

To ensure the literature review incorporated a suitably broad range of references, further literature was sought by searching the websites of known relevant agencies. These agencies included:

- Ministry of Primary Industries, NZ
- The Department of Health, Disability and Ageing, Australia
- The Health Star Rating website

Searching the reference lists of all included studies was not feasible. Instead, the references of the following reviews were searched:

- The performance and potential of the Australasian Health Star Rating system: a four-year review using the RE-AIM framework (Jones et al. 2019)
- The potential effectiveness of front-of-pack nutrition labelling for improving population diets (Kelly et al. 2024)

These are relatively recent, high-quality reviews that both included the evidence surrounding effectiveness of the HSR. As such, a risk minimisation and validation exercise was undertaken to identify any potentially missed publications through cross comparing the publications included in these two reviews with those identified through our search.

Of the 57 publications included in the review by Jones et al. (2019), 16 were already included in our review, 31 were out of scope (did not meet eligibility criteria, mainly because they did not focus on consumer behaviours), and 3 government commissioned reports were identified for inclusion.

Of the 221 publications included in the review by Kelly et al. (2024), 18 were already included, 210 were out of scope (did not meet eligibility criteria, mainly due to being conducted on populations outside of Australia and New Zealand), and 1 peer-reviewed publication were identified for inclusion.

In addition, FSANZ studies that detailed unique findings on the HSR were also included, even if they hadn't been published at the time of the literature review search.

Research review process

The search process initially identified 287 potentially relevant documents. References were exported to EPPI-Reviewer 4, a web-based software program for managing and analysing data for literature reviews. Duplicates were removed using EPPI-Reviewer 4 duplicate management tools; references allocated a similarity score of at least 0.95 by the software were automatically excluded, and remaining potential duplicates identified by the software were manually screened and excluded by one officer.

Following removal of duplicates, out of scope papers were removed based on title and/or abstract. Finally, documents identified as out of scope on the basis of full-text review were excluded. Additional studies from references of the two reviews and FSANZ publications were also included. This resulted in 48 full text documents (consisting of 46 unique studies) being included. All stages of the screening process were conducted by three officers concurrently. Officers met regularly to ensure agreement of included and excluded articles.

Figure A1 shows the number of documents retrieved at various stages of the review process. The information depicted in Figure A1 is based on the Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA; Moher et al., 2010).

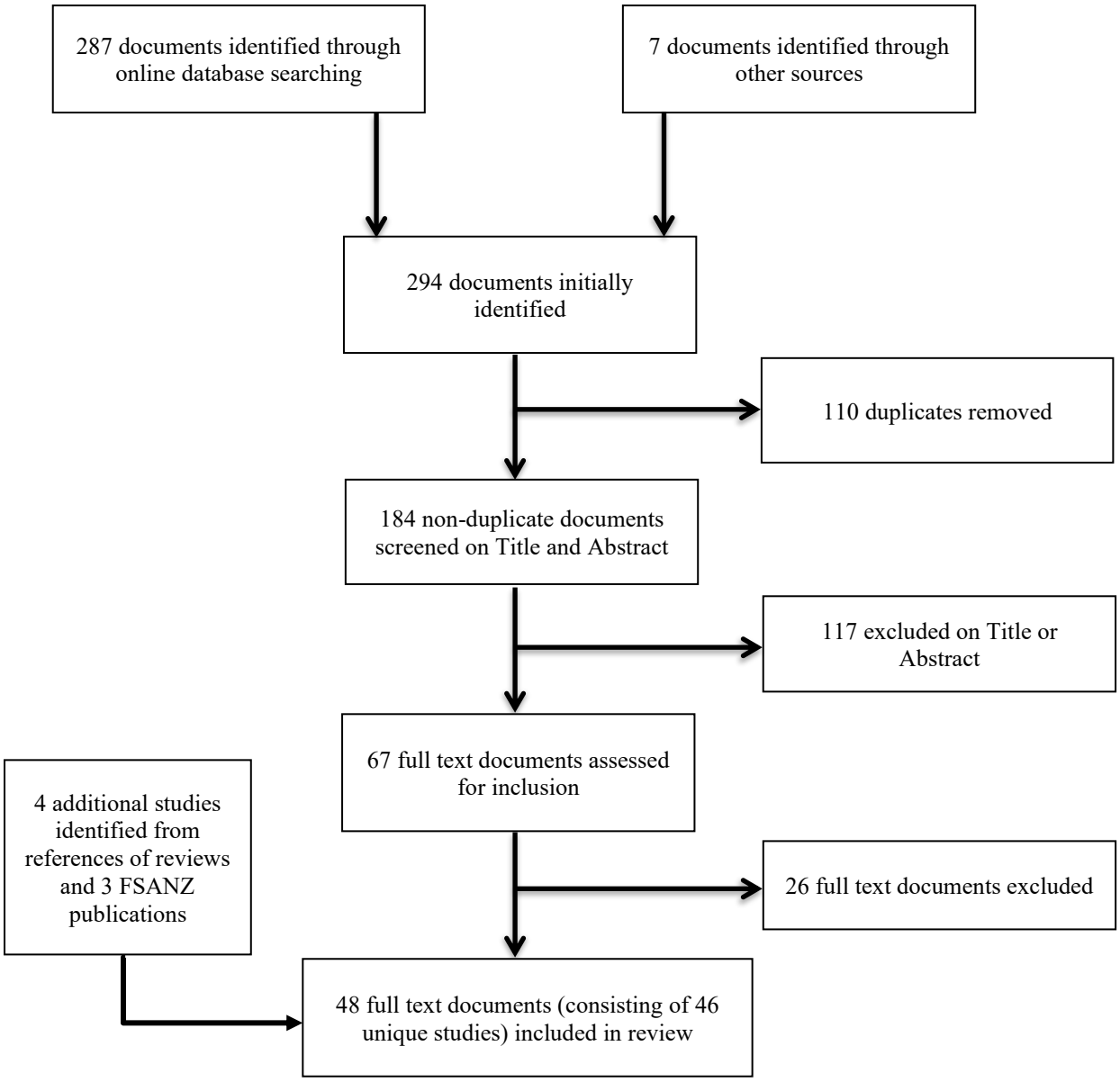

Figure A12. Number of documents retrieved at various stages of the review process.

Data extraction

The data extracted from each study included: Author(s), publish date, data collection date, title, study aims, study design, sample characteristics, stimuli used (if applicable), outcome measures of interest, relevant findings, limitations, and funding source. The data was summarised for each study and is presented in Appendix 3: Table of study characteristics and quality assessments. Data extraction was completed by three officers.

Appendix 2: Revised QATSDD

The original QATSDD has been shown to produce reliable and valid quality assessments for studies with diverse designs (Sirriyeh et al., 2012). However, recent criticism of the tool suggests there is a need to further define the language used (Fenton et al. 2015). Fenton et al. (2015) suggested that the criteria be further described, with specific examples incorporated for each criterion. The revised version of the QATSDD utilised in the current review therefore further elaborates on the criteria outlined in the original QATSDD tool. Additionally, items that were deemed to be assessing similar criteria were merged for ease of use, and an item assessing ethical approval was also added.

As with the original QATSDD, not all criteria in the revised QATSDD were applicable to all studies (as some criteria were only relevant to quantitative studies, or to qualitative studies). Therefore, the maximum possible rating was higher for studies that used mixed designs (i.e. for studies that had both quantitative and qualitative components). However, this variance was accounted for when calculating overall ratings for each study (as the ratings of each criterion were summed and then divided by the maximum possible total rating; Sirriyeh et al., 2012).

The revised QATSDD consists of a total of 14 items (12 items for quantitative or qualitative studies, 14 items for mixed-design studies). A full copy of the revised QATSDD is in Table A2.

Table A2. Revised Quality Assessment Tool for Studies with Diverse Designs (QATSDD).

Note: all criteria are relevant to both quantitative and qualitative studies, except where otherwise stated (i.e. criteria 9-12).

Theme	Criteria no.	Criteria	0 = Not at all	1 = Very slightly	2 = Moderately	3 = Complete
Research Background and Aims	1	Explicit theoretical or conceptual framework. Consider: • Review of previous relevant studies/literature • Rationale for the study and how it links together with the discussion of the results • Application of existing theory (e.g. Theory of planned behaviour, Health motivation theory) or descriptive consideration of key concepts and their inter-relationships	No mention at all.	Reference to broad theoretical basis i.e. some general details – very limited justification for the study and/or very limited discussion of how results related to the literature or theories.	Reference to a specific theoretical basis. i.e. more specific details than rating 1. E.g. strong justification for the study in the introduction based on existing literature or theories, but limited discussion of how the results of the study relate to literature or theories (or vice versa).	Explicit statement of theoretical framework and/or constructs applied to the research. Justifies what the current study will add to the existing body of evidence, with thorough discussion of consistencies/inconsistencies with results from prior studies (theorises possible reasons for inconsistencies/what all results taken together imply about a phenomenon/construct). Note that reference to a theoretical model may not be necessary for an applied study (descriptive consideration of key concepts and their inter-relationships may suffice).
	2	Statement of aims/objectives in main body of report.	No mention at all.	General reference to aim/objective at some point in the report including abstract.	Reference to broad aims/objectives in main body of report.	Explicit statement of aims/objectives in main body of report.
	3	Clear description of research setting. Consider: • Who (specific target population) • What (clear research problem/question being studied in the target population)	No mention at all.	General description of research area and background. Very general target population for research question stated e.g. 'consumers of	General description of research problem in the target population. Most dot points covered.	Specific description of the research problem and target population in the context of the study. All dot points covered.

Theme	Criteria no.	Criteria	0 = Not at all	1 = Very slightly	2 = Moderately	3 = Complete
		• Where (where the research took place, e.g. in lab/online/at home, and where participants were from) • When (when the research took place) • This criteria is not about a description of the data collection procedure or tools.		alcohol'. Most other dot points not covered.		
	4	Fit between stated research question and research design. Consider: • Research design e.g. experimental versus cross-sectional designs. This criteria is not about data collection tools. • Experimental designs are appropriate for establishing cause and effect e.g. the effect of labelling on behaviour. Whereas qualitative studies or surveys may be better suited to answer questions regarding consumer perceptions.	No research question/aim/objective stated.	Research design/approach can only address some aspects of the research question.	Research design/approach can address the research question but there is a more suitable alternative that could have been used or used in addition.	Research design/approach selected is the most suitable approach to attempt to answer the research question
Sampling and recruitment	5	Evidence of sample size considered in terms of analysis. Consider: • Discussion of smallest sample cell • Oversampling demographics of interest with low prevalence	No mention at all.	Basic explanation for choice of sample size. Evidence that size of the sample has been considered in study design. E.g. vague reference to other studies without further explanation.	Evidence of consideration of sample size in terms of saturation/information redundancy or to fit generic analytical requirements. E.g. mentions calculations or saturation requirements but the final sample was	Explicit statement of data being gathered until information redundancy/saturation was reached or to fit exact calculations for analytical requirements. E.g. mentions exact calculations/saturation requirements and these were met.

Theme	Criteria no.	Criteria	0 = Not at all	1 = Very slightly	2 = Moderately	3 = Complete
					unable to completely meet these (e.g. necessary sample for main effect has been met but not for subgroup analyses, or numbers approach but don't quite meet the target), or mentions generic sample requirements that may not necessarily generalise to the current study requirements.	
	6	Representative sample of target group of a reasonable size Consider: • Online panels may limit ability to achieve a representative sample • Convenience samples may limit ability to achieve a representative sample • Demographic characteristics of the sample – is any subgroup over- or under-represented? E.g. if the aim of the study was to answer a research question regarding participants of various ages, then the sample is not representative if, for example, a very small percentage of the sample were young adults, and the majority were within an older age bracket.	No statement of target group.	Sample is limited but represents some of the target group or representative but very small.	Sample is somewhat diverse but not entirely representative, e.g. inclusive of all age groups, experience but only one workplace. Requires discussion of target population to determine what sample is required to be representative.	Sample includes individuals to represent a cross section of the target population, considering factors such as experience, age and workplace.

Theme	Criteria no.	Criteria	0 = Not at all	1 = Very slightly	2 = Moderately	3 = Complete
	7	Detailed recruitment data • Describes the process of recruitment as well as response rates, drop-out rates etc. (if applicable)	No mention at all, or only final N reported.	Minimal recruitment data, e.g. no. of questionnaires sent and no. returned. Or only final N reported plus clear description of recruitment method.	Most recruitment information but not complete account, e.g. full recruitment figures but no information on strategy used. Or clear description of recruitment method and recruitment figures, except one figure missing (e.g. number dropped out and final N reported, but no information on N who declined to participate).	Complete data regarding no. approached, no. recruited, attrition/drop-out data where relevant, method of recruitment.
Procedural details	8	Description of procedure for data collection. Consider: • The order in which participants completed tasks/questionnaires. • Description of the data collection tools e.g. question wording/response options/stimuli given to participants. Note this is different from criteria 9 below which assesses whether the data collection tools were appropriate to use; criteria 8 assesses whether an adequate description was provided of the tools themselves.	No mention at all.	Very basic and brief outline of data collection procedure, e.g. 'using a questionnaire distributed to staff'.	States each stage of data collection procedure but with limited detail or states some stages in detail but omits others.	Detailed description of each stage of the data collection procedure.
Data collection tools	9	Data collection tools justified, reliability and validity assessed. Consider:	No mention at all.	Very limited consideration of reliability/validity of data collection	Some evidence that the reliability/validity of the data collection tool(s) has been	Reliability and validity of all major tool(s) has been established. Note that the authors do not need to

Theme	Criteria no.	Criteria	0 = Not at all	1 = Very slightly	2 = Moderately	3 = Complete
(Quantitative)		• Questionnaires, measures and stimuli used • Reliability indicates consistency e.g. if you tested a group of participants at time 1, then tested them again at time 2, the results should be the same/consistent between time 1 and time 2 (test-retest reliability). • Validity indicates that the measurement tool is measuring what it is intended to e.g. use of piloting or statistical assessment of tools where appropriate. • If ratings differ for different tools used, then take an average, e.g. if a measure is a 2, but stimuli are a zero, the rating will be 1.		tool(s) e.g. generally and accurately explains why the construct to be measured is appropriate, without reference to the actual measurement tool(s) or any reliability/validity assessments. Or vaguely states that the tools were based on a review of the literature without citations or further elaboration.	considered e.g. based on use in a cited prior similar study but without reference to any reliability/validity assessments. Or some attempt to assess reliability and validity but insufficient (e.g. unsuccessful attempt to establish test-retest reliability but no further action is taken).	assess reliability and validity themselves; reporting these based on prior studies may suffice if based on similar populations.
Data collection tools **(Qualitative)**	10	Format and content of data collection tool justified. Consider: • Questions/schedules/stimuli/guides used for interview/focus groups • How were the questions/guides developed? Based on existing theory/literature? • Previously tested/piloted. • Consideration of leading/biased questions.	No mention at all	Very limited consideration of quality of data collection tool(s) e.g. generally and accurately explains why the topics are appropriate to include in the guide to answer the research question(s), but questions or guide not piloted or used in a prior study. Or vaguely states that the tools were based on a review of the literature	Some evidence that the quality of the data collection tool(s) has been considered e.g. based on use in a cited prior similar study without further explanation. No major concerns in terms of leading/biased questions, but could benefit from further consideration or elaboration of the dot points.	Quality of all major tool(s) has been established, e.g. clearly justified based on detailed explanation of a prior study/literature. No concerns regarding leading or biased questions. Note that if a mixed design study had one minor qualitative component where participants are simply given the opportunity to provide further comments on a construct/topic, e.g. “do you have any further comments about….” Then this may be rated here as a 3, as long as there are no concerns regarding leading/biased questions.

Theme	Criteria no.	Criteria	0 = Not at all	1 = Very slightly	2 = Moderately	3 = Complete
				without citations or further elaboration.		
Data analysis **(Quantitative)**	11	Data analysis approach justified and undertaken appropriately Consider: • Do statistical tests match the type of data? • Were multiple tests accounted for to control for type 1 error? e.g. via Dunnett's, Tukey or Bonferroni corrections. However less of a concern if p values are very high anyway (>0.05), or very small (<0.001). • Were confounding variables considered? (e.g. entered as covariates) • Were statistical assumptions acknowledged where relevant? (e.g. multicollinearity for regression, or tests of normality where relevant). Means and SDs are not appropriate for interpreting skewed data (medians and interquartile ranges would provide a more accurate representation of group data in this case) • Proportional data: Fisher's test should be used over Chi square test if low frequencies (n<5 in a group/cell). • Could the study benefit from additional analyses to provide greater insight? • Results adequately reported to support conclusions e.g.	No mention at all, or the analytical approach does not even broadly match the type of data.	**Most of the dot points have NOT been considered**, reported on or correctly applied, but the analytical approach broadly matches the type of data. E.g. use of a one-way between-subjects ANOVA is appropriate to analyse multiple group levels of a single independent variable. However correction for multiple testing/statistical assumptions/control for covariates not considered or reported on.	**Most of the dot points have been addressed**. Analysis allows reasonable conclusions to be made from results but could still benefit from further consideration from the list of dot points, (e.g. consideration of statistical assumptions, or additional analyses could provide greater insight). However note that if most points have been addressed, but serious concerns remain that would significantly impact confidence in results (e.g. confounding variables), then the study should not be granted a 2 for this criteria.	All dot points haven been considered where relevant. Method of analysis selected is the most suitable approach, and results are adequately reported to support conclusions.

Theme	Criteria no.	Criteria	0 = Not at all	1 = Very slightly	2 = Moderately	3 = Complete
		descriptive statistics, p values, etc.				
Data analysis **(Qualitative)**	12	Analytical approach justified and assessment of reliability of analytic process Consider: • Approach to analysis described e.g. grounded theory, thematic coding. • how did they develop codes, themes. • techniques to increase trustworthiness in results e.g. multiple researchers, interrater reliability, member-checking (i.e. returning data to participants to check for accuracy and resonance with their experiences), audit trail, reflexive process, negative case search (i.e. searching for and discussing elements of the data that do not support or appear to contradict patterns or explanations that are emerging from data analysis), triangulation. • discussion of subjective influences of analysis • Results adequately reported to support conclusions e.g. use of participant quotes.	No mention at all of the approach to analysis	Basic description of approach to analysis (e.g. themes coded from the data vs. use of an existing coding scheme that was developed prior to data collection), but **most of the dot points missing, not considered or incorrectly applied,** i.e. no or limited description of techniques to increase trustworthiness in results, no further details of how codes were developed, missing information when reporting results.	**Most of the dot points have been addressed**. Analysis allows reasonable conclusions to be made from results but could still benefit from further consideration from the list of dot points. E.g. justified description of how themes were coded, but only use of one or two techniques to ensure trustworthiness in results, only a few instances where results could be reported more clearly to support conclusions.	All dot points have been considered where relevant. Method of analysis selected is the most suitable approach. Use of a range of methods to enhance trustworthiness in results, and results are adequately reported to support conclusions.
Ethics	13	Ethics approval	No mention at all.	N/A	N/A	Ethics approval obtained.

Theme	Criteria no.	Criteria	0 = Not at all	1 = Very slightly	2 = Moderately	3 = Complete
Strengths and limitations	14	Strengths and limitations critically discussed?	No mention at all.	Very limited mention of strengths and limitations with omissions of many key issues.	Discussion of some of the key strengths and weaknesses of the study but not complete.	Discussion of strengths and limitations of all aspects of the study including design, measures, procedure, sample & analysis.

Appendix 3: Table of study characteristics and quality assessments

Please see supplementary material.