Factors forming consumer willingness to pay a premium for free-range eggs

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Received 29 July 2022
Revised 15 November 2022
Accepted 18 November 2022

Abstract

Purpose – Little is known about the external stimuli, which trigger a change in a consumer's cognitive and affective state and lead to a consumer's willingness to pay a premium price (WTPPP) behavioural response. This study aims to close this knowledge gap by providing insight into how a unique combination of antecedents affects consumer attitude toward purchasing free-range eggs and leads to a behavioural response, which is measured by consumer WTPPP for free-range eggs.

Design/methodology/approach – An online questionnaire was developed, with data collected from 392 Australian consumers. This study employs confirmatory factor analysis (CFA) to examine the measurement model before testing the hypothesised relationships using covariance-based structural equation modelling (CB-SEM).

Findings – The study reveals that the tested customer perceived value (CPV) dimensions, animal welfare and source credibility are positive stimuli of consumer attitude towards purchasing free-range eggs, which subsequently promotes consumer WTPPP for free-range eggs.

Research limitations/implications – Findings drawn from Australian consumers may not be generalisable to consumers from disparate contexts, and stimuli beyond those tested may influence consumer attitude and WTPPP.

Originality/value – This is one of the first studies to use the stimulus–organism–response (SOR) theory to investigate and contribute to extant knowledge and understanding of consumer behaviour relating to free-range eggs and specifically of consumer attitude towards purchasing and WTPPP for free-range eggs. This study offers practical implications for free-range egg farmers, retailers and policymakers.

Keywords Free-range eggs, Attitude, Willingness to pay, Animal welfare, Source credibility

Paper type Research paper

1. Introduction

According to estimates by ResearchAndMarkets.com (2021), the global egg market is expected to forge ahead in sales value from US$227.3 bn in 2021 with a compound annual growth rate (CAGR) of 7% to US$297.4 bn in 2025. Concurrently, the global egg market is being driven toward more hen-friendly production by the consumer's growing animal welfare awareness and concerns (Cao *et al.*, 2021; Rondoni *et al.*, 2020), demands for transparency of production processes (Legendre and Coderre, 2018) and an increasing preference by the majority of consumers for free range eggs (Zakowska-Biemans and Tekien, 2017).

These market forces and trends have also been observed in the Australia egg industry (Choice, 2021). The Australian egg industry over the last decade has witnessed a rapid rise in annual egg sales value (from A$465.8 m to A$1.1 bn) in major supermarket grocery chains.

Declaration statement: Funding details: Not applicable.

British Food Journal

0007-070X
DOI 10.1108/BFJ-07-2022-0663

During the same period, the Australian egg industry recorded a marked increase in free-range egg sales from 37.3 to 59.0% of the supermarket grocery chains' market sales value and a pronounced decline in the sales value of caged hen eggs from 49.5 to 36.0% (Australian Eggs, 2021; Campbell *et al.*, 2021). Free-range eggs (i.e. eggs produced by hens that are "not confined to cages", "free to roam/move about" and have "access to the outdoors/paddock/grass") (Choice, 2015, p. 4) are currently Australian consumers' preferred egg type, and this preference is projected to continue to grow into the foreseeable future (Australian Eggs, 2010, 2021; Campbell *et al.*, 2021).

Despite rising consumer interest in and consumption of free-range eggs (Lusk, 2019), increasing attention of the academic community toward free-range eggs has predominantly focused on commercial free-range egg production (Campbell *et al.*, 2021) and not toward understanding which factors affect consumer attitude towards purchasing free-range eggs and willingness to pay a price premium for free-range eggs. While some studies have examined the influence of the customer perceived value (CPV) construct on consumer attitude towards purchasing, few studies have examined the influence of CPV dimensions (Ruiz-Molina and Gil-Saura, 2008) and even fewer with regards to the influence of CPV dimensions on consumer attitude towards purchasing free-range eggs. Furthermore, limited studies have investigated the effects of animal welfare on consumer attitude and behaviour towards consumption of products of animal origin (Rondoni *et al.*, 2020; Vanhonacker and Verbeke, 2014); however, animal welfare has been identified as a significant influence on these constructs in contexts other than the egg industry (Verbeke, 2009). As well, limited research has investigated in one study the influence of a number of antecedents that could further explain consumer attitude towards purchasing (Anshu *et al.*, 2022) and the consequence on consumer willingness to pay a price premium for a product (Zhang *et al.*, 2020) such as free-range eggs. Finally, studies of consumer behaviour in Australia relating to free-range eggs are scant.

The novelty of this study is that these knowledge gaps are closed by providing a better understanding of the antecedents of consumer willingness to pay a premium price (WTPPP) for free-range eggs. This study draws upon prior findings which suggest that consumer behaviour is the outcome of numerous diverse forces (Islam *et al.*, 2019), and we reveal that each of the tested CPV dimensions [functional value (performance/quality), functional value (price/perceived value), emotional value and social value], and animal welfare and source credibility are positive 'stimuli' of consumer attitude towards purchasing free-range eggs ('organism'), which subsequently promotes consumer WTPPP for free-range eggs ('response'). Moreover, this is one of the first studies to use the stimulus–organism–response (SOR) theory to model these influences and investigate and contribute to extant knowledge and understanding of consumer behaviour relating to free-range eggs, and specifically of consumer WTPPP for free-range eggs. This study offers practical implications for free-range egg farmers, retailers and policymakers through provision of insight into consumer behaviour in Australia relating to free-range eggs.

The remainder of the paper is structured in the following manner. The next sections discuss background literature on the SOR theory, and the constructs CPV and attitude; followed by the research model and hypothesis development. The methodology adopted, results and discussion are then elaborated on. The paper is closed out with the implications, limitations and directions for future research and conclusion.

2. Background literature

2.1 Stimulus–organism–response (SOR) theory

The SOR theory has predominantly been used to rationalise consumer behaviour (Singh *et al.*, 2022). The SOR theory explains how stimuli (S) from an external environment affect

the cognitive and affective intermediary states of the consumer, i.e. the organism (O), which mediates and translates those stimuli into behavioural responses, exhibited as consumer behaviour (Tandon *et al.*, 2021). Based on the SOR theory, this study intends to provide insight into the influence of environmental factors, namely CPV, source credibility and animal welfare as the stimuli, on the attitude towards purchasing free-range eggs as the internal state of the 'organism', which shapes consumer WTPPP as the response.

2.2 Customer perceived value (CPV)

Two main conceptualisations of value are suggested to exist. First, value is a unidimensional construct focused on the quality–price relationship, where consumers acquire value as a result of the difference between utility contributed by attributes of a product and disutility from what is paid) (Sánchez-Fernández and Iniesta-Bonillo, 2007). Second, value is a multidimensional and multifaceted construct (comprising various dimensions that act additively and interdependently), which later studies have adopted (García-Salirrosas *et al.*, 2022; Slack *et al.*, 2021). Sheth *et al.* (1991) were initial researchers to suggest (based on the theory of consumption value [TCV]) a combination of dimensions (functional, epistemic, conditional, social and emotional value) to be incorporated into a multidimensional model of value. Sweeney and Soutar (2001) deconstructed the consumer value dimensions proposed by Sheth *et al.* (1991) into the PERVAL (PERceived VALue) scale comprising four dimensions, namely, functional value (performance quality), functional value (price/value for money), emotional value and social value (García-Salirrosas *et al.*, 2022; Slack *et al.*, 2021). The PERVAL scale addresses the overdependence on economic value in earlier conceptualisations, acknowledges the significant contribution of emotions to perceived value (Sánchez-Fernández and Iniesta-Bonillo, 2009; Zang *et al.*, 2022) and has been shown to be a robust, valid and reliable measure of CPV (Gallarza *et al.*, 2021; Slack *et al.*, 2021).

2.3 Attitude

Researchers suggest that attitude refers to a consumer's overall evaluation (Solomon, 2004) based on exposure to information and experiential factors, which results in "a learned predisposition to respond consistently favourably or unfavourably to an object" (Ruiz-Molina and Gil-Saura, 2008, p. 306), issue, person or action (Solomon, 2004). Furthermore, since attitudes are predispositions to respond in a certain manner, attitudes influence consumer behaviour (Ayaviri-Nina *et al.*, 2022). In the context of this study, consumer attitude towards purchasing free-range eggs is investigated.

2.4 Free-range eggs

No universally accepted definition of 'free-range eggs' is in existence (Parker and de Costa, 2016; Scrinis *et al.*, 2017). Hence, considering the context of this study is Australian consumers, reference will be made to the definition of 'free-range eggs' as stipulated in Australian legislation, namely, the Australian Consumer Law (Free-Range Egg Labelling) Information Standard 2017. This legislation states the meaning of the term 'free-range eggs' as "eggs laid by hens that: (a) had meaningful and regular access to an outdoor range during daylight hours during the laying cycle; (b) were able to roam and forage on the outdoor range; and (c) were subject to a stocking density of 10,000 hens per hectare or less" (Government of Australia, 2017).

3. Research model and hypothesis development

Literature widely reports the existence of a strong relationship between CPV and customer attitude towards purchasing product from a retailer (García-Salirrosas *et al.*, 2022;

Ruiz-Molina and Gil-Saura, 2008), CPV significantly influences consumer attitude and behaviour (Sweeney and Soutra, 2001), the significant positive effect of CPV on both product attitude and purchase intention (Yu and Lee, 2019) and the creation of value for customers is evidenced in positive customer attitude towards the product (Dlačić and Žabkar, 2012). Notwithstanding, a large portion of the published research has examined the influence of the construct CPV on consumer attitude and to a lesser extent, the influence of the dimensions of CPV. Thus, it has been suggested that the influence of the dimensions of perceived value (García-Salirrosas *et al.*, 2022; Slack *et al.*, 2021), on customer attitude (Ruiz-Molina and Gil-Saura, 2008), should be analysed as is the case in this study.

Functional value (performance quality) refers to "the utility derived from the perceived quality and expected performance of the product" (Sweeney and Soutar, 2001, p. 211). There is evidence that suggests customer attitude towards purchase of a product is dependent on product performance quality (Zang *et al.*, 2022). Similar results were found in retail research which highlighted that the higher the quality of the products offered, the more positive the customer attitude towards the retailer and the product (Papista and Dimitriadis, 2019; Ruiz-Molina and Gil-Saura, 2008). Other studies also confirm that customer perception of performance quality has a positive effect on their attitude towards consumption and the purchase decision (García-Salirrosas *et al.*, 2022; Mahmoud *et al.*, 2018). Therefore, it is hypothesised that

H1. Functional value (performance quality) positively influences attitude towards purchasing free-range eggs.

According to Sweeney and Soutar (2001, p. 211), the definition of functional value (price/value for money) is "the utility derived from the product due to the reduction of its perceived short-term and longer-term costs". The price of a product provides information to the consumer about the functional value (price/value for money) of the product and is considered one of the main factors which influence consumer decision-making and behaviour (García-Salirrosas *et al.*, 2022; Phang *et al.*, 2020). Previous studies have found that value for money was a key factor influencing consumer intention to purchase (Higueras-Castillo *et al.*, 2019) and was determined to be common across different cultural contexts (Jiang, 2016). Likewise, prior research has identified that when consumers perceive functional value (price/value for money) could be derived from a product, consumer attitude toward the consumption experience was more positive (Mahmoud *et al.*, 2018). These findings are reinforced by Higueras-Castillo *et al.* (2019) who assert that consumer perceived functional value (price/value for money) has a considerable impact on a consumer's attitude and intention to purchase. Hence, this study proposes the following hypothesis:

H2. Functional value (price/value for money) positively influences attitude towards purchasing free-range eggs.

Emotional value has been described by Sweeney and Soutar (2001) as the perceived benefit derived from the feelings or affective states of enjoyment or pleasure that a product generates. Researchers (Roig *et al.*, 2013; Yu and Lee, 2019) determined that where a product is unique, one-of-a-kind and important to consumers, those consumers perceived emotional value (a sense of joy and excitement) about the product, developed good memories of the product (Afaq *et al.*, 2022) and a positive attitude toward the product (Yu and Lee, 2019). The findings of other researchers in disparate sectors reinforce these determinations and confirm that emotional experiences and feelings engender positive consumer attitude toward the brand (Jeong *et al.*, 2020; Roig *et al.*, 2013); and the emotional value appears to be the main determinant of customer attitude (Ruiz-Molina and Gil-Saura, 2008) and to have a considerable impact on consumer attitude (Cho *et al.*, 2019; Higueras-Castillo *et al.*, 2019). Therefore, this study proposes the following hypothesis:

H3. Emotional value positively influences attitude towards purchasing free-range eggs.

Consumers evaluate products not just by functional value and the enjoyment or pleasure derived from products but also by the social value ("the utility derived from the product's ability to enhance social self-concept") (Sweeney and Soutar, 2001, p. 211). Social value is another significant construct that explains consumer choice (Kim *et al.*, 2013; Reyes-Menendez *et al.*, 2022). A number of studies have shown that when customers perceive to gain high social value from brands and products, they exhibit a more positive attitude toward the intended consumption experience and purchase decision (Caniëlsa *et al.*, 2021; Mahmoud *et al.*, 2018) and that social factors are key in influencing people's attitude toward purchasing a product (Caniëlsa *et al.*, 2021; Nosi *et al.*, 2017). Thus, it is postulated that

H4. Social value positively influences attitude towards purchasing free-range eggs.

While research into animal welfare has continued to increase over the last 30 years, no universally accepted definition of animal welfare has emanated. Thus, animal welfare is commonly described according to features such as an animal coping with the environment in which it lives, its fitness and health, meeting its biological needs and its ability to express its innate behaviour (Cornish *et al.*, 2016). Researchers have found that animal welfare is an important extrinsic factor that affects consumers' hedonic and emotional responses towards purchasing products of animal origin (Bennett *et al.*, 2016; Jiang *et al.*, 2021; Rolfe, 1999; Situmorang *et al.*, 2022) and that consumers rate animal welfare as the second highest priority in determining their food purchase decision (behind food safety) (Jiang *et al.*, 2021). More specifically, research has established that consumers hold a genuine concern for hen welfare (Moffat *et al.*, 2019; Rolfe, 1999; Situmorang *et al.*, 2022), an active interest in the systems and conditions under which hens are grown and eggs produced (Campbell *et al.*, 2017), "rated the welfare of free range hens high" (Pettersson *et al.*, 2016, p. 2009) and valued animal welfare extremely highly (Bennett *et al.*, 2016), when considering a purchasing choice of eggs (Pettersson *et al.*, 2016, p. 2009). Thus, it is proposed that

H5. Animal welfare positively influences attitude towards purchasing free-range eggs.

A widely accepted definition of source credibility is "a communicator's positive characteristics that affect the receiver's acceptance of a message" (Ohanian, 1990, p. 41). Studies have investigated and confirmed that recipients of information can be influenced by source credibility (Cheung *et al.*, 2008; Chen *et al.*, 2014; Wong *et al.*, 2020) and that source credibility effects consumer behaviour (Ismagilova *et al.*, 2020). Source credibility has been conceptualised as comprising two major dimensions, namely, trustworthiness and expertise (Metzeger, 2007). According to Hovland *et al.* (1953), trustworthiness is the extent of confidence the recipient perceives in the communication source's intent to provide information that is objective, honest and valid. On the other hand, expertise is described as "the extent to which a communicator is perceived to be a source of valid assertions" (Hovland *et al.*, 1953, p. 21) and relates to the capability and competence of the communicator to deliver the information (McGuinnies and Ward, 1980). Trustworthiness and expertise have been shown to have a positive influential effect on consumer attitude, behavioural intention and behaviour (Hwang *et al.*, 2018; Lin and Xu, 2017). Researchers have also found that information with high source credibility can be more easily transferred and believed (Cheung *et al.*, 2008), can positively change a recipient's opinion (attitude) towards the opinion supported by the information source (Cheung *et al.*, 2008) and positively affect consumers' intention to purchaser (Zhang *et al.*, 2014). Hence, source credibility is deemed critically important in understanding and influencing consumer attitude towards purchasing (Ismagilova *et al.*, 2020; Zhang *et al.*, 2018). Therefore, it is hypothesised that

H6. Source credibility positively influences attitude towards purchasing free-range eggs.

According to researchers (Kucher *et al.*, 2019; Li and Meshkova, 2013), the willingness (of consumers) to pay a price premium (WTPPP) refers to the maximum amount of money a consumer is willing to pay for a product or bundle of product attributes. Free-range eggs are perceived by customers to comprise a bundle of attributes of interest such as "better quality, more nutritious and safer and having better sensory characteristics than caged eggs" (Bray and Ankeny, 2017, abstract). Researchers suggest that consumers are more likely to develop positive attitudes toward food that is generally regarded as more nutritious and safer than conventionally produced food (Michaelidou and Hassan, 2008) and that consumers are WTPPP for those products and product attributes (Lagerkvist and Hess, 2011). Also, Bennett *et al.* (2016, p. 14) confirmed that customers are WTPPP for free-range eggs where it would enable "poultry farmers to ensure that hens do not suffer". Researchers have established that consumer attitude is an integral determinant of an individual's behavioural intention (Zhang *et al.*, 2020) and the existence of an association between consumer attitude and WTPPP for animal welfare-friendly products (Miranda-de la Lama *et al.*, 2019) such as free-range eggs (Cornish *et al.*, 2016). Furthermore, researchers (Güney and Giraldo, 2020; Harkness and Areal, 2018) reinforce that consumers with a positive attitude towards purchasing a product were willing to pay a price premium for the product. Hence, it is postulated that

H7. Attitude towards purchasing free-range eggs positively influences willingness to pay premium price.

Figure 1 presents the proposed conceptual framework and hypotheses for this study.

4. Methodology

4.1 Theuse of the SOR theory in this study

The SOR theory was employed in this study as the foundational theory for a number of reasons. First, "the theory is developed from environmental psychology and provides a framework for analysing the effects of situational impacts on consumer behaviour" (Satish *et al.*, 2021, p. 116). Second, the SOR theory uses three nonmutually exclusive components, including SRO, to aid understanding of consumer behaviour (Grace *et al.*, 2015). Third, the SOR theory has been evidenced to provide a high degree of predictive power as to how a customer reacts to unique environmental stimuli (Jeong *et al.*, 2020; Laato *et al.*, 2020). Finally, although the SOR theory has been extensively used in previous studies of consumer behavior across a wide range of diverse contexts (Belbağ, 2021; Laato *et al.*, 2020; Satish *et al.*, 2021), to the knowledge of the authors, this study would be one of the first to use the SOR theory to provide unique insight into the influence of environmental factors (namely CPV, source credibility and animal welfare) as the stimuli on the attitude towards purchasing free-range eggs as the internal state of the 'organism' and the combined influence of the stimuli and organism on consumer WTPPP as the 'response'.

4.2 Questionnaire development

The scales and measurement items used in the survey instrument were pre-validated in prior studies. To suit the context of this study, the wording of the items was amended. A modified version of the PERVAL scale (comprising functional value [performance quality] [four items], functional value [price/value for money] [three items], emotional value [three items] and social value [four items]) as proposed by Seeeney and Soutar (2001, p. 211) was adopted in this study. Items that measured animal welfare (seven items) were adopted from Jiang *et al.* (2021), source credibility [comprising expertise (three items) and trustworthiness (three items)] from Zhang *et al.* (2018), attitude (six items) from Ajzen and Fishbein (1980) and willingness to pay a premium (three items) from Zhang *et al.* (2020). Respondents' perception as to how much

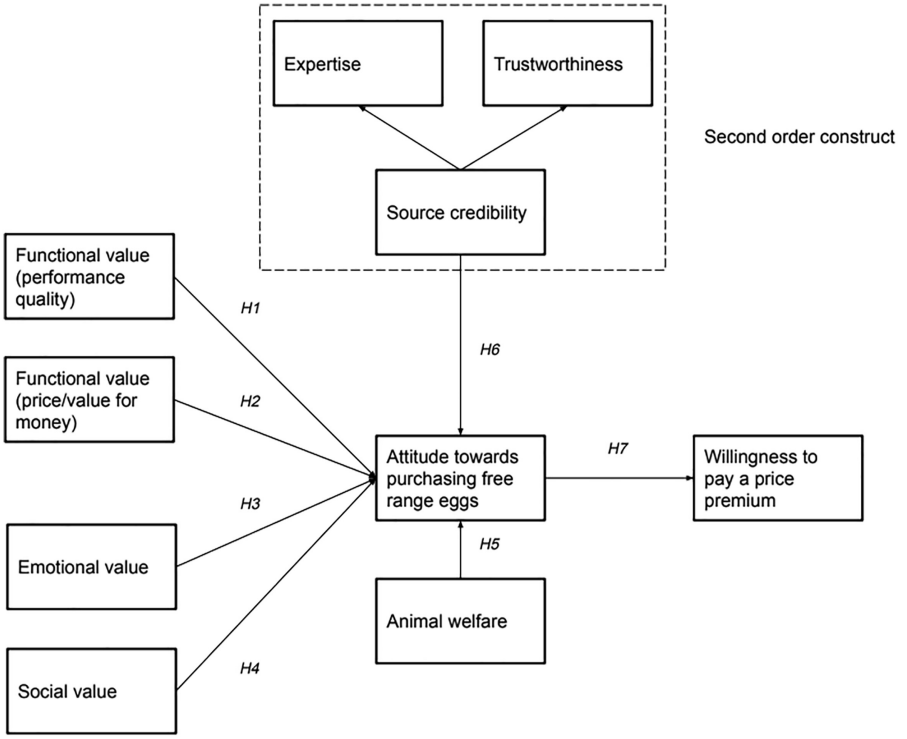

Figure 1.
Proposed conceptual model

they agree or disagree with a particular statement were captured using a seven-point Likert scale ranging from 1 (Strongly disagree) to 7 (Strongly agree).

Face and content validity of the survey instrument scales was assured based on the anonymous opinions and consensus of a panel of five experts with expertise in consumer behavior, marketing and psychology. Prior studies have adopted a similar method (Zechariah *et al.*, 2021). Additionally, a pilot study was conducted with 30 respondents to test the data collection instrument and research protocols in preparation for the larger study. Based on the pilot study responses, minor changes were made to the wording of some items in the survey instrument. These changes were aimed at reducing ambiguity and increasing accuracy of the measure of respondents' level of agreement with the items. For example, functional value (performance quality) item 4 originally read "Free-range eggs are well made" and was reworded "Free-range eggs are well produced"; emotional value item 1 originally read "I enjoy using free-range eggs" and was reworded "I enjoy consuming free-range eggs"; and willingness to pay a price premium item 1 was reworded from "I am willing to pay more money to purchase free-range eggs as opposed to regular eggs" to read "I am willing to pay more money to purchase free-range eggs as opposed to caged chicken eggs".

4.3 Data collection and participants

The survey instrument used in this study was an online questionnaire developed using the SurveyMonkey web survey platform. Links to the questionnaire were circulated using a sponsored advertisement on Facebook, as the number of Facebook users are steadily growing in Australia (with 11.4 m users in 2021), and Facebook is the most frequently used social media

platform in Australia (Statista.com, 2022). A snowball sampling technique was adopted in this study. The sponsored Facebook advertisement requested Facebook users to respond to the online survey and also to recruit other Facebook users to respond, with the sample snowballing to an increasing size. Other studies have successfully used paid Facebook advertisements (Bennetts *et al.*, 2019) and the snowball sampling technique (Dosek, 2021) to access populations.

Data were collected from an online questionnaire conducted between June and September 2021 in Australia. The selection of Australian consumers for data collection is considered appropriate as the egg industry in Australia has witnessed a rapid rise in the sales value of free-range eggs and a corresponding decline in the sales value of caged eggs (Campbell *et al.*, 2021). A total of 403 responses were received; of which, 11 were removed due to incomplete or missing information. The remaining 392 responses were used to conduct further tests and analyses. The Sekaran and Bougie table (Sekaran and Bougie, 2009) is well known for sample size determination among behavioural and social science researchers and has been adopted in this study to determine the minimum suitable sample size. The Sekaran and Bougie table suggests that a sample of 384 is suitable for a population greater than 1,000,000. This study's sample size of 392 exceeded the minimum sample size recommended by Sekaran and Bougie (2009) and was thus determined to be adequate for this study. The sample predominantly comprised female respondents ($n = 216$, 55.10%), respondents in the age brackets 26–30 years ($n = 146$, 34.95%) and 31–40 years ($n = 131$, 33.42%), and with an annual income below AUD30,000 (249, 61.22%).

4.4 Data analysis

A combination of SPSS (version 27) and AMOS (version 27) software were used to conduct covariance-based structural equation modeling (CB-SEM). This study employed confirmatory factor analysis (CFA) to examine the measurement model before testing the hypothesised relationships using covariance-based structural equation modelling (CB-SEM). CB-SEM is a popular method used in prior studies to understand consumer behavior (Singh *et al.*, 2021; Sharma *et al.*, 2021). The use of CB-SEM was also justified as the data met the necessary sample size and multivariate requirements, and the proposed hypotheses tested were well grounded in theory.

5. Results

5.1 Data distribution and common method bias

Before the CFA was performed, the data were assessed for normality and multicollinearity. Normal distribution was confirmed as both the kurtosis and skewness values were less than the prescribed limits. The absence of multicollinearity issues in the data was also confirmed, as the variance inflation factor (VIF) values were below 5 and tolerance values above the 0.10 threshold as recommended by Hair *et al.* (2010). The possibility of common method bias is present when using self-reported data. To test for common method bias, we conducted the Harman's single factor test that reported 32.17% variance using extracted single factor (without rotation). This common method value is well below the 50% threshold recommended by Podsakoff *et al.* (2003) and confirms that common method bias did not influence this study's results.

5.2 Measurement model

Internal consistency of the study's constructs was determined using Cronbach's alpha. According to Fornell and Larcker (1981), both the composite reliability and Cronbach's alpha should be above 0.70. This study's composite reliability (Table 1) and Cronbach's alpha values met this requirement. The factor loadings for all items were above the recommended cut-off value of 0.40 (Hair *et al.*, 2010), indicating that all items were good measures of each construct (Table 2).

Table 1.
Discriminate validity

	CR	AVE	MSV	MaxR(H)	FVQ	PVP	EMV	SCV	AWF	EXP	TRW	ATT	WPPP
FVQ	0.92	0.77	0.57	0.87	*0.85*								
FVP	0.89	0.73	0.43	0.93	0.26	*0.91*							
EMV	0.93	0.80	0.53	0.91	0.23	0.23	*0.91*						
SCV	0.93	0.76	0.54	0.89	0.26	0.19	0.25	*0.86*					
AWF	0.95	0.74	0.64	0.92	0.15	0.17	0.17	0.21	*0.91*				
EXP	0.87	0.69	0.22	0.95	0.14	0.17	0.26	0.13	0.15	*0.91*			
TRW	0.80	0.67	0.40	0.91	0.21	0.15	0.22	0.27	0.21	0.12	*0.87*		
ATT	0.95	0.76	0.34	0.94	0.24	0.21	0.26	0.19	0.22	0.24	0.26	*0.91*	
WPPP	0.92	0.79	0.21	0.92	0.25	0.12	0.23	0.23	0.14	0.16	0.17	0.14	*0.95*

Note(s): The italic faced diagonal elements are the square root of the variance shared between the constructs and their measures. Off-diagonal elements are the correlations between constructs. ***$p < 0.001$. FVQ: functional value (performance quality); FVP: functional value (price/value for money); EMV: emotional value; SCV: social value; AWF: animal welfare; EXP: expertise; TRW: trustworthiness; ATT: attitude towards free-range eggs; WPPP: willingness to pay premium price

Variable	Measurement items	Model and item indices SL	SMC
Functional value (performance quality)	FVQ1	0.89	0.79
	FVQ2	0.86	0.74
	FVQ3	0.88	0.77
	FVQ4	0.87	0.76
Functional value (price/value)	FVP1	0.88	0.77
	FVP2	0.87	0.76
	FVP3	0.82	0.67
Emotional value	EMV1	0.91	0.83
	EMV2	0.89	0.79
	EMV3	0.89	0.79
Social value	SCV1	0.91	0.83
	SCV2	0.85	0.72
	SCV3	0.88	0.77
	SCV4	0.84	0.71
Animal welfare	AWF1	0.96	0.96
	AWF2	0.81	0.81
	AWF3	0.89	0.89
	AWF4	0.82	0.82
	AWF5	0.86	0.86
	AWF6	0.79	0.79
	AWF7	0.88	0.88
Expertise	EXP1	0.86	0.74
	EXP2	0.83	0.69
	EXP3	0.8	0.64
Trustworthiness	TRW1	0.84	0.71
	TRW2	0.78	0.61
	TRW3	0.83	0.69
Attitude	ATT1	0.88	0.77
	ATT2	0.84	0.71
	ATT3	0.92	0.85
	ATT4	0.89	0.79
	ATT5	0.84	0.71
	ATT6	0.84	0.71
Willingness to pay a premium price	WPPP1	0.85	0.72
	WPPP2	0.89	0.79
	WPPP3	0.92	0.85

Note(s): SL = standardised loading; SMC = squared multiple correlations

Table 2. Confirmatory factor analysis

Convergent validity was confirmed as all average variance extracted (AVE) values exceeded the 0.5 threshold and were below their respective composite reliability values (Table 1). Considering all AVE values' square roots exceeded their interconstruct correlations, discriminant validity was also confirmed (Fornell and Larcker, 1981). Heterotrait–monotrait (HTMT) analysis was also performed and confirmed discriminant validity – all values were lower than the 0.85 threshold (Henseler *et al.*, 2015) (Table 3). A good model fit was confirmed by the results from the confirmatory factor analysis (CFA) (χ^2/df = 1.93; Comparative Fit Index (CFI) = 0.94,Tucker–Lewis index (TLI) = 0.93, Root Mean Square Error of Approximation (RMSEA) = 0.05).

5.3 Control variables

The dependent variables of this study were not influenced by the socio-demographic factors of this study. That is, income, gender, qualification and age were not found to have a confounding effect on attitude towards purchasing free-range egg and WTPPP.

5.4 Structural model

To test the proposed directional hypotheses (i.e. predictions made by the authors' regarding the positive influence of certain variables on other variables, based on literature on the topic) (Salkind, 2010) and to confirm the fit of the overall model, path analysis was performed. Results confirmed a good model fit (χ^2/df = 1.81; CFI = 0.94; TLI = 0.93; RMSEA = 0.04) as threshold values recommended by Hair *et al.* (2010) were met: x^2/df value was below 5; TLI, CF and GFI values were above 0.90 and RMSEA score was below 0.80. The results of the testing of the hypotheses (Table 4) confirm that all seven hypotheses tested were supported: H1 (β = 0.60***), H2 (β = 0.28***), H3 (β = 0.51***), H4 (β = 0.24***), H5 (β = 0.72***), H6 (β = 0.32***) and H7 (β = 0.47***). To examine the confounding effect of the control variables, the model was controlled. No significant influence was found on the dependent variables in the study.

This study's model explains 49% of the variance in attitude towards free-range eggs (R^2 = 0.49) and 42% of the variance in willingness to pay premium price (R^2 = 0.42). These R^2 values suggest that this study's model has a moderate power for prediction (R^2 values of 0.33–0.67) (Chin, 1998 as cited in Henseler *et al.*, 2009, p. 303) of attitude towards free-range eggs and willingness to pay premium price. It is further suggested that this study's results confirm that this model is suitable for the prediction of attitude towards free-range eggs and willingness to pay premium price.

6. Discussion

This study found that all tested stimuli positively influenced consumers' attitude towards purchasing free-range eggs; however, animal welfare had the strongest influence followed by functional value (performance quality). These results imply that while consumers are "value-driven" (as each of the CPV dimensions had a distinct positive effect on consumers' attitude towards purchasing free-range eggs) and are also influenced by source credibility,

	FVQ	PVP	EMV	SCV	AWF	EXP	TRW	ATT	WPPP
FVQ									
PVP	0.61								
EMV	0.22	0.73							
SCV	0.51	0.12	0.61						
AWF	0.23	0.16	0.13	0.22					
EXP	0.21	0.15	0.45	0.35	0.77				
TRW	0.37	0.54	0.52	0.15	0.37	0.36			
ATT	0.67	0.77	0.11	0.63	0.44	0.56	0.25		
WPPP	0.21	0.32	0.21	0.72	0.25	0.42	0.16	0.53	

Table 3. HTMT analysis

Hypothesis	Path	β	Significance	Support
H1	FVQ → ATT	0.60	<0.001	Yes
H2	FVP → ATT	0.28	<0.001	Yes
H3	EMV → ATT	0.51	<0.001	Yes
H4	SCV → ATT	0.24	<0.001	Yes
H5	AWF → ATT	0.72	<0.001	Yes
H6	SCR → ATT	0.32	<0.001	Yes
H7	ATT → WPPP	0.47	<0.001	Yes

Table 4. Hypothesis testing results

consumer free-range egg choice decisions were most heavily influenced by animal welfare conditions and the perceived quality of free-range eggs. These animal welfare results reinforce the findings of other studies which determined the increasing importance and level of consumer concern regarding the intensification of animal production systems (Alonso *et al.*, 2020) and the implications of animal production systems on animal welfare (Fernandes *et al.*, 2019), consumers' growing interest in protection of and improvement in the welfare of farmed animals (Alonso *et al.*, 2020) and that animal welfare conditions of production had the greatest impact on consumers' egg purchasing decisions (Heng *et al.*, 2013). Consumers in effect could hold the key to dramatic improvement in the welfare of millions of farmed animals now and into the future, and also subsequent improvements in legislation to ensure minimum standards of welfare in farmed animal production, through increasingly purchasing welfare friendly products (such as free-range eggs). Furthermore, this study's functional value (performance quality) results could suggest that consumers perceived animal friendly products such as free range eggs as being a more healthier, tastier and hygienic food choice when compared to caged hen eggs; hence, on that basis, consumers' developed positive attitude towards purchasing free-range eggs. This finding is also supported by other research which found that consumers perceived that animal welfare friendly farming conditions could promote positive quality aspects of the food product (Alonso *et al.*, 2020), that the quality of the products was perceived to be higher from production systems with higher levels of animal welfare (Troy and Kerry, 2010), and consumer perceptions that "high food quality is correlated with high levels of animal welfare" (Alonso *et al.*, 2020, p. 5).

This study also confirmed that due to the influence of the tested stimuli, consumers developed a strong positive attitude towards purchasing free-range eggs, and also a willingness to pay a price premium for free-range eggs. These findings could suggest that those consumers perceived free-range eggs were promoted by credible sources; produced under animal welfare friendly conditions; comprised a desirable bundle of attributes such as "better quality, more nutritious, and safer, having better sensory characteristics than caged eggs" (Bray and Ankeny, 2017, abstract) and were 'good value'. Thus, consumers developed a strong positive attitude towards purchasing free-range eggs and willingness to pay a price premium for those products (Lagerkvist and Hess, 2011). This finding could also suggest that while traditionally eggs have been sold as a cheap, healthy source of protein, consumers with a high level of concern for animal welfare were willing to pay a premium price for free-range eggs produced under higher levels of farm animal welfare, and through such premium prices paid could also support ongoing improvements in farm production animal welfare (Alonso *et al.*, 2020). A number of researchers reinforce the positive attitude of consumers towards purchasing animal welfare friendly products, and willingness to pay for those products (Alonso *et al.*, 2020; Clark *et al.*, 2016; Miranda-de la Lama *et al.*, 2017).

7. Implications

7.1 Theoretical implications

This study suggests six important theoretical implications. To begin with, this study is one of the first empirical studies to provide understanding into the factors influencing consumer attitude towards purchasing free-range eggs, and WTPPP for free-range eggs. While consumer attitude towards purchasing products (Ayaviri-Nina *et al.*, 2022) and WTPPP (Miranda-de la Lama *et al.*, 2019; Zhang *et al.*, 2020) are growing significantly in importance as consumer behavioural phenomena, the factors influencing consumer attitude towards purchasing and willingness to pay a price premium, and the constructs themselves, are underexplored in the context of free-range eggs. Thus, this study significantly extends empirical knowledge pertaining to the tested interrelationships and of consumer attitude towards purchasing and WTPPP, and provides a suitable model for prediction of consumers' attitude towards purchasing free-range eggs and WTPPP for free-range eggs.

Second, other research has used the SOR theory to explain factors influencing consumer attitude towards purchasing certain products (Mahmoud *et al.*, 2018) and of the subsequent influence on WTPPP in various contexts (Lagerkvist and Hess, 2011; Michaelidou and Hassan, 2008). However, to the best of our knowledge, this is one of the first studies to use the SOR theory to model and contribute to extant knowledge and understanding of consumer behaviour relating to free-range eggs, and specifically of consumer attitude towards purchasing and WTPPP for free-range eggs, and in the context of a pandemic. We revealed that each of the tested CPV dimensions [i.e. functional value (performance/quality), functional value (price/perceived value), emotional value and social value], and animal welfare and source credibility are positive 'stimuli' of consumer attitude towards purchasing free-range eggs ('organism'), which subsequently promotes consumer WTPPP for free-range eggs ('response').

Third, while a large portion of the published research has examined the influence of the construct CPV on consumer attitude, researchers have suggested the need for empirical investigation of the lesser studied influence of the CPV dimensions on consumer attitude (Ruiz-Molina and Gil-Saura, 2008). This study employed the PERVAL scale [comprising functional value (performance/quality), functional value (price/perceived value) emotional value and social value] to close this gap and provide valuable insight into the significant influence of the CPV dimensions on consumer attitude towards purchasing free-range eggs.

Fourth, limited studies have investigated the effects of animal welfare on consumer attitude and behaviour towards consumption of meat and other products of animal origin (for example, Vanhonacker and Verbeke, 2014). Furthermore, while animal welfare has been identified as one factor (among other factors) that influences consumer attitude towards purchasing of products of animal origin (Verbeke, 2009), this research specifically has established that consumer genuine concern for animal welfare significantly influences their attitude towards purchasing of free-range eggs and in turn, their WTPPP for free-range eggs.

Fifth, while the influence of source credibility on consumer attitude has been extensively examined in studies, this association is deemed critically important in understanding and influencing consumer attitude towards purchasing (Zhang *et al.*, 2018); in the context of free-range eggs, this association is under explored. This study confirms the positive influence of source credibility on consumer attitude towards purchasing free-range eggs and enriches the literature by extending empirical knowledge of this association.

Finally, this is one of few studies (such as Cao *et al.*, 2021; Rondoni *et al.*, 2020; Situmorang *et al.*, 2022) contributing towards the scant knowledge of consumer behaviour pertaining to free-range eggs during a pandemic.

7.2 Practical implications

This study offers four implications for free-range egg farmers, retailers and policymakers. First, by exposing the significant impact of CPV as a stimulus for consumer attitude towards purchasing free range eggs, this study suggests that egg farmers and retailers should focus on the creation and promotion of CPV of free-range eggs. This could be achieved by ensuring commercial free-range egg production and supermarket grocery value chains are operationally efficient and effective, and integrated marketing communications are used to highlight the value benefits to consumers in purchasing free-range eggs. Furthermore, it is suggested that policymakers ensure that relevant legislation is in place to ensure consistent quality and control are maintained throughout value chains.

Second, this study demonstrates the significant influence of animal welfare as a stimulus for consumer attitude towards purchasing free-range eggs. Therefore, as new knowledge in animal welfare and changes in societal views on acceptable treatment of animals occur, ongoing amendment of legislation by policymakers is suggested to aid regulatory agencies and egg farmers to continuously improve animal welfare. Furthermore, in order to promote a

positive consumer attitude towards purchasing free-range eggs, we suggest that egg farmers and retailers continue to educate consumers as to what constitutes 'free-range eggs' and 'animal welfare' (according to the legislation), the modern farming practices adopted and the quality product guaranteed. Our suggestion reinforces the conclusion of Rondoni *et al.* (2020) that customers need to be better informed regarding egg choices.

Third, by revealing that consumers consider source trustworthiness and expertise in determining source credibility and that source credibility potentially enhances consumer attitude towards purchasing free-range eggs, this study suggests that supermarket chain marketers should position the product to build authenticity of their 'free-range egg' labelling and brand. For example, supermarkets can ensure that free-range eggs are only sourced from competent regulatory authority certified egg farmers, and compliant free-range egg product are labelled confirming they have been certified by a competent regulatory authority. In light of supermarket chains confirming to consumers that a competent regulatory authority has certified the product, supermarkets could persuasively promote source trustworthiness and expertise, positively influence consumers attitude towards purchasing the product and induce consumers to use free-range egg product.

Lastly, considering this study has showed that consumer attitude towards purchasing free-range eggs can enhance consumer WTPPP for free-range eggs, supermarket chains should ensure that advertising of these products, marketing information placed on the shelves of the retail stores and product labelling promote the CPV benefits, animal welfare compliance with legislation and source credibility of free-range eggs. Such communication at the point of purchase can clarify to consumers what they could expect to receive when they purchase free-range eggs, develop a positive consumer attitude towards purchasing free-range eggs and contribute to consumer WTPPP.

7.3 Societal implications

First, this study confirmed that consumers hold a genuine concern for hen welfare, value animal welfare extremely highly and have an active interest in the systems and conditions under which hens are grown and eggs produced, when considering purchasing animal welfare friendly products such as free-range eggs. Increasing prioritisation by consumers for purchasing animal welfare friendly products potentially poses wide-ranging societal challenges. Large-scale egg producers argue that intensive caged hen egg production is necessary to produce sufficient eggs at a commercially sustainable price to remain profitable. Thus, changing consumer behaviour could put at risk these producers' very existence. Currently, free-range egg producers operate under the Australian voluntary self-regulation animal welfare and labelling standards – growing demand for free-range eggs could open up the opportunity for misleading and deceptive production and labelling practices to meet such growing demand. Bearing the aforementioned in mind, supermarkets' growing demand for a reliable supply of large-scale, low cost, perfect quality and appearance, 'assured' free-range eggs could be put at risk, as could the legitimacy of their claims of 'free-range eggs'. Second, we also confirmed that consumers are willing to pay a premium price for free-range eggs which meet their animal welfare, perceived value and source credibility expectations. However, the lack of an enforceable Australian free-range egg standard could mean that many eggs labelled 'free-range' are produced under conditions that are significantly inconsistent with voluntary standards and consumer expectations and that consumers could be purchasing eggs claimed to be 'free range' (but are not) at a premium price. Finally, because of the obvious free-range egg production and labelling implications, and the need for consumer protection, government policymakers could be forced to intervene with a new or amended animal welfare and egg regulatory legislative system which is enforceable and provides support for implementation and monitoring. These societal implications suggested to result from this research reinforce some of the implications proposed by Parker and de Costa (2016).

8. Limitations and directions for future research

This study, despite offering insight into consumer WTPPP and consumer behaviour toward free-range eggs, has some limitations. First, this study's findings are drawn from Australian consumers and may not be applicable to consumers from other cultural contexts. In line with the suggestion of Baghi and Gabrielli (2019) to improve generalisability of the findings, future research could consider investigation of consumers from multiple, disparate cultural contexts. Second, various stimuli beyond CPV, animal welfare and source credibility may influence consumer attitude toward purchasing and WTPPP for free-range eggs. Thus, we suggest that future studies consider incorporation of other stimuli such as consumer subjective norms, environmental awareness and social return. Third, this study employed a cross-sectional design for data collection. To enable capture of change in consumer responses and to further explain consumer attitude toward purchasing and WTPPP for free-range eggs, future studies could adopt longitudinal survey designs. Finally, this study adopted a form of non-probability sampling, namely, snowball sampling, using a link to the questionnaire posted on Facebook. Thus, as suggested by Kirchherr and Charles (2018, p. 3), where snowball sampling is the adopted sampling method, "individuals in the population of interest do not have the same probability of being included in the final sample", and "findings from a snowball sample would therefore not be generalisable". Future research could consider use of a probabilistic sampling technique (such as simple random sampling or stratified random sampling) to obtain a statistically representative sample and enable the researchers to generalise findings to the population studied (Palys and Atchison, 2014).

9. Conclusion

This study adopted the SOR theory to build a model for providing understanding of the factors which influenced consumers' attitude towards purchasing free-range eggs and ultimately their willingness to pay a price premium for free-range eggs. Data were collected from Australian respondents ($N = 392$) regarding CPV dimensions, animal welfare and source credibility (stimuli), which influenced consumers' attitude towards purchasing free-range eggs (organism) and the resultant willingness to pay a price premium for free-range eggs (response). We concluded that all the tested stimuli positively influenced consumers' attitude towards purchasing free-range eggs (with animal welfare and performance quality the strongest stimuli) and that consumers were willing to pay a price premium for free-range eggs. Furthermore, this study confirmed that the SOR theory was an adequate framework to investigate and develop a model suitable for prediction of consumer attitude towards purchasing free-range eggs and WTPPP.

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