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SINGH, Pallavi, SAHADEV, Sunil, WEI, Ms Xinya and HENNINGER, Claudia E.

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Sahadev Sunil (Orcid ID: 0000-0001-9648-8079)
Henninger Claudia E (Orcid ID: 0000-0002-9978-5340)

MODELLING THE ANTECEDENTS OF CONSUMERS' WILLINGNESS TO PAY FOR ECO-LABELLED FOOD PRODUCTS

Dr Pallavi Singh, Prof Sunil Sahadev, Ms Xinya Wei and Dr Claudia E Henninger

Dr Pallavi Singh (P.Singh@shu.ac.uk), Sheffield Business School, Sheffield Hallam University, 7241 Stoddart Building, Howard Street, Sheffield, S1 1WB, 0114 225 6455

Dr Pallavi Singh is a Senior Lecturer in Marketing at Sheffield Hallam University. Her research interest includes environmental education in schools, sustainable consumption in families, consumer food waste, socialization theory and child influence in family decision making. Her work has been published in leading marketing journals such as Journal of World Business, Journal of Business Research, Technology Forecasting and Social change, International Journal of Market Research, Journal of Marketing Communication etc.

Professor Sunil Sahadev (S.Sahadev@brighton.ac.uk), University of Brighton, Elm House, Brighton, BN24AT.

Prof. Sunil Sahadev is a Professor of Marketing and Responsible Enterprise at University of Brighton. His areas of research interest include sustainability and responsible enterprises, managing boundary spanning elements, international management and digital business. He has published research articles in reputed journals like the Journal of World Business, British Journal of Management, Journal of Business Research, European Journal of Marketing etc.

Ms Xinya Wei (122522719@qq.com), Management School, University of Sheffield, Conduit Road, Sheffield, S10 3FL

Ms Xinya Wei completed her Masters in Marketing Management Practice at the University of Sheffield. Her dissertation entitled "The study of determinants of environmental concern, cognitive psychology, risk perception and socio-demographics that influence Chinese consumers' willingness to pay for eco-labelled products" formed the basis of this paper. Since completing her Masters, Xinya has returned to China and is successfully working as a practitioner.

Dr Claudia E Henninger (Claudia.Henninger@manchester.ac.uk), School of Materials, university of Manchester Sackville Street Building, Oxford Road, Manchester, M13 9PL, 0161 306 3901

Dr Claudia E Henninger is a Reader in Fashion Marketing Management, with a research interest in sustainability, the circular economy, and more specifically collaborative consumption, in the context of the fashion industry. Claudia is further the Chair of the Academy of Marketing's SIG Sustainability and an Executive Member of the Sustainable Fashion Consumption Network.

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Modelling the antecedents of consumers' willingness-to-pay for eco-labelled food products

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Abstract

The purpose of this paper is to model the antecedents of consumers' willingness-to-pay for eco-labelled food products. This research utilises the Theory of Planned Behaviour (TPB) to model the impact of consumers' awareness of eco-labels, environmental concerns, beliefs in the environmental ability of eco-labels, and presence of children on their willingness to pay for eco-labelled food products. This study uses Structural Equational Modelling (SEM) and PROCESS macros, to test the moderated mediation model on a sample of 333 online responses. Findings suggest the impact of consumers' environmental concerns and eco-label awareness on their willingness-to-pay for eco-labelled food products is partially mediated by consumers' belief in the environmental ability of these eco-labels. The relationship is further moderated by the presence of children living in the household. This study establishes the value of consumers' beliefs in the environmental ability of eco-labels and implies that communication strategies need to be carefully refined to provide consumers with more information about eco-labels and to emphasise the environmental ability of eco-labels utilised within the food industry as this can have an impact on their willingness to pay for these products especially for consumers, who have children in the same household.

Keywords: eco-labels, Chinese food industry, willingness-to-pay, environmental ability, environmental concern, children

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1. Introduction

The environmental impacts associated with food production and consumption raise concerns among consumers (Sala et al., 2017). Consequently, consumers are increasingly considering environmental issues during their purchase decision-making process (Darnall et al., 2018). Companies are responding by providing heightening levels of information on their sustainable practices through the use of eco-labels and/or self-regulated management systems (Gam et al., 2010; Borin et al., 2011; Lin et al., 2015). Eco-labels operate as an informational cue regarding a product's environmental characteristics, which can reduce the information asymmetry between producers and consumers by visually informing consumers about the sustainable features of products. Eco-labels can therefore transform credence into quasi-search attributes (Perrini et al., 2010) so as to facilitate conscious decision-making, which in turn stimulates demand for pro-environmental products (Thøgersen et al., 2010; Eldesouky et al., 2020; Potter et al., 2021). Eco-labels can thus indirectly help to reduce the adverse environmental impact of consumption and improve environmental quality (Lusk et al., 2007), whilst also change actual behaviour through influencing consumers' awareness and attitudes (Grolleau & Caswell, 2006).

Despite their growing importance and use worldwide, it is estimated that only about 20 percent of consumers, who reported to be environmentally conscious, actually purchase eco-labelled products (Eurobarometer, 2014). Even though demand for eco-labels on food has increased their use is still low, fragmented, and differential (Grunert et al., 2014). The less-than-optimal uptake of eco-labels is attributed to a host of reasons. To explain, the number of alternative eco-labelling schemes has steadily increased (Czarnezki et al., 2014). In fact, it is estimated that currently about 147 food eco-label schemes exist globally (Eco-label Index, 2022). Interestingly, despite having so many eco-labels, consumer awareness of these remains low (Grunert et al., 2014; Taufique et al., 2019). This is a crucial factor as awareness of eco-labels is the pre-requisite of their use in consumers' decision-making (Thøgersen et al., 2010).

However, general awareness of eco-labels is not quite adequate to drive eco-label uptake, instead past research has shown that specific awareness, which includes the ability to recognise and recall labels and understanding their benefits (Thøgersen, 2000; Henninger, 2015; Taufique et al., 2019) is crucial for consumers to adopt them. In terms of food eco-labels, while they do follow specific regulations and serve specific purposes, they often share common

characteristics and communicate complex multifaced information (Chen et al., 2022). For example, organic, local, and green food labels all signify pro-environmental practices in the production process, which is a shared overarching characteristic, however local food also showcase carbon miles, whilst organic food labels certify no use of chemicals or genetic techniques in farming, and green food labels signify no use of toxic and environment pollutants during the production process (Moruzzo et al., 2020; Eco-label Index, 2022). The complex information is hard to process easily by the consumers who are using eco-labels as clues and signals of trust to reduce the information search and information processing time while making purchase decision.

Thus, overlapping characteristics and a lack of clarity and multiplicity of information may cause ambiguity and misunderstanding among consumers about what eco-labels' signal and what their benefits are (Hu et al., 2012; Syrengelas et al., 2018) and thus, lead to ineffective and inefficient use by consumers (Chen et al., 2022). This could imply that consumers may single out one characteristic or benefit they associate with eco-labels in general when making a purchase decision, rather than reflecting on all and/or specific characteristics of individual labels. This is evidenced in extant research on the use of eco-labels in food product consumption where perceptions of eco-labels signifying 'health' and 'safety' are preferred, whilst 'environmental benefits' rank lower in consumers' priority when choosing eco-labelled food products (Grunert et al., 2014; Donato & D'Aniello, 2021). This is surprising as environmental concerns among consumer are increasing, with consumers being concerned about the impact their consumption practices have, the use of environmental benefits as a motivator to use eco-labels in food products remain low in comparison to others.

Further, food consumption in itself involves complex decisions, where the notion of health and wellbeing of consumers are integrated when making purchase choices (Faupel et al., 2014). The decision-making process becomes even more complex for individuals who live together with one or more members, where choices of others in the family and concerns for their wellbeing, influence food choices (Riefer & Hamm, 2011). Even though eco-labels as signalling cues are designed to support consumers in their decision-making process, extant research on the use of food eco-labels has predominantly considered consumers as individuals and thus, there is a lack of research that focuses on family setting, which can have an impact on the complexity of the decision process. For example, children are important influencers on food consumption decisions. They directly influence decisions by either stating their choices

directly or indirectly and thus, their presence motivates parents to make careful choices (Hjelmar, 2011). Extant research on food eco-labels only seldomly discusses the presence of children as drivers for choosing eco-labelled food products (Liu et al., 2022). Moreover, extant research seems to be dominated by organic food labels which are associated with health and safety benefit as their dominant signal (Hjelmar, 2011; Riefer & Hamm, 2011; Van Doorn & Verhoef, 2011; Kriwy & Mecking, 2012). However, the presence of children as an influence for considering environmental benefits of food eco-labels lacks research, even though conserving the environment for future generations is considered an important motive for pro-environmental behaviour in families (Barreto et al., 2014).

In the light of the discussion above, this study aims to explore, with rising environmental concerns among consumers

1. what role environmental concerns and specific knowledge of eco-labels play in consumers' willingness to pay for eco-labelled food products;
2. whether consumers acknowledge environmental benefits of eco-labels in food products;
3. whether they trust them enough to pay for eco-labelled products; and
4. what role the presence of children has on the decision-making process.

This research was undertaken in China because following the worldwide growing importance of eco-labels and increasing environmental concern of their own consumers, the Chinese market has seen an increase in eco-labels and standards that marks products as *safe*, *organic*, *healthier,* and *pro-environmental options* (Sirieix et al., 2013; CBBC, 2015). Green food initiatives in China date back to the 1990s, eco-labels such as the Chinese Environmental Protection Label (CEL) were introduced to allow consumers to identify environmentally friendly and safe options (Paull, 2008; ITC, 2016a). Scandals faced by the Chinese food industry further led to revisions of the Food Safety Law in 2015 (Balzano, 2015; CBCNews, 2015), therefore enhancing and strengthening the use of eco-labels on food products. Despite increased prevalence of eco-labels in food products, Chinese consumers show scepticism and lack of trust in eco-label claims (Moruzzo et al., 2020; Wang et al., 2020), which in turn affects their use of eco-labels as reliable sources of information. Extant research also shows that Chinese consumers' knowledge and awareness of eco-labels is generally low (Liu et al., 2013; Moruzzo et al., 2020). Despite seeking labels as important sources of information for food

quality and safety, Chinese consumers show limited ability to recognise and identify eco-labels (Wang et al., 2020).

Extant research into eco-labels on food products in China has predominantly focused on 'safety', 'health', and 'quality' benefits (Wang & Wei, 2006; Luo, 2010; Wu et al., 2011; Grunet et al., 2015; Zhang et al., 2018; Moruzzo et al, 2020; Riccioli et al., 2020; Wang et al., 2020). Although eco-labels on food products in China are intended to showcase the absence of harmful or undeclared biological, chemical, or physical contamination and certify environmentally friendly production processes and food quality, these labels are predominantly associated with aspects surrounding 'safety' and 'healthy' (Rupprecht et al., 2020). Whereas environmental benefits and messages related to environmentally friendly processes communicated by eco-labels are underrepresented in the extant research. Latest research by Liu et al. (2022) further outlines that despite Chinese parents being very protective of their children, there is very limited research which explores the role of the presence of children on choice of eco-labelled food product.

To examine the research aims, this study focuses on four dominant eco-labels in the Chinese food industry i.e. the CEL, the Chinese National Organic Product Certification, the No Harm Agriculture Food Label, and the Safety Quality label (Shen, 2012; ICT, 2016b; Moruzzo et al., 2020) and subsets influencing the consumer decision-making process. This research uses the Theory of Planned Behaviour (TPB) to explore the impact of Chinese consumers' *'environmental concern'* and *'awareness of eco-labels'* on their *'willingness to pay'* for eco-labelled food products when they are aware of these specific eco-labels, whilst further examining the mediating effect of the '*belief in the environmental ability of the eco-label*' and the moderating effect of the '*presence of children in a family'*, that may affect eco-labelled food product consumption.

The paper is structured as follows. Section 2 presents literature discussing the use of the TPB and the hypothesis development. In section 3, methods and data collection processes are discussed. Section 4 presents the results of the measurement model and hypothesis tests. Section 5 presents the discussion of the results with theoretical contributions. The Section 6 outlines practical contributions, limitations, and areas of future research and finally a conclusion is presented in section 7.

2. Literature Review

2.1 Theoretical underpinning -The Theory of Planned Behaviour (TPB)

The TPB is motivational rather than volitional and considers how intentions are transformed into actual behaviour (Ajzen & Fishbein, 1980; Bertrandias & Elgaaied-Gambier, 2014; Schuitema & de Groot, 2014; Nuttavuthisit & Thøgersen, 2017). It links beliefs and behaviour, by centring on personal attitudes towards intension and behaviour, perceived social pressure, and whether this behaviour can be easily executed (Ajzen & Fishbein, 1980; Cholette et al., 2013; Bertrandias & Elgaaied-Gambier, 2014; Schuitema & de Groot, 2014; Nuttavuthisit & Thøgersen, 2017). The TBP is widely applied to successfully understand and predict pro-environmental behaviour of individuals for example in the context of recycling, saving water, energy conservation (cf. Yuriev et al., 2020). The TPB has further been widely used in exploring the impact of eco-labels on individuals' purchase intensions and behaviour of food products (Taufique et al., 2017; Qi & Ploeger, 2019; Lee at al., 2020; Wang et al., 2020; Ates, 2021; Tian et al., 2021). Along with its predictive ability, the TBP is also known for its flexible structure. In the field of pro-environmental behaviour, to enhance its explanatory power and predictive ability in a specific context, authors extended the theory by introducing additional variables, such as environmental concern, environmental knowledge, and moral norms, along with the original three predictors of attitude, subjective norm, and perceived behavioural control (Yadav & Pathak, 2016; Dangelico et al., 2020; Siraj et al., 2022). Its flexible structure has further been applied with different variables, where new variables like environmental knowledge, eco-label knowledge, environmental concern, trust, norms, etc have been used along with few but not all the original predictors (Taufique et al., 2017; Dangelico et al., 2021; Tian et al., 2021). Although the TPB has previously been criticised for only being able to explore one behaviour at a time and thus, overlook the complexity of the issue in the pro-environmental domain (e.g. Armitage & Conner, 2001; Thorbjørnsen et al., 2007; Yuriev et al., 2020), the predictive ability, flexible nature, and applicability in developing economies like China (Qi & Ploeger, 2019; Wang et al., 2020) makes it suitable for the purpose of this research. This is further supported by Sharma (2021) in his review on consumer's purchase behaviour and green marketing. Extending the applicability of the TBP on pro-environmental behaviour research with a flexible model, in this study environmental concern, along with the awareness of eco-labels are proposed to influence consumers' willingness to pay for eco-labelled food products. We also introduce consumers' belief in the environmental ability of eco-labels as a mediator and the presence of children in families as a moderator. Environmental concern is

defined as general attitude related to 'environmental protection' (Bamberg, 2003; Momberg et al., 2012), awareness of eco-labels is defined as the ability to recognise and recall these eco-label (Taufique et al., 2019), and the belief in the environmental ability is conceptualised as consumers' trust/belief in the claim of environmental benefits that eco-labels provide. The discussion on contextualisation of these constructs and development of hypothesis is presented in following sections.

2.2 Hypothesis development

2.2.1 Environmental concern, awareness of eco-labels and willingness-to-pay

Environmental concern is viewed as a general attitude that relates to consumers' cognitive and affective evaluations of the attitude object 'environmental protection' (Bamberg, 2003; Momberg et al., 2012). It reflects the extent to which consumers are aware of problems regarding the environment, worries about threats to the environment, the consequences of such threats for the environment, and the lack of human action to protect the environment for future generations (Dunlap & Jones, 2002; Shen, 2012). Extant research shows that environmentally concerned consumers try to adapt their buying behaviour, seek products which have a lesser impact on the environment, and are willing to pay for such products (Cerri et al., 2018; Testa et al., 2020; de Canio et al., 2021; Sadiq et al., 2021). Eco-labels are important informational cues, which provide information on environmental impacts of products; therefore, they act as important sources of information for environmentally concerned consumers during their purchase decision-making process and additionally provides level of assurance (Testa et al., 2015, 2020; Lee et al., 2020). Therefore, we hypothesise:

H1: *Consumers with higher environmental concern are willing to pay more for eco-labelled food products.*

Environmental awareness has been considered as a significant predictor of green purchasing behaviour (Thøgersen, 2000; Haron, et al., 2005; Sharma, 2021). However contrary to general environmental knowledge, consumers' specific knowledge about the product itself being produced in an environmentally friendly way enhances the ability of a person in pursuing green purchase behaviour (Testa et al., 2015). Lee et al. (2020) suggest that higher consumer knowledge leads to higher willingness-to-pay. Eco-labels are a method of communicating pro-environmental information regarding the product to consumers. A prerequisite of using eco-labels in the consumer decision-making process is awareness and understanding of them

(Schuitema & de Groot, 2014; Lee et al, 2020; Siraj et al., 2022). In the context of China, research (CBCNews, 2015; Lin et al., 2015, Qi & Ploeger, 2019; Wang et al., 2020) indicates that Chinese consumers' general environmental knowledge has increased as a result of food scandals, thus, they are more aware of and concerned with environmental issues related to the food industry. Additionally, since the Food Safety Law revision, eco-labels in China are a widespread phenomenon, which makes it easier to assume that awareness of eco-labels is also increased (Zhang et al., 2018). On this basis, high awareness of specific eco-labels therefore creates consumer specific knowledge (Lee et al., 2020; Testa et al., 2020) probably leading them to be willing to pay more. Therefore, we hypothesise:

H2: *Consumers who are aware of eco-labels are willing to pay more for eco-labelled food products.*

2.2.2 Belief in environmental ability of eco-labels and willingness to pay

Trust is vital within the consumer decision-making process, which has led to the emergences of third party and public authority eco-labelling schemes (Horne, 2009; Topolansky Barbe et al., 2013; Bertrandias & Elgaaied-Gambier, 2014; Nuttavuthisit and Thøgersen, 2017). Eco-labelling as a leading promotional tool has been established as a key communicator of pro-environmental attributes of products (Brecard, 2014). For an eco-label to be effective in promoting the said pro-environmental attributes, consumers need to trust its information (Thøgersen, 2000; Grunert, 2011). Such trust has been defined as an individual's expectation that another person, product, or organisation will keep promises and fulfil obligations (Perrini et al., 2010). It is the 'perceived credibility and benevolence of the target of trust' (Doney & Cannon, 1997), therefore incorporates reliability in terms of promises made and benevolence of the other party's interests (Gorton et al., 2021). Applying this definition of trust to eco-labels will mean that consumers need to trust/believe in the promises i.e. claims surrounding environmental attributes communicated by the said label. The impact of trust on consumer decision-making or pro-environmental products is well established (Testa et al., 2015; Sharma, 2021) and research also states that trust plays an important role in the use of eco-labels for food purchase by consumers (Taufique et al., 2017; Gorton et al., 2021; Siraj et al., 2022). However extant research has measured 'trust' in general terms i.e. by capturing whether consumers trust eco-labels (Taufique et al., 2017) and not what information consumers trust. Further, consumers' trust in the institution providing the label also influences their trust where trust in

the institution can transfer onto the certification i.e. labels being offered (Gorton et al., 2021) which also does not always mean that the consumers understand and believe in the claims/information provided through eco-labels. Overall, past experience of consumers can also influence their trust in the eco-labels (Taufique et al., 2017; Gorton et al., 2021) for example, in the case of food scandals, Chinese consumers showed scepticism towards claims made by certification labels (Zhang et al., 2018; Moruzzo et al., 2021). That is why in this research we measured trust by measuring consumers' belief in environmental ability of eco-labels, which captures whether consumers trust the environmental claims (promises) made by them. Consumers need to be convinced by eco-labels' 'integrity' and 'ability' (Smith & Barclay, 1997; Horne, 2009; Topolansky Barbe et al., 2013) to be able to incorporate them in their decision-making.

Authors (Horne, 2009; Zepeda et al., 2013; Donato & D'Aniello, 2021) state that consumers utilise eco-labels if these enable them to achieve their ultimate goal (e.g. environmental benefits). Consumers concerned with credence attributes (environmental claims) may actively seek eco-labelled products (Testa et al., 2015), as these are symbolic signifiers (Henninger, 2015; Lin et al., 2015). However, believing in the claims of eco-labels is what provides them with assurance about the credibility of the claims made, which allows consumers to make a conscious decision to pay more for eco-labelled products. Therefore, we hypothesise

H3: *Consumers levels of belief in the environmental ability of the eco-label positively impact their willingness to pay more for eco-labelled food products.*

2.2.3 Mediating role of Belief in environmental ability of eco-labels

Consumers with a positive attitude towards environmental conservation generally have high levels of environmental concern, which means they have a heightened extrinsic sensitivity towards environmental issue and are willing to take action to protect the environment, which may include consuming products and willingness-to-pay more for products that have less impact on the environment (Zimmer et al., 1994; Testa et al., 2020). To ensure the identified intension and behaviour i.e. willingness-to-pay for eco-labelled products, environmentally concerned consumers are more likely to undertake intentional learning strategies to make informed decision (Newton et al., 2015). Therefore, they seek additional information and make conscious decisions to understand the environmental claims made by eco-labels (Testa et al., 2020). Fukuyana (1996) states that trust elicits both cognitive and affective responses in

individuals. When trust is present, individuals tend to conserve cognitive energy in their decision-making processes (Kahneman & Frederick, 2002; Doherty et al., 2013) by passively assessing information, which means that an individual does not engage in rigorous evaluation, but relies on cognitive shortcuts (Tost, 2011). In terms of the use of eco-labels, these labels work as shortcuts. Through eco-labels, companies send clear and effective signals to consumers regarding their performance (companies') to ensure environmental sustainability (Testa et al., 2015). Awareness of eco-labels acts a pre-condition of individuals' cognitive processes to seek more information. However, with multiple eco-labels in the market, consumers can be confused and thus, this can limit their effectiveness (eco-labels) in encouraging required behaviour (Testa et al., 2015). Belief in eco-label claims offers high credence value to consumers to be evaluated by them and therefore make decisions to use them (Donato & D'Aniello, 2021) i.e willingness-to-pay more. Therefore, belief in environmental ability of eco-labels is a mediating condition for an environmentally concerned consumer, who is aware of eco-labels and thus, willing to pay for eco-labelled food products. Therefore, we hypothesise.

H4: *The impact of environmental concern of consumers on their willingness to pay for eco-labelled food products is mediated by their belief in the environmental abilities of the eco-label.*

H5: *The impact of consumer's awareness of eco-labels on their willingness to pay for eco-labelled food products is mediated by their belief in the environmental abilities of the eco-label.*

2.2.4 Moderating role of the presence of children in families

Socio-demographic characteristics can further influence whether consumers are willing to pay a premium price for eco-labelled food (Shen, 2012). Extant research (Chen & Lobo, 2012; Shen, 2012) on Chinese eco-label consumption investigates the impact of age, income, education level, and geographic location on consumers' intentions to purchase eco-labelled products with only a few considering the presence of children as an important factor (Rupprecht et al., 2020). Having children influences a family's food consumption decision, where children become the direct and indirect influencer for food choices for the entire family (Hjelmar, 2011). Further, Carey et al. (2008) and Gam et al. (2010) found that the *inheritance factor* in families could influence the decision-making process, which implies that parents make more ethical choices if children are present. This also holds true within the food context, where the presence of children impacts on the purchasing decision – if children are present organic food

consumption increases mainly because of health and safety reasons, but also considering protecting the environment for future generations (Hjelmar, 2011; Van Doorn & Verhoef, 2011; Kriwy & Mecking, 2012). Chinese consumers care for their families and are concerned with food safety, health, and environmental benefits (Chen & Lobo, 2012; Zhang et al., 2018). Food is not only seen as a means to reward children, but also one aspect consumers feel they can take control over in regard to making a conscious choice to acting environmentally responsible (Ma, 2015). Consumers try to use key information i.e. price, brand, or quality label, which are especially relevant and ease the decision-making process (Kroeber-Riel et al., 2009). Eco-labels provide consumers a shortcut to seek required information about environmental benefits of food products. As parents, consumers tend to make more conscious choices, due to their parental responsibilities (Barreto et al., 2014) and care for their children and the future of their children (Liu et al., 2022). Consumers further dwell into ensuring the authenticity of the information these eco-labels provide at the point of decision. Thus, their perception of their trust in the information provided by eco-labels gives them the required security and assurance to make their decision (Hjelmar, 2011; Sonderskov & Daugbjerg, 2011; Rupprecht et al.,2020). Therefore, we hypothesise:

H6: *The presence of children moderates the relationship between belief in the environmental ability of eco-labels and willingness-to-pay for eco-labelled food products, such that the effect is stronger for consumers' who have children living them.*

The conceptual model that incorporates the hypotheses is shown in Figure1.

Insert Fig. 1

3. Methods

This study applied a survey based quantitative research approach. To ensure content validity, the survey measures used in this research were adapted from existing literature, except for the construct to measure awareness of eco-labels. Following extant research (Rahbar &Wahid, 2011; Shen, 2012) to measure the level of awareness of eco-labels, a new scale was created where images of the four most popular eco-labels in the food industry in China were shown to respondents. These eco-labels were: (i) Chinese Environmental Protection Label (ii) Chinese Organic Product Certification (iii) No Harm Agriculture Food Label and (iv) Safety Quality Label. The respondents were asked to choose the name of the shown eco-label from a given list, to measure aided recall. They were then asked, using a five-point Likert scale, the extent

to which they were aware of these labels. The belief in the environmental abilities of these eco-labels were measured by asking respondents to what extent they believe purchasing products with these eco-labels were good for the environment (Rahbar & Wahid, 2011; Shen, 2012). Environmental concern was measured using a seven-item scale based on the measures developed by Shen & Saijo (2009). Individual items were slightly modified to reflect current environmental concerns and problems in China. The willingness-to-pay construct was measured through items adopted from Mohamed et al. (2014). The construct was measured using two items that indicated respondents' agreement on their willingness-to-pay more for eco-labelled products using a five-point scale. The presence of children in a family was measured using a dichotomous scale, where respondents were asked if they have children under the age of 18 years living with them through a yes or no scale.

Though social desirability bias is a possible problem while using itemised scales for measuring such constructs, the impact is not considered to be significant as we had assured complete anonymity for the respondents. Previous studies have shown that anonymous surveys can significantly reduce social desirability bias (e.g., Randall & Fernandes, 1991; King & Bruner, 2000). The items used in the measurement model are presented in the appendix.

3.1 Data sample, analysis, and results

To ensure participants have a clear understanding and appropriate interpretation of the questions and terminologies used in the questionnaire, a pilot study was conducted using Chinese overseas students in Sheffield, UK. The purpose of the pilot study was to check the language of the questions, its understandability by respondents, and the time taken to complete. As a result of the pilot study, some of the questions were reworded to make it more user friendly for respondents. The co-authors on this paper are proficient in both Mandarin and English, they carefully translated the modified questionnaire from English into Mandarin and back, to ensure that the key meaning of the questionnaire remained the same and reliable.

Data was collected from Shanghai, using a web-based survey, distributed through a popular Chinese online survey (SOJUMP). Shanghai was selected because of its economic status and urban population. Using a convenience sampling method, the survey was shared on WeChat a key social media platform, using peer group contacts. The participants targeted were adults who had financial independence and made their food consumption choices for themselves and their families. To access suitable participants, a screening question on awareness about eco-

label was used. Informed consent was acquired prior to participants completing the survey. WeChat being a popular social media platform in China facilitated quick and wide access to the target population however the response rate was not as good as expected. A total of 336 responses were obtained, of which 333 responses were valid and included in this research (excluding pilot). Out of the total valid responses, 54.7% were female and 45.3% were male, showcasing that the gender distribution is in line with other studies in consumer research on China and reflects that women are still predominantly responsible for food shopping in China (Qi & Ploeger, 2019). The average age range of the sample was 30 years, with 55.4% of respondents indicating that they had children under the age of 18 living with them. A total of 68.4% had a university education, showing data to be representing people with a higher education level and declared average monthly household income of up to 6000 RMB.

Insert Table 1

3.2 Common method bias

Common method bias can occur when both the independent and dependent variables are measured within one survey, using the same response technique (Kock et al., 2021). This may impact the reliability of items and the validity of the results (MacKenzie & Podsakoff, 2012), and it may affect the parameter estimates of the hypothesised relationships among the constructs, causing deflated or inflated results of relationships and leading to type 1 or type 2 errors. Therefore, it is important to check for common method bias and ensure procedural and statistical control (Kock et al., 2021).

To check for common methods bias, Harman's single factor test was used. The results indicate that one factor explained only 23.6 percent of the variance, which proves that there is no influence of common method bias in the sample. Additionally, the method adopted by Williams et al. (2003) was followed to determine the extent of common method bias by including a common method bias factor into the model. All remaining factors were transformed into several single-item constructs, and a ratio of R^2 with a common method bias factor to R^2 without a common method bias factor was compared. The ratio was 1:361, indicating that there was no influence of common method bias.

4. Results

4.1 Measurement Model

The measurement model was evaluated using Partial Least Square Structural Equation Modelling (PLS-SEM) due to its advantages in working with a small sample size in respect to population, distributional assumptions, and soft modelling assumptions (Hair et al., 2019). The sample size was determined using a power table (Hair et al., 2014). As per the table, the required numbers of observations for the model with 2 independent variable (as in this study, See fig 1) is 52 to achieve a statistical power of 80% for detecting R^2 values of at least 0.25 (with a 5% probability of error) (Hair et al., 2014). The sample size for this study was 333 which exceeds the required number, and therefore meets the minimum requirement.

SMARTPLS (3.2) was used to assess the suitability of the measurement model. Internal consistency reliability was established by using composite reliability and Cronbach's alpha (Hair et al., 2014) - the scores were above 0.70 (Table 2). The convergent validity was assessed through item loadings (>0.7) and the average variance extracted (AVE) (>0.5), which suggests a good convergent validity (ibid). (Appendix 1: items and standardised loadings are listed)

Insert Table 2

The discriminant validity was tested through a matrix of cross-loadings, which found no violation (Table 3 a). Additionally, the Fornell-Larcker (1981) criteria (Table 3 b) was also used to assess discriminant validity. In Table 3b the diagonal elements are the square root of the AVE and the non-diagonal elements are inter-constructed correlations. Each construct shares more variance with its own measurement items than with others, thus, establishing discriminant validly of the measurement model. The heterotrait-monotrait ratio of correlations (HTMT) approach to assess discriminant validity was also used. All HTMT ratios were below the 0.85 limit for all the constructs. All upper bootstrapping confidence intervals were below one, therefore providing evidence of discriminant validity (Henseler et al., 2015).

Insert Table 3 a and 3b

4.2 Moderated mediation model

The moderated mediation hypotheses shown in fig.1 were tested using PROCESS Macro (Hayes & Preacher, 2014). PROCESS Macro was chosen for its capacity to estimate mediation and moderation effects and its effectiveness in testing a model's predictive validity (Rialti et al., 2019). It is also well established as a data analysis tool in extant research applying the TPB into consumer studies (e.g., Robinot et al., 2017; Gregorio-Pascuala & Mahler, 2020; Tian et al., 2021). For this study, model 14 of the PROCESS Macro template was used, as it facilitates the analysis of a moderated mediation model.

A two-stage analysis was conducted as the PROCESS Macro allows for only one independent variable at a time to be tested. Stage 1 used environmental concern as the independent variable and Stage 2 used eco-label awareness as the independent variable. Belief in the environmental ability of eco-labels was considered as the mediating variable and the presence of children in the family was the moderating construct.

Insert Table 4

Insert Table 5

Tables 4 and 5 present the results of the moderated mediation model with environmental concern as the independent variable. Table 4 demonstrates that both the interaction term (β=0.26; $p<0.00$) and the direct effect are significant (β=0.40; $p<0.00$) with a R^2 value of .31 ($p<0.00$). This implies that presence of children in the family moderates the indirect relationship between environmental concern on willingness-to-pay through the belief in the environmental ability of eco-labels. This interpretation is supported by the results from Table 5, which show the conditional effect of the moderation term for two different levels of the presence of children. Here the value 0 implies no child and the value 1 implies the presence of a child in the family. Though the indirect conditional effect for both values are significant, the significant value for the index of moderated mediation (Index=0.20 with SE=0.10, LLCI & ULCI=0.01 & 0.38) shows that the moderation effects are significantly different for the two different values of the presence of child in the family. Since the effect value for families with a child (β=0.40) is higher than for families without a child (β=0.20) we can conclude that the mediating effect is stronger for families with children compared to families without children.

Hence, taken together, the results suggest a partial mediation effect of the belief in eco-labels in the relationship between environmental concern and willingness-to-pay, thus supporting H1, H3, H4 and H6.

Further, the mediation effect of the belief in environmental ability of eco-labels on the relationship between awareness of eco-labels on willingness-to-pay a premium for eco-labels, was tested using PROCESS Macro model 14.

Insert Table 6

Insert Table 7

Tables 6 and 7 show the impact of awareness of eco-labels on the belief in environmental abilities of eco-labels and on the willingness-to-pay for eco-labels. Table 7 highlights the significance of the direct and indirect effect of awareness of eco-labels on willingness-to-pay, which supports H2. H5 is supported as the regression coefficient is significant (β=0.2747; $p<0.00$) and R^2 value of 0.16000 ($p<0.00$) (Table 5). Moreover Table 7 demonstrates that both the direct and the indirect effect of eco-label awareness on willingness-to-pay for eco-labels are significant, therefore, the belief in the environmental abilities of eco-labels *partially* mediates the relationship between eco-label awareness and willingness-to-pay for eco-labels, which further supports H5.

Thus, Tables 4 to 7 show that direct and mediating hypotheses H1 to H6 are supported. The moderating role of the 'presence of children in families' is also supported.

4.3 Effect of control variables

The effect of age, gender, education level, and income level were conceptualised as control variables to test their impact on the moderated mediation model. SMARTPLS 3.2 was used to check the effect of control variables. Each of the above mentioned variables were included in the hypothesises model as individual latent variables to test their effect on the two endogenous variable s, i.e. the belief in the environmental ability of eco-labels and willingness-to-pay. The results showed that gender had a significant effect on the belief in environmental ability of eco-labels. Income showed a significant effect on both the belief in environmental ability of eco-labels and the willingness-to-pay. However, none of the control variables showed any significant effect on sign or significance of path coefficient and R^2 value in the main model. Therefore, it can be inferred that the control variables did not have any impact.

4.4 Predictive ability of the moderated mediation model

The out of sample predictive ability of the moderated mediation model was assessed using the PLS-Predict procedure in SMARTPLS 3.2 (Hair et al., 2019; Shmueli et al., 2019). As presented in Table 8, $Q^2_{predict}$ values were positive for all indicators of both the endogenous constructs i.e. the belief in environmental ability of eco-labels and willingness-to-pay. Since the error distribution of indicators of both the endogenous constructs was not symmetrical, the MAE value was used to assess the predictive capability of the constructs (Shmueli et al., 2019). Results showed that for all indicators of both the endogenous constructs (i.e. the belief in environmental ability of eco-labels and the willingness-to-pay) the MAE for the PLS-SEM model was smaller than that of the LM benchmark. Therefore, it can be concluded that the model has a strong external (out of sample) predictive capability (Shmueli et al., 2019; Hair et al., 2021).

Insert Table 8

Table 9 presents a summary of the hypothesis with results of moderated mediation model.

Insert Table 9

5. Discussion and theoretical implications

While eco-label prevalence has increased significantly in China, the level of awareness and recall of eco-labels among Chinese consumers is still underdeveloped (Liu et al., 2013; Moruzzo et al., 2020; Wang et al., 2020). While Chinese consumers are now exposed to several eco-labels this may also cause confusions among consumers, which hinders the effective use of eco-labels as information tools. Additionally, eco-labels incorporate more than one type of information, e.g. environmental aspects and safety, which can create signalling confusion among consumers and thus, consumers may perceive one benefit higher over the other. Further, food scandals in the past have affected consumers' trust in eco-labels and increase scepticism towards the information eco-labels provide. Accounting for these situations, we used the Theory of Planned Behaviour to explore the impact of Chinese consumers' *'environmental concern'* and *'awareness of eco-labels'* on their *'willingness-to-pay'* for eco-labelled food products when they are aware of the eco-labels in question and can recall them. While at the

same time exploring the role of consumers' belief in the environmental ability of eco-labels and the presence of children in the equation.

Our findings indicate that Chinese consumers, who are environmentally concerned, are willing to pay more for eco-labelled food products, which concurs with extant research (Horne, 2009; Testa et al., 2015, 2020; Cerri et al., 2018; de Canio et al., 2021; Sadiq et al., 2021). Our findings show that direct relationships between environmental concern and willingness-to-pay are significant, which confirms that environmentally concerned consumers try to adapt their behaviour by using products, which have less impact on the environment. Eco-labels, by providing consumers with the necessary information, assist them in finding those products. Therefore, our results indicate that since environmentally concerned consumers seek more information (Testa et al., 2020) before making any purchase decision, certifications like eco-labels on food products will be preferred by them in comparison to food products without any certifications or labels.

Further, similar to the extant research (Schuitema & de Groot, 2014; Lee et al., 2020; Siraj et al., 2022), our results also prove a positive relationship between the awareness of eco-labels and the willingness-to-pay for those eco-labelled food products. However, research on Chinese consumers' eco-label usage, generally, has conceptualised general knowledge and awareness about eco-labels, which offers inconsistent impact on their willingness-to-pay (Taufique et al., 2017). Research shows that, instead of general knowledge, consumers' specific knowledge about how products are produced in an environmentally friendly way enhance their intension to purchase these and their willingness-to-pay for them (Testa et al.,2015; Lee et al., 2020). If consumers do not have sufficient resources and information to evaluate whether the producers comply with said production standards, they rely on eco-labels to understand production standards. Therefore, specific knowledge of the eco-labels i.e. the ability to recognise and recall a label for their benefits is important (Thøgersen, 2000). This research contributes to this stream, by including the importance of specific knowledge by measuring the awareness of specific eco-labels, which communicate environmental benefits. Our research offers empirical evidence that when consumers are aware of specific eco-labels and their benefits (i.e. specific knowledge) they are willing to pay more for those eco-labelled food products.

Consumers' trust in eco-labels plays a vital role in reducing scepticism and increasing their validity in consumers' minds, which translates into their willingness-to-pay (Taufique et al., 2017; Gorton et al., 2021; Siraj et al., 2022). Concurring with extant research, our findings also

established the role of trust on eco-labels in consumers' willingness-to-pay for eco-labelled food products. However, in extant research on eco-labelled food products, 'trust' has been measured in general terms (Taufique et al., 2017), rather than clearly showing whether consumers trust the specific claim of these eco-labels (environmental claims/benefits in our research) or have any other sources of trust (e.g., institutional trust spilling over to trust on eco-labels; or general trust on labelling itself; or perceptions of eco-labels providing safety, which generates trust) (Gorton et al., 2021), therefore leading to uncertainty in the object of trust in eco-label research. To establish clarity in the object of trust and ensure that consumers are not unconsciously spilling over general trust, in this research, we termed the trust variable as 'the belief in environmental ability of eco-label' and measured consumers' belief on the environmental claims these eco-labels used. Therefore, contrary to extant research (eg: Taufique et al., 2017; Gorton et al., 2021; Liu et al., 2022; Siraj et al., 2022) our research contributes by clearly establishing the object of trust as environmental claims made by the eco-label in question.

Further, our results show that 'the belief in the environmental ability of eco-labels' partially mediates the impact of environmental concern and eco-label awareness of Chinese consumers on their willingness-to-pay. This implies that the belief in eco-labels' environmental ability serves as security and acts as a motivation, which then leads to their increased willingness-to-pay for eco-labelled food products (Zhou et al., 2013; Testa, et al., 2015; Nuttavuthisit & Thøgersen, 2017; Gorton et al., 2021; Siraj et al., 2022). By understanding the role of the belief in environmental ability of eco-labels, similar to existing literature (Taufique et al., 2017; Gorton et al., 2021; Siraj et al., 2022), we contribute by clarifying how two antecedents of consumers' willingness-to-pay a premium for eco-labels operate through a mediating mechanism. Therefore, we establish that environmental concern and high awareness and recall of specific eco-labels are not sufficient determinants of consumers' willingness-to-pay for eco-labelled food products, but the presence of consumers' belief in their environmental ability i.e. clear object of trust, is an important mediating condition, which reduces the attitude-behaviour gap.

Even though, a wide range of eco-labels in China (Chinese Environmental Protection Label, Chinese Organic Product Certification, No Harm Agriculture Food Label etc) focus on environmental benefits, consumers perceive 'health' and 'safety' as dominating traits of eco-labels, when it comes to food products (Rupprecht et al., 2020) and environmental benefits either become secondary or are not part of their perception of eco-labels. Most research related

to eco-labels and food products in China also focuses on the 'safety' and 'health' domain of the message these eco-labels communicate (Wang & Wei, 2006; Luo, 2010; Wu et al., 2011; Grunet et al., 2015; Zhang et al., 2018; Moruzzo et al, 2020; Riccioli et al., 2020; Wang et al., 2020) and consumers' perception about the environmental benefit/message of eco-labels has either been researched in tandem with other benefits like health and safety or not researched at all. This multiplicity of information via eco-labels shows either the hierarchal or the relative nature of value specific benefits associated with eco-labels and may lead to undermining the clarity about the value singular benefits, like a pro-environmental message, hold among consumers' perception and the usage of eco-labels in food products (Cho & Baskin, 2018; Donato & D'Aniello, 2021; Dorce et al., 2021). Our research contributes by establishing clarity, by specifically measuring consumers' aware of eco-labels with environmental benefits and their belief in the environmental ability of those eco-labels as important factors, while making purchase decisions. We established that Chinese consumer value environmental benefits when assessing eco-labels for food products. Environmental benefits of eco-labels hold equal signalling power therefore warrant more attention in the communication of these eco-labels.

Food safety is generally a major concern for families, who seek to protect and care for their children and motivates them to buy food which is good/safe for the environment (Chen & Lobo, 2012; Ma, 2015). Consumers typically show more careful behaviour in their role as a parent and make extra conscious choices when buying food for their children. Eco-labels provide the necessary signalling, which assures consumers about the attributes of products and helps them to make a decision (Faupel et al., 2014). Therefore, the presence of children in families clearly has a direct or indirect effect on the food purchasing behaviour of individuals. However, extant research on eco-labelling on food products predominantly measured individual consumers' behaviour as a unit, with very few research evaluating the impact children have on consumers' choice of eco-labelled food products (Rupprecht et al., 2020; Liu et al., 2022). Our research fills this gap in two ways, firstly by statistically establishing that the presence of children has a significant effect on consumers' willingness-to-pay for eco-labelled food products. Secondly, most previous research, which evaluated the role of children in families on eco-labelled products, only used it as heterogenous factor (Zakowska-Biemans & Tekien, 2017; Bronnmann & Hoffmann, 2018; Kim & Lee, 2018; Rupprecht et al., 2020; Gorton et al., 2021; Liu et al., 2022), whereas our research conceptualises the presence of children as a moderating variable, thereby exploring a completely different mode of influence of the presence of children in families. Our findings highlight that the presence of children in families moderates the

relationship between belief in the environmental ability of eco-labels and the willingness-to-pay. This means that families with children under the age of 18 demonstrate a higher reliance on their belief in the environmental ability of eco-labels, while making a conscious choice to pay more for eco-labelled food products compared to families who did not have any minors.

Findings of our research are also widely applicable on contexts other than China, because globally consumers are increasingly considering environmental issues in their purchasing decision (Darnall et al., 2018). Along with the continuous rise in eco-consciousness and green consumption in recent years, consumers are found to pay more attention to the social and environmental values, and thus, putting functional values of products at the back burner (Liu et al., 2022). This heightened attention has in fact resulted in 147 different food eco-labels globally (Ecolabel Index, 2022), which provides the necessary information to consumers to be able to make informed decisions. The issue we analysed in this study: increasing environmental concern, wide range of eco-labels, consumer confusion resulting from a multiplicity of information, issue of trust, importance of environmental benefit in eco-labels, and impact of children on consumers' willingness-to-pay for eco-labelled food products are all valid in any geographical context.

6. Practical implication, limitation, and future research directions

Our research makes several practical contributions for two important stakeholders, mangers and policy makers, and are presented in the following sections.

6.1 Implications for managers

We provide an insight into Chinese consumers' willingness-to-pay for eco-labelled food products, which is of vital importance, considering growing environmental concerns among Chinese consumers. We highlight that the belief in the environmental ability of eco-labels is a key influencer which guides consumers' knowledgebase and environmental concerns and influences whether (or not) they are willing to pay for eco-labelled food product. Therefore, we suggest that companies should work on enhancing communication strategies, by giving consumers clear and simple information, which involves less factors to process. This will reduce confusion and ambiguity and will foster Chinese consumers' belief of the environmental ability of eco-labels.

Further, this research suggests that Chinese consumers give importance to the environmental ability of eco-labels. This proves the signalling power of environmental benefits in the food product context. This offers key managerial implications. Companies could use environmental benefits as signalling cues in their communication strategy to create differentiation in the market and achieve a competitive advantage. Rather than having multiple benefits like safety, and health, they should be focusing on one and in this case environmental benefits. Clear information will enhance authenticity of the information and also enhance consumers trust in eco-labels.

We clearly demonstrated that the presence of children moderates the relationship between consumers' belief in the environmental ability of eco-labels and their willingness-to-pay. Our research suggests that consumers, who are looking after minors, use their belief in the information provided by eco-labels when making a decision. This is significant for practitioners as this provides a strong basis for consumer segmentation to eco-label/green companies. Further, companies should provide clear information about what eco-labels certify in marketing communication and packaging to create differentiation and competitive advantage. This can also help companies focus on the environmental benefits of food products designed for children while targeting parents as primary customers.

6.2 Implication for policy makers

Our research shows that eco-label awareness i.e. specific knowledge, and recall of eco-labels, where consumers can also recognise the benefits eco-labels offer, is very important for consumers before making a decision to purchase eco-labelled food products. Policy makers need to work in enhancing visibility of environmental eco-labels so that consumers are more aware of them. Further communication strategies should be in place to educate consumers about eco-labels' environmental benefits. Clear communication on what eco-labels stand for would be required for consumer to enhance their trust in these eco-labels.

6.3 Limitations and future research directions

The study, while making important contributions to the literature on eco-labels, is not devoid of limitations. The convenience sampling process limits the statistical generalisability of the results, though the relatively large sample size provides some level of validity despite the limitations of the sampling process. Further, the study focused on Shanghai, which is selected for its economic status and urban population. Socio-demographics of the population of the

study mostly incorporated highly educated urban population with medium income group. Even though the study offers insights into the behaviour of consumers from this particular socio-demographic, future studies should target a wider and more varied sample, like consumers from different regions of the country, rural areas, migrants, different income groups, and education level, to get more specific insight on consumers' willingness-to-pay for eco-labels, which communicate environmental message.

One of the other limitations of the study is the willingness-to-pay measure, which provides indications on respondents' willingness-to-pay, however a follow up bid indication could have provided data on how much more they are willing to pay.

Our study, even though it uses specific eco-labels, which communicate environmental benefits of food products, does not include particular food product categories in the research design. The results certify that belief in the environmental ability of eco-labels impacts environmentally concerned consumers' willingness-to-pay for those eco-labelled food products. However, consumers' level of trust/belief in the environmental ability of eco-labels may vary as per the category of food products. Therefore, future researchers can design their study incorporating environmental oriented eco-labels within particular food categories to test the relationship, which may offer more insight on consumers' use of eco-labels and their willingness-to-pay for particular food products.

Our research showed a moderating effect of the presence of children in families. To further enrich understanding of this moderating effect on the role of eco-labels, future research can test the model on the children's food product category. This direction will help enhance understanding of the role belief in environmental ability of eco-labels play when parents are buying food for their children.

Further, the impact of other family members, presence of elderly or pregnant women in the family, should be studied in future research to develop a fuller understanding of the consumption of food products as family consumption and the role of eco-labels in it.

Our research proved the mediating role of beliefs in the environmental ability of eco-labels in consumers' willingness-to-pay for eco-labelled food products. Future research can investigate the source of that belief i.e .what constitutes consumers' belief on the claims made by eco-labels, is it the institutional trust which spills over, past individual experience of consumers, or in-depth knowledge about the eco-labels certification process and the robustness of the process

which creates this belief. Future research could also consider new antecedents for building belief in the ability of eco-labels, such as the message source, strategy, and media choice and the process by which they create that belief.

7. Conclusion

The main aim of the research was to model the antecedents of the consumers' willingness-to-pay for eco-labelled food products in the context of China, where consumers still show low awareness of eco-labels, probably due to their multiplicity as well as overriding information and shared characteristics. The lack of awareness and the ensuing confusion leads to trust issues and lesser reliance on environmental benefits in comparison to health and safety benefits communicated by eco-labels in food products. Our findings confirm environmental concerns, awareness of eco-labels, and belief in the environmental ability of eco-labels as main antecedents of consumers' willingness-to-pay for eco-labels. Our research contributes mainly by explaining the nature and role of these antecedents. Results confirm that the strength of consumers' belief on the environmental benefits of eco-labels play an important role on their willingness-to-pay for eco-labelled food products by acting as mediators between environmental concern and awareness of eco-labels. Our findings established consumers' belief in the environmental ability of eco-labels as an object of trust on eco-labels. We further confirmed that instead of general awareness of eco-labels, specific knowledge i.e. awareness of eco-labels and also their environmental benefits contribute to their willingness-to-pay.

Our research further assesses the role of the presence of children on the use of eco-labels in food purchase behaviour. Our findings confirm that consumers' belief in environmental benefits of eco-labels play a major role as an object of trust when consumers have children living with them. The findings offer significant practical implications by establishing the signalling value of environmental benefits of eco-labels and value of simplicity and clarity in the information provided by eco-labels and specifically highlighting role of environmental benefit of eco-labels while targeting families with children.

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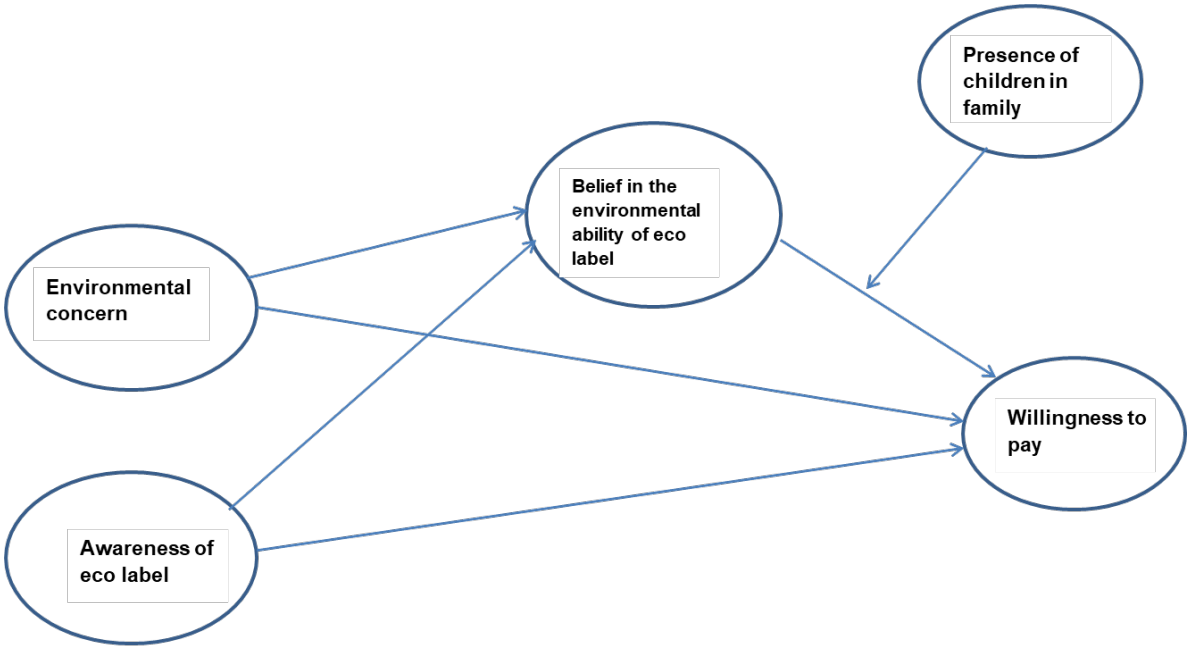
Figures

Fig.1 Conceptual Model



Tables

Table 1: Respondents' demographic profile

Respondents' demographic profile		**Percentage**
Gender	Male	45.3
	Female	54.7
Age	18-30	53.3
	31-55 and above	46.4
Income	Up to 6000RMB	62.2
	Above 6000RMB	37.5
Education	Below university	31.3
	University	68.4
Having Children in the family	Yes	55.4
	No	44.3

Table 2: Internal consistency and convergent validity

Measurement Model criteria			
	Composite reliability	**Cronbach's alpha**	**AVE**
Environmental concern	0.936	0.919	0.675
Awareness of eco-label	0.946	0.923	0.815
Belief in environmental ability of eco-label	0.958	0.942	0.851
Willingness to pay	0.960	0.918	0.924

Table 3a: Cross loading table to assess discriminant validity

	Awareness of eco-labels(Awareness)	Belief in environmental benefit of eco-label (Belief)	Environmental concern(EC)	Willingness to pay(WTP)
Awareness1	**0.941**	0.389	0.289	0.378
Awareness2	**0.945**	0.416	0.298	0.393
Awareness3	**0.784**	0.301	0.237	0.273
Awareness4	**0.930**	0.340	0.246	0.307
Belief1	0.398	**0.909**	0.520	0.476
Belief2	0.342	**0.935**	0.545	0.447
Belief3	0.388	**0.930**	0.533	0.478
Belief4	0.363	**0.916**	0.512	0.461
EC1	0.249	0.444	**0.808**	0.331
EC2	0.303	0.419	**0.783**	0.356
EC3	0.171	0.496	**0.858**	0.385
EC4	0.215	0.520	**0.863**	0.354
EC5	0.181	0.463	**0.869**	0.390
EC6	0.305	0.479	**0.833**	0.415
EC7	0.287	0.458	**0.730**	0.376
WTP1	0.370	0.503	0.469	**0.965**
WTP2	0.359	0.466	0.403	**0.958**

Table 3b: Fornell-Larcker Criteria for discriminant validity

Fornell-Larcker Criteria for discriminant validity					**Mean**	**S.D**
Awareness of eco-labels	**0.903**				3.283	1.33
Belief in environmental benefit of eco-label	0.405	**0.923**			4.35	0.919
Environmental concern	0.299	0.572	**0.822**		4.53	0.684
Willingness to pay	0.379	0.505	0.455	**0.961**	4.095	1.043

Table 4: Impacts of environmental concern on belief on eco-labels and willingness to pay

Model: Coefficients of regression- Environmental concern on Belief in environmental ability of eco-labels				
	Coeff (with standard error)	**p**	**Lower limit of confidence interval (LLCI)**	**Upper limit of the confidence interval (ULCI)**
Constant	0.88 (0.28)	.00	0.33	1.44
Environmental Concern	0.77 (0.06)	.00	0.64	0.89
Model: Impact of environmental concern on Willingness to Pay – mediating and moderating impacts				
	Coeff (with standard error)	**p**	**Lower limit of confidence interval (LLCI)**	**Upper limit of the confidence interval (ULCI)**
Constant	1.10(0.40)	.01	.32	1.88
Belief in eco-label	.26(0.09)	.00	.09	.44
Environmental Concern	.40(0.09)	.00	.22	.57
Presence of Children	-1.04(0.48)	.03	-1.99	-.10
Belief in environmental ability of eco-label X Presence of children (Interaction term)	.26(0.11)	.02	.04	.47

Table 5: Direct and indirect effect of environmental concern on willingness to pay

Direct effect of Environmental concern on Willingness to Pay			
Effect (with standard error)	**p**	**Lower limit of confidence interval (LLCI)**	**Upper limit of confidence interval (ULCI)**
.40 (0.09)	.00	.22	.57
Indirect Conditional Effect of Environmental concern on Willingness to Pay at different values of the moderator			
Moderator Value	Effect	Boot LLCI	Boot ULCI
0 (Families with no children	0.20	0.05	0.38
1 (Families with children)	0.40	0.26	0.55

Table 6: Impact of eco-label awareness on the belief in eco-labels

Model: Coefficients of regression- Eco-label awareness on Belief in environmental ability of eco-labels				
	Coeff (with standard error)	**p**	**Lower limit of confidence interval (LLCI)**	**Upper limit of the confidence interval (ULCI)**
Constant	3.4568 (0.1248)	.00	3.2113	3.7022
Awareness	.2747 (0.0352)	.00	.2055	.3439

Table 7: Mediating effect of belief in environmental ability of eco-labels in eco-label awareness to willingness to pay relationship incorporating direct and indirect effect.

Model: Mediating effect of belief in environmental ability of eco-labels in eco-label awareness to willingness to pay				
	Coeff (with standard error)	**p**	**Lower limit of confidence interval (LLCI)**	**Upper limit of the confidence interval (ULCI)**
Constant	1.4842 (0.2403)	.00	1.0115	1.9570
Belief in eco-labels	.4778 (0.0584)	.00	.3629	.5927
Direct and indirect effect of belief on awareness of eco-labels to willingness to pay relationship				
Awareness (direct effect on willingness to pay)	.1607 (0.0401)	.00	.0818	.2397
		Boot SE	**Boot LLCI**	**Boot ULCI**
Awareness (indirect effect on willingness to pay)	.1313	.025	.0866	.1868

Table 8: PLS $_{predict}$ results

Variable	Variable	Q^2 $_{predict}$	PLS-SEM_Mean Absolute Error (MAE)	Linear Model_Mean Absolute Error (LM_MAE)	Difference between PLS-SEM_ MAE and LM_MAE
Belief in the environmental ability of eco labels	Belief1	0.324	0.576	0.589	-0.013
	Belief2	0.322	0.594	0.617	-0.023
	Belief3	0.331	0.514	0.525	-0.011
	Belief4	0.301	0.573	0.584	-0.011
Willingness to	WTP1	0.267	0.711	0.726	-0.015
	WTP2	0.211	0.692	0.713	-0.021

Table 9: Statistical support for the hypotheses.

Hypothesis	Description	Result
H1	Chinese consumers with higher environmental concern are willing to pay more for eco-labelled food products.	Supported
H2	Chinese consumers who are aware of eco-labels are willing to pay more for eco-labelled food products.	Supported
H3	Chinese consumer's level of belief in environmental ability of eco-label positively impacts their willingness to pay more for eco-labelled food products.	Supported
H4	The impact of environmental concern of Chinese consumers on their willingness to pay for eco-labelled food products is mediated by their belief in the environmental abilities of the eco-label.	Supported
H5	The impact of Chinese consumer's awareness of eco-labels on their willingness to pay for eco-labelled food products is mediated by their belief in the environmental ability of the eco-label.	Supported
H6	The presence of children moderates the relationship between belief in the environmental ability of eco-labels and willingness to pay for eco-labelled food products.	Supported

Appendix:

No.	Construct	Items	Loadings
1	Environmental concern	I am concerned about environmental problems.	0.808
		I am concern about global warming.	0.783
		I am concerned about the effect of harmful industrial substances on health.	0.858
		I am concerned about water pollution.	0.863
		I am concerned about air pollution.	0.869
		I am concerned about waste problem.	0.833
		I believe that conserving the environment more important than life convenience.	0.730
2	Eco-labels awareness	I am aware of the Green Product Label.	0.941
		I am aware of the No Harm Agricultural Food Label.	0.945
		I am aware of the Quality Ensured Label.	0.784
		I am aware of the China Environmental Label.	0.930
3	Belief in environmental benefit of eco-labels	I believe that a product with the label with No Harm Agricultural food is good for the environment and health.	0.909
		I believe that a product with the Green Product Label is good for the environment.	0.935
		I believe that a product with the China Environmental Label is good for the environment.	0.930
		I believe that a product with the Quality ensured Label is good for environment and health.	0.916
4	Willingness to pay	I would like to pay more for products with environmental-friendly labels.	0.965
		I would like to pay more for products with quality and safety ensured labels.	0.958