



**Consumer Reactions to Deal Popularity
Information: Cue Congruency, Perceived
Authenticity, Service Types, and
Cultural Difference**

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This thesis is submitted in fulfilment of
the requirements for the degree of

Doctor of Philosophy
(Marketing and Management)

January 2017

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ACKNOWLEDGEMENTS

First and foremost, I would like to express my appreciation and thanks to my principal supervisor, Associate Professor Sally Rao Hill: you have been a supportive mentor to me. I am so honoured to have been supervised and mentored by you. You have guided me to a correct research path while still left freedom for me to think for myself and work at my own pace. Your advanced thoughts and ideas and your always positive attitude toward almost everything are admirable, and have convinced me that everything is possible and that I can make it. To me, you are more than a supervisor, a super person playing multiple roles as a mentor and as a friend. I would also like to express my appreciation to my co-supervisor, Associate Professor Indrit Troshani for always encouraging my research. Whenever you said “it sounds interesting to me”, that gives the power to me to move on, digging deeper into the maze of studies in the literature. You have always been supportive in the development of my research, provided valuable editing by pointing out critical writing issues, and showed me excellent examples of how to respond to reviewers’ comments. I cannot express in words my gratitude for being a member of this great team. The supervision by both of you is priceless and I am really lucky to have you in my research career.

A special thanks to my family members, grandma, father, mother, brother, and my cat. Your company and ongoing support and encouragement was what has sustained me thus far. I would also like to thank all my friends for their emotional support even though some did not really understand what it is that I was doing. I cannot thank you all enough.

ABSTRACT

This research was undertaken to examine how online deal popularity influences consumer reactions and the conditions under which the effects take place using scenario-based experiments. Three studies were conducted and reported in this thesis.

Study I tests a model that is underpinned by cue utilisation theory that reactions to online deal popularity may be mediated by service quality expectation and the effect will vary across service types, namely, experience and credence services. The findings support the theorised model in demonstrating that consumers who face high online deal popularity tend to have high service quality expectation, which in turn, increases their willingness to recommend and their intention to purchase a service in a deal. Furthermore, Study I provides evidence that the effect of deal popularity on service quality expectation is significant for credence services and not significant for experience services.

Study II extends Study I by examining cue congruency effect and consumers' perceived information authenticity as the boundary conditions that may modify the effect. Results support the moderating effect of cue congruency and perceived information authenticity. That is, when consumers face the congruent cue combination (i.e., high online deal popularity paired with a high star rating) and when they have high perceived authenticity about the online deal popularity, they have high service quality expectation, which in turn increases their intention to purchase the service deal. In addition, while congruent cues indeed amplify the effect of online deal popularity, high deal popularity can influence service quality expectation even when incongruently paired with another cue (i.e., a low star rating). This suggests the dominant role of online deal popularity under incongruent cue combinations.

Using an observational learning perspective, Study III examines consumers' risk perceptions toward online deal popularity by considering the purchase uncertainty in online shopping for service deals. In addition, Study III compares the effect between two countries, Australia and Taiwan, using Hofstede's cultural value dimension scores and Hall's cultural context as the proxies of cultural differences. Results suggest that perceived performance risk and psychological risk mediate the effect of online deal popularity on purchase intention in both countries. With the significant mediating effect of perceived risks, the direction of the influence for Australian consumers is opposite to that for Taiwanese

consumers. Australian consumers were found to perceive high performance and psychological risk when facing high online deal popularity, which subsequently reduces their intentions to purchase a service in a deal. By contrast, Taiwanese consumers were found to have low performance and psychological risk when facing high online deal popularity which increased their purchase intention.

The three studies that comprise this thesis enhance current understanding of the effects of online deal popularity and the mechanism and boundary conditions through which it operates. Thus it contributes to cue utilisation and observational learning theory in service marketing and the broader consumer behaviour literature. Practical implications have been provided for e-retailers to leverage on online deal popularity as a marketing signal to influence consumers' service quality expectations and risk perceptions by considering service types, national cultures, perceived information authenticity, and cue congruency for service deal promotions.

STATEMENT OF AUTHORSHIP

I would like to acknowledge the contribution of my supervisors in each of the studies and papers in this thesis. While I am the principal and lead author for all studies and corresponding articles, I have been assisted in the writing of the journal papers by Associate Professor Sally Rao Hill and Associate Professor Indrit Troshani. The contribution ratio of authors is outlined below.

Online Consumers' Responses to Deal Popularity as an Extrinsic Cue

Karen Chia-yin Kao – 70%
Sally Rao Hill – 15%
Indrit Troshani – 15%

Online Consumers' Reactions to Service Deal Popularity: The Role of Cue Congruency and Perceived Authenticity

Karen Chia-yin Kao – 70%
Sally Rao Hill – 15%
Indrit Troshani – 15%

A Cross-cultural Assessment of Deal Popularity in e-Commerce

Karen Chia-yin Kao – 70%
Sally Rao Hill – 15%
Indrit Troshani – 15%

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Chapter 1. INTRODUCTION

This chapter introduces the topic which has been organised as three separate studies. These studies are presented in this thesis in journal article format. The chapter provides the background to the research question and an overview of key research issues.

1.1 BACKGROUND TO THE RESEARCH

Internet technology enables constant changes to business models, often necessary as a result of changes to online consumer behaviour. For those actors that leverage technology and understand their consumers, e-commerce has become lucrative. A recent industry survey indicates that retail e-commerce sales worldwide reached US\$1.55 trillion in 2015 and the global revenues are projected to grow to US\$3.4 trillion in 2019 (Statista Inc, 2016).

A significant part of e-commerce sales is contributed to by the increase of online shopping through desktops/laptops (76.9%), tablets (12.4%), and mobile phones (10.7%) (Rudolph, 2016). This growing online shopping trend has created incentives for an increasing number of retailers to jump on the e-tailing bandwagon to target a borderless market space. More than 50% of consumers from 26 countries have experienced online shopping from an overseas retailer in the past six months (Nielsen, 2016).

Furthermore, the online retailing markets are no longer a field solely for shopping for goods. Services including restaurant or travel services constitute a large portion of products/services bought online. Indeed, a global survey indicates that 49% of online consumers have bought travel products or services,

43% bought event tickets, and 21% ordered food online (Nielsen, 2016). The World Wide Web provides a lucrative channel for service providers to boost their service sales. Recent marketing strategy has been subjected to ongoing changes to accommodate the influence of online consumer behaviour. In addition to widely researched electronic-word-of-mouth (eWOM) influences such as online consumer reviews and ratings of services (cf. Khare *et al.*, 2011; Liu, 2006; Tsao *et al.*, 2015), a notable phenomenon of purchasing online services is that consumers' purchase behaviour seems to be influenced by the popularity of an online deal. This thesis investigates online consumer reactions toward this emerging influence of online deal popularity for online service deals.

1.1.1. Online service deals

Services are often promoted by the deal-of-the-day group buying websites which provide coupon deals for local services, such as personal training lessons, massage sessions, restaurant dining, or travel packages at deeply discounted prices (Liu and Sutanto, 2012). Most of the services are provided by small or medium-sized local service companies (Liu and Sutanto, 2012). To promote their services, e-retailers and service vendors often form coalitions to stimulate sales by offering deep discounts and limiting the time a deal is on offer, the volume to be sold, the product range made available, and offering a variety of vendors (Che *et al.*, 2016).

Unlike traditional online purchases of goods, when purchasing a service deal online, consumers pay upfront and then have to redeem coupons within a stipulated timeframe (often up to three months) at physical stores. The fact that consumers generally are requested to pre-pay for intangible services that they

have not used before, may impede potential consumers' purchase decisions. Thus, online operators often show deal popularity in an attempt to influence consumers' decisions.

1.1.2. Online deal popularity

Online deal popularity represents other consumers' purchase decisions in the form of the number of deals bought by others displayed as a running counter at websites during a deal duration (Luo *et al.*, 2014). Deal popularity information has become readily accessible on many e-retailing websites such as Groupon.com and eBay.com. It has been suggested that deal popularity is a powerful marketing tool that can influence online consumer purchase behaviour which leads to sales boosts and benefits e-retailers and service/product providers (Clancy, 2013).

Online deal popularity can be mirrored by crowdedness in a traditional physical service, potentially signalling to outside observers the attractiveness of a service (Zhang *et al.*, 2013). It influences consumers' perceived value for money about a service (Coulter and Roggeveen, 2012) and signals a deal's worth due to its popularity (Luo *et al.*, 2014). This can result in a possible bandwagon effect (Luo *et al.*, 2014) and information cascades (Duan *et al.*, 2009). These effects lead consumers to follow predecessors' purchase decisions and rationalise their own purchase decisions with the notion that the majority's choices cannot be wrong (Maheswaran and Chaiken, 1991).

Several studies have provided empirical evidence of the positive effect of online deal popularity on consumer purchase intention of service deals (Luo *et al.*, 2014; Subramanian and Rao, 2016). Yet, the way in which online consumer reactions

are influenced by online deal popularity remains unclear, particularly as they relate to service quality expectation and risk perceptions. Furthermore, with the phenomenal rise in online shopping globally and steady upward trends into the future, further research exploring online consumer behaviour across cultures becomes imperative for academics and e-retailing practitioners alike. Such research is needed to improve further current limited understanding of these influences in a borderless online shopping environment.

1.2 RESEARCH ISSUES

Information about other consumers' online behaviour, such as ratings or purchase decisions, has become an important online shopping indicator by new consumers. This is because other consumers' experience is often perceived to be more credible and trustworthy than conventional marketing communication such as advertising (Liu, 2006; Wu and Lee, 2016). This indicates the influence of existing consumers' behaviour in online environments. Online deal popularity reflecting other consumers' purchase decisions is assumed to be related to pre-purchase service quality expectation. The notion that consumers use this information for decision making can be ascribed to quality uncertainty, particularly pertaining to online service deals.

An understanding of consumer reactions toward online deal popularity is important to both marketing managers and scholars, as this information plays a key role at the early stage in the consumers' decision making processes. How and when consumers use this information is likely to have an impact on the effectiveness of marketing strategies related to deal popularity and, as a consequence, contribute to the success of online retailing business for services.

This thesis examines the extent to which online deal popularity influences their reactions to online service deals and the boundary conditions of such influence. In the next section, several research issues are identified as they relate to online deal popularity.

1.2.1 Online deal popularity as a quality cue

The intangible attributes of services can impede consumer evaluations before consumption (Olson, 1972; Zeithaml, 1988). Consequently, consumers may need to look for other cues to help them in their pre-purchase evaluations and decision making. For example, they may evaluate service quality by judging service personnel's dress at a bricks-and-mortar store (Shao *et al.*, 2004), the reputation of a brand name (Jeon *et al.*, 2014) or price (Chiu and Chen, 2014) prior to purchase. Similarly, when encountering unfamiliar or new offers, online deal popularity becomes an influential cue for consumer behaviour. Previous research has found a positive effect of service deal popularity on purchase intention (Luo *et al.*, 2014), suggesting it can be used as a cue to influence potential consumers (Subramanian and Rao, 2016).

From a consumer's perspective, quality evaluation and risk perception are often precursors to a purchase decision (Olson, 1972; Sweeney *et al.*, 1999). Quality is often considered a determining factor prior to a purchase decision (Zeithaml *et al.*, 1996). Although much service information has been provided online, such as the service providers and locations, the quality of a service cannot be evaluated until it has been carried out or consumed (Parasuraman *et al.*, 1985).

Services contain non-searchable attributes that force consumers to search for additional information cues to help with making a purchase decision (Zeithaml,

1988). When facing uncertainty, consumers may develop expectations about service quality by employing readily available information, such as price, which they may subsequently use as a cue for quality inferences (Sweeney *et al.*, 1992). Consumers' shopping behaviour as well as their utilisation of information cues both change in e-retailing environments.

In online shopping contexts where deeply discounted pricing and unfamiliar brands may not be useful for helping consumers to form judgements of service quality, consumers are likely to use alternative cues to, at least, form a service quality expectation. In particular, information about individual online behaviour (e.g., buying or rating) outweighs other cues for service purchases due to experience sharing and perceived information credibility (Mitra *et al.*, 1999).

Cue utilisation theory suggests that cues can be used as surrogate indicators of product/service quality by consumers (Olson, 1972; Zeithaml, 1988). While an individual's purchase behaviour can be recorded as a number constituting the popularity information of a deal, online deal popularity can be deemed as a cue related to the product/service. Drawn on the cue-quality conceptualisation derived from theory, it can be argued that online deal popularity can influence consumers' behavioural intentions (e.g., purchase and recommendation) through forming service quality expectation in a pre-purchase situation. Study I and II presented in this thesis will be based on the concept of online consumers' purchase and recommendation intentions by using online deal popularity to form service quality expectation.

1.2.2 The influence of service type

It is widely accepted that the general characteristics of a service include its

intangibility and lack of standardisation (Murray, 1991). A classification distinguishing services based on attributes that are easy/difficult to evaluate prior to and after purchase suggests three types, namely search, experience, and credence services (Darby and Karni, 1973; Nelson, 1970). Quality expectations of search type services (e.g., dry cleaning services) can be precisely formed by physical examinations prior to purchase (Mitra *et al.*, 1999). Therefore, online information cues may be more useful for consumers considering buying experience and credence services which have attributes that cannot be identified prior to purchase. The distinction between the two types lies in that experience services' (e.g., a massage) quality can be judged after consumption, while it is difficult to confidently evaluate the quality of credence services (e.g., a legal service) even after consumption.

Service type has attracted scholars to study consumer behaviour. Findings suggest that in online shopping contexts consumers prefer to buy experience services compared to buying credence services (Keh and Pang, 2010; Sharma *et al.*, 2014). Particularly, the influence of eWOM is stronger for experience than for credence or search services (Pan and Chiou, 2011; Pan and Zhang, 2011; Park and Lee, 2009). Given these differences, another aim of Study I is to present a theoretical, empirical, and managerial perspective on consumer utilisation of online deal popularity as a quality cue in the decision making process considering service type as the boundary condition.

1.2.3 Multiple cue utilisation

Cue utilisation often involves the use of multiple cues. The role of congruency among cues has been addressed empirically in the marketing literature,

suggesting that cues can be more useful when providing corroborating rather than conflicting information (Maheswaran and Chaiken, 1991; Miyazaki *et al.*, 2005). On the basis of cue congruency theory, congruent cues suggest cue reliability and thus potentially enhance consumer confidence in their ability to use a set of cues for product/service quality inferences (Miyazaki *et al.*, 2005; Pezoldt *et al.*, 2014). From a heuristic information process perspective, consumers prefer congruent cues for quick and efficient decision making (Maheswaran and Chaiken, 1991).

Congruent cue combinations (e.g., brand, price, country-of-origin, or warranty) are perceived to be favourable for product/service quality expectation and decision making (e.g., Akdeniz *et al.*, 2013; Josiassen *et al.*, 2008; Miyazaki *et al.*, 2005). Limited studies have explored online information cues in the light of cue congruency. While star rating has been widely used as a proxy for popularity in online shopping contexts (Flanagin *et al.*, 2014; Park *et al.*, 2007; Ye *et al.*, 2013), what remains under-researched from the cue-congruency is whether the combination of both popularity cues (i.e., deal popularity and star rating) influences online consumer reactions.

By contrast, incongruent cue combinations are deemed to be dissonant. Under these conditions, consumers often ignore cues or even develop negative attitudes toward product/service quality inferences (i.e., the negative cue dominates) (Miyazaki *et al.*, 2005). However, from an information cascades perspective, when online consumers face uncertainty about a purchase, they observe and imitate others' behaviour regardless of private information or the reason behind others' decisions (Bikhchandani *et al.*, 1992). As such, when others' purchases accumulate to a large number captured as high deal popularity, this may drive

consumers' pre-purchase service quality expectation irrespective of the generic and negative quality inferences derived from the low star rating of a service deal. Thus, while high star rating may amplify the effect of high deal popularity under a congruency effect, it is argued that high deal popularity can dominate service quality expectation when paired with low star rating. However, research in this regard remains silent.

An investigation of combinations of both cues is deemed to be essential for practical marketing strategy and contributes to the existing knowledge of multiple cue utilisation. Study II investigates how the combination of two popularity cues influences consumers' utilisation of online deal popularity.

1.2.4 Information authenticity

Information displayed on websites is often deemed to be the product of computer applications, which often undermines consumers' trust of the digitalised world (Blöbaum, 2016). A key issue is thus related to the authenticity of information, which suggests that consumers are often suspicious about information is displayed on websites (Sundar, 2008). Precedents set by unethical online retailers that have fraudulently manipulated online information (e.g., fraudulent online reviews of Yelp.com) have legitimised these suspicions (e.g., Luca and Zervas, 2016).

When a piece of information fails to yield confidence for making judgments, it forces consumers to scrutinise information holistically and may delay decision making (Maheswaran and Chaiken, 1991). Consumers' perceived authenticity of online information determines how information influences their attitudes and behavioural intentions (e.g., Featherman *et al.*, 2006; Huang *et al.*, 2011). For

example, consumers' perceived authenticity of online reviews has been found to impact on brand attitude, purchase intention, and word-of-mouth behaviour (Seok *et al.*, 2016). Perceived authenticity of information is thus considered to have an impact on the utilisation of online deal popularity. Little attention has been paid to examining the impact of consumers' perceived information authenticity on online deal information. The role of perceived authenticity of deal popularity is examined in Study II.

1.2.5 Risk perceptions toward online deal popularity

Generally, the purchase of services entails more uncertainty than the purchase of goods. This uncertainty concerns service performance and the consequence of the purchase (Murray and Schlacter, 1990). Particularly in online shopping contexts which are widely considered as separated shopping services (Keh and Pang, 2010), consumers have to pay upfront online and consume a service at a later time by physically visiting the service provider. Uncertainty about the possible adverse consequences of buying a service online may arise from the difficulty of evaluating the service prior to a purchase (Forsythe and Shi, 2003) and the intangibility of online retailers' services (Keh and Pang, 2010).

In this situation, consumers are not well informed about a service, which leads to perceptions of high performance risk (Erdem *et al.*, 2004; Mitra *et al.*, 1999). Perceived risk, based on the definition, is the function of uncertainty and adverse consequences, shaping consumer behaviour in seeking additional information (Murray, 1991). Indeed, researchers in service marketing suggest that consumers' utilisation of information for service evaluation is rather complex (Davis *et al.*, 1979; Murray, 1991).

Given the uncertainty of an online service deal, consumers are compelled to rely to a great extent on external sources as cues, such as other consumers' experiences (e.g., eWOM) (Keh *et al.*, 2015; Zeithaml, 1981; Zhang *et al.*, 2010) or brand (Mitchell and Greated, 1993) as a strategy to reduce risk perceptions. Information from other consumers is likely to be favoured by consumers under conditions of online service shopping (Liu, 2006; Wu and Lee, 2016). Based on observational learning theory, people avoid uncertain situations by observing predecessors' behaviour and then deciding whether to follow or not (Bandura, 1977). Online deal popularity can thus be used to reduce the perceived risk of purchasing a service deal online. Considering the vital role of perceived risk in information search and purchase behaviour for services (Mitra *et al.*, 1999), this thesis, as presented in Study III, further explores how the use of deal popularity information influences risk perceptions and, subsequently, purchase intention.

1.2.6 Cultural difference in perceived risk toward online deal popularity

National culture has been found to influence consumers' attitudes and behaviours (e.g., Mazaheri *et al.*, 2014; Tai and Chan, 2001). Hofstede (1994)'s cultural value of individualism-collectivism dominated cultural comparison studies for years, distinguishing Western and Eastern cultures in the marketing literature (Weber and Hsee, 1998). Consumers from Western and Eastern cultures, as suggested by Hall (1976), act distinctly in terms of how they use information cues based on social contexts.

For example, consumers from Australia and Taiwan, representing Western and Eastern cultures respectively, may interpret deal popularity information differently. Australians are characterised by individualism and have a low

context culture. This suggests that they look after their own needs and listen to their own voice more than those of others, regardless of the context (Hall, 1976; Hofstede *et al.*, 2010). By contrast, Taiwanese are characterised by collectivism and have a high context culture, indicating their social reliance and interdependence (Hall, 1976; Hofstede *et al.*, 2010).

Previous research shows that consumers from Western and Eastern cultures process information such as price and website information differently, which in turn influences how they form attitudes toward a service or website (Davis *et al.*, 2008; Mazaheri *et al.*, 2014; Tai and Chan, 2001). As such, the interpretation of online deal popularity information is assumed to be different between Australians and the Taiwanese. There is paucity of research concerning how online deal popularity information affects consumers' risk perceptions toward a service deal across cultures. In responses, this thesis, as presented in Study III, investigates consumer purchase intention by observing online deal popularity underlying the process of risk perceptions between Australian and Taiwanese consumers.

1.3 OBJECTIVES OF RESEARCH

The aim of this research is to develop a better understanding of consumers' reactions towards online deal popularity. Comprised of three studies written in journal article format, this thesis uses scenario-based experiments to investigate the effect of online deal popularity. The use of experimental design is appropriate in this research because it provides superior capacity to demonstrate hypothesised causality and association of key variables, clear interaction effects that can be better understood, and reliable conceptualisations that can be

developed (Keh *et al.*, 2015; Leung *et al.*, 2005; Yaprak, 2008).

This research provides empirical evidence of the effect of online deal popularity on service quality expectation and risk perceptions which in turn influences behavioural intentions, taking into account service types, cue congruency, perceived information authenticity and cultural differences. The results are useful for e-retailers in strategically emphasising the effectiveness of online deal popularity. Figure 1.3.1 summarises research objectives of the three studies according to research issues.

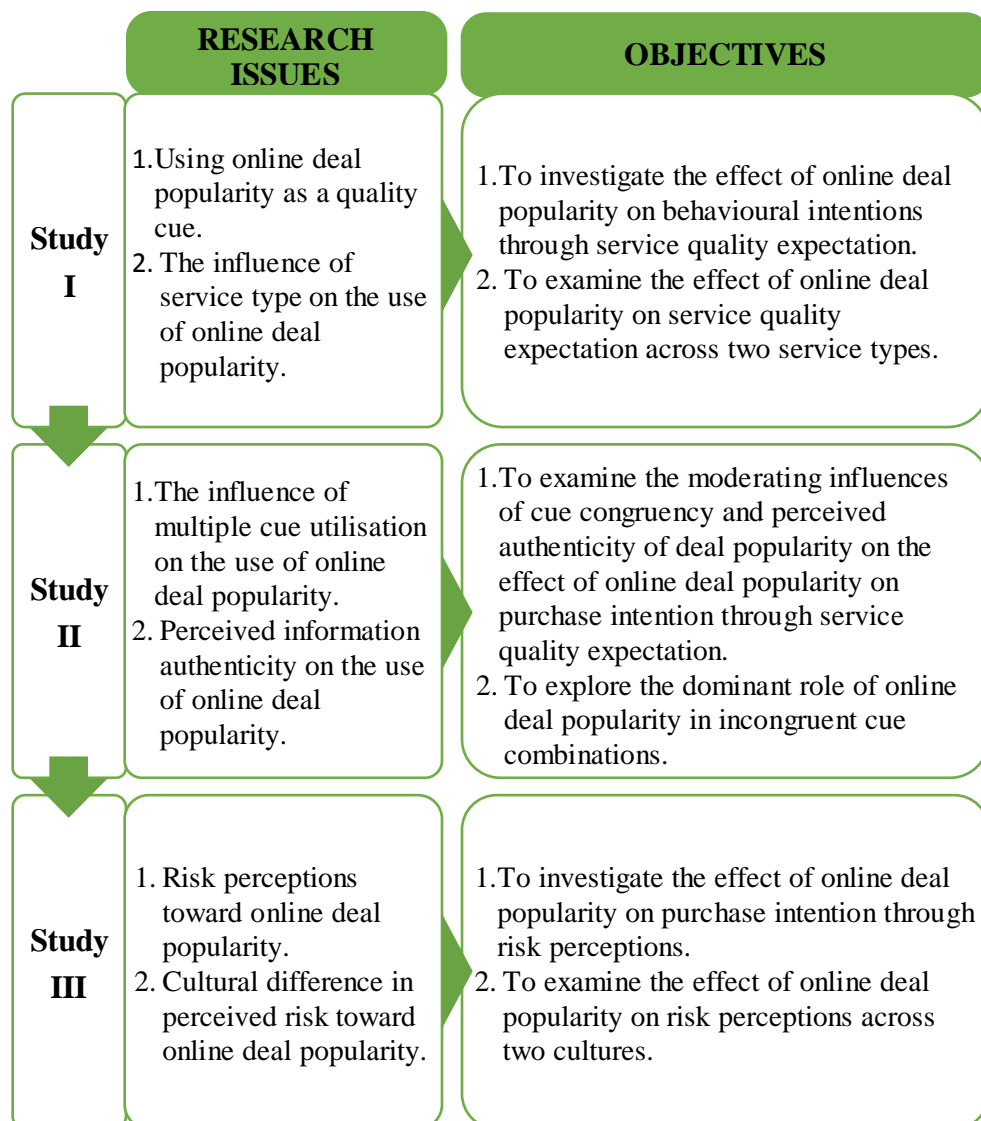


Figure 1.3.1 Objectives of the research

1.4 SIGNIFICANCE OF THE RESEARCH

The first study provides evidence that online deal popularity is related to service quality expectation in online shopping situations. Applying cue utilisation theory, it is found that online deal popularity can be used as an extrinsic cue to inform service quality prior to purchase. Specifically, the findings suggest that consumers' purchase intentions and willingness to recommend are influenced by high online deal popularity which increases their expected service quality. This effect is stronger for purchasing credence services than for purchasing experience services. This study aims to contribute to cue utilisation theory in the e-commerce strand of service marketing literature. To the best of the researcher's knowledge, Study I is the first that provides empirical evidence of the role of online deal popularity in signalling service quality across service types. The findings provide implications for e-retailers in understanding the mechanisms of consumer use of online deal popularity in relation to service quality expectation for purchase decisions and recommendations, and the stronger effect for credence services promotion online.

The second study extends the results of the first by identifying the boundary conditions of cue congruency and perceived information authenticity. By realistically including star rating in experiment scenarios, the findings demonstrate that when consumers' perceived authenticity of deal popularity is high, positively congruent cue combinations amplify the effect of online deal popularity on purchase intention through enhancing service quality expectation. Additionally, high online deal popularity is found to drive consumers' service quality expectations when paired with low star rating. This suggests its distinct effect when another popularity cue is presented to be negative. To the best of the

researcher's knowledge, this is the first study to provide empirical evidence demonstrating the effectiveness of two popularity cues underlying the congruency effect and the dominant role of online deal popularity.

This study is also the first that empirically evaluates the impact of information authenticity from a consumer's perspective in online shopping. The findings provide implications for e-retailers wishing to take advantage of high deal popularity in both congruent and incongruent cue combinations and wishing to enhance consumers' perceived authenticity of online information before enjoying the effect of high deal popularity.

The third study adopts the lens of risk perceptions in examining the effect of online deal popularity in a cross-cultural setting. Considering the cultural influence, this study investigates consumer reactions toward online deal popularity between two cultures, Australia and Taiwan, which represent Western and Eastern cultures, respectively. The findings support the framework showing that the risk perceptions mechanism of the effect of online deal popularity on purchase intention is different across cultures. This study is the first to explore the relationship between online deal popularity and risk perceptions, thus providing an alternative view of the effect of online deal popularity. The findings provide implications for global e-marketers. While deal popularity information can be used to reduce risk perceptions of consumers in Taiwan, it does not have the same effect for Australian consumers.

1.5 THESIS OUTLINE

This thesis consists of five chapters. Figure 1.5.1 summarises the flow of thesis chapters in a diagrammatic form, and a brief description outlines content.

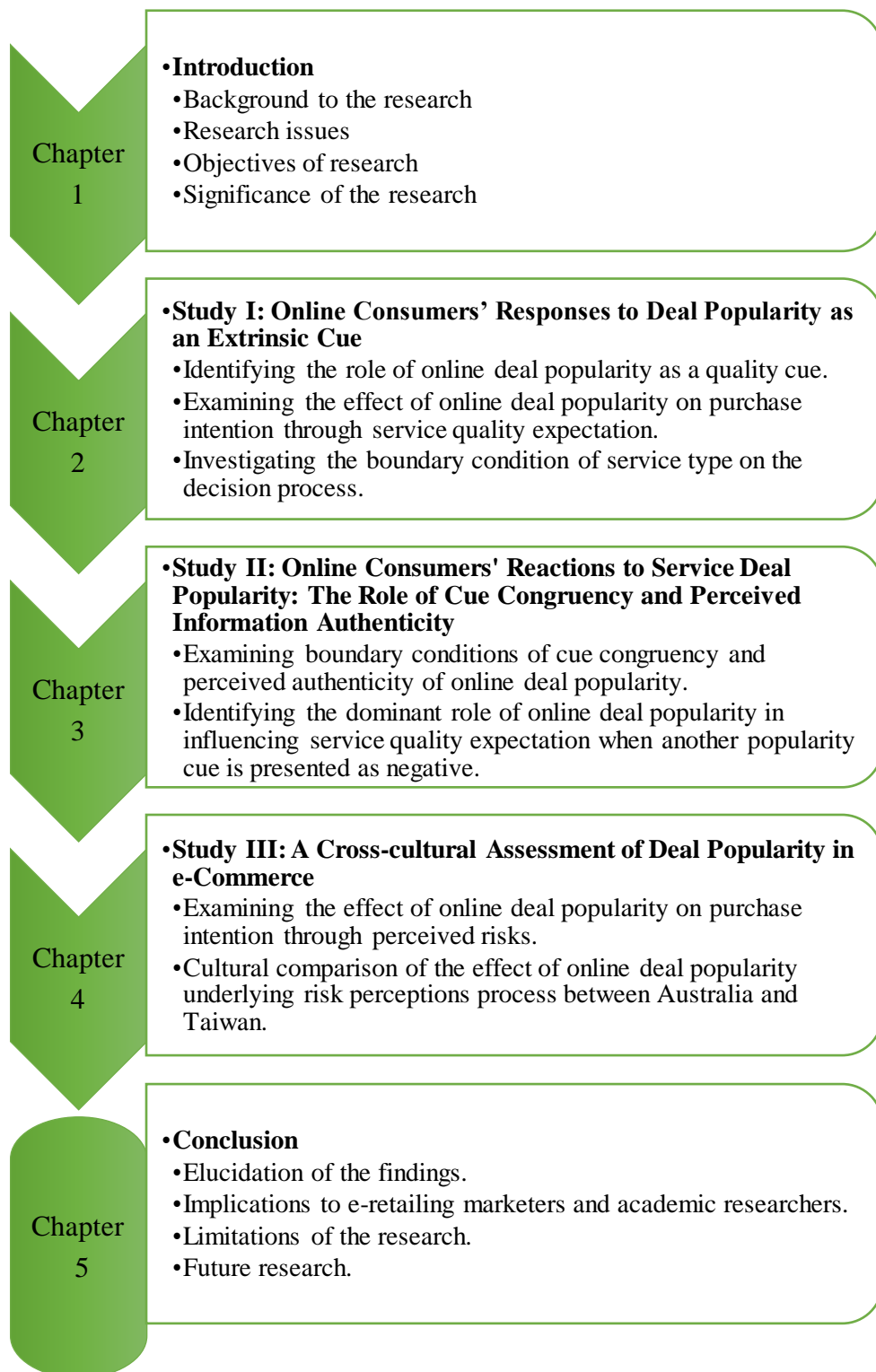


Figure 1.5.1. Framework of thesis

1.6 SUMMARY

This chapter has provided the research background of online deal popularity as used on e-retailing websites. While an increasing number of large and small retailing websites provide this information in an attempt to boost sales, limited academic research has been conducted to examine how online deal popularity influences consumers' reactions. Specifically, no research explores whether online deal popularity can serve as a quality cue to influence a consumer's quality expectation toward online service deals, how a consumer's purchase intention is influenced by their service quality expectation and risk perceptions from online deal popularity; how the decision process through service quality expectation and risk perceptions varies across service types and cultures; how (in)congruent information and perceived information authenticity impacts the use of online deal popularity for service quality expectation and purchase intention. This chapter has presented a solid justification for conducting the research. Chapter two presents Study I and identifies the role of online deal popularity from cue utilisation in influencing consumers' service quality expectations and the boundary condition of service type.

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Chapter 2. STUDY I: Online Consumers' Responses to Deal Popularity as an Extrinsic Cue

INTRODUCTION

The first study, *Online Consumers' Responses to Deal Popularity as an Extrinsic Cue*, is an examination of the effect of online deal popularity on consumer reactions, taking into account the mediating role of service quality expectation.

Consumers who encounter unfamiliar brands of deep discounted service deals often face uncertainty. Common cues for pre-purchase service quality inferences such as price and brand names may not be appropriate quality indicators under such circumstances.

While online deal popularity representing others' purchase decisions influences consumers' purchase decisions, it may impact service quality inferences prior to purchase. This area is under-explored. One way to advance this area is with empirical research explaining the association of service quality inferences and behaviour intentions with online deal popularity being used as a quality cue. This avenue of research is worth pursuing, given the growing use of deal popularity in e-commerce.

Furthermore, consideration of consumers' reactions toward online information may be different between experience and credence services. Indeed, the manner in which consumers react to online deal popularity across service types remains unknown. For a better understanding of online deal popularity's influences, Study I aims to investigate the effect of online deal popularity on purchase intention and willingness to recommend by considering service quality

expectation as the mediator and service type as the boundary condition.

Study I is presented in journal article format, and is currently published as EarlyCite in the Journal of Computer Information Systems (JCIS)¹, published by Taylor & Francis. The presentation in this thesis is in the required format of the journal, while tables and figures have been placed throughout the article to facilitate reading. The JCIS article evolved from a paper accepted and presented at the SERVSIG 2016 Conference² (See Appendix A). The conference paper is authored by Karen C. Kao, Sally Rao Hill, and Indrit Troshani with the contributions the same as the contribution ratio for this article, which is outlined on the next page.

¹ <http://www.tandfonline.com/doi/abs/10.1080/08874417.2016.1232997>

² <http://www.servsig2016.com/>

STATEMENT OF AUTHORSHIP

Statement of Authorship

Title of Paper	Online Consumers' Responses to Deal Popularity as an Extrinsic Cue
Publication Status	Published (EarlyCite)
Publication Details	This research paper has been published in the Journal of Computer and Information Systems which is accessible online on 3 November, 2016.

Principal Author

Name of Principal Author (Candidate)	Karen Chia-yin Kao	
Contribution to the Paper	I conceptualized research framework from literature review, designed and conducted experiments for data collection and analysis, reported findings, and implemented writing.	
Overall percentage (%)	70%	
Certification:	This paper reports on original research I conducted during the period of my Higher Degree by Research candidature and is not subject to any obligations or contractual agreements with a third party that would constrain its inclusion in this thesis. I am the primary author of this paper.	
Signature		Date Nov. 22, 2016

Co-Author Contributions

By signing the Statement of Authorship, each author certifies that:

- i. the candidate's stated contribution to the publication is accurate (as detailed above);
- ii. permission is granted for the candidate to include the publication in the thesis; and
- iii. the sum of all co-author contributions is equal to 100% less the candidate's stated contribution.

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STUDY I

ONLINE CONSUMERS' RESPONSES TO DEAL POPULARITY AS AN EXTRINSIC CUE

KAREN C. KAO, SALLY RAO HILL, INDRIT TROSHANI

ABSTRACT

Deal popularity indicates the popularity of a product or service within a specific deal duration and is being used by many e-tailers in their websites/apps. While deal popularity is receiving increasing attention by academics and practitioners alike, its effect as an extrinsic cue remains under-researched. Using an experimental design, this study investigates the effect of deal popularity on expected service quality in an e-tailing environment. It is found that deal popularity influences service quality expectations for credence services but not experience services. High deal popularity positively influences consumers' intention to purchase and willingness to recommend credence services. E-tailers of services need to pay attention to deal popularity displayed for credence services and leverage on the positive effect it has on consumers.

Keywords: deal popularity, cue utilization, service quality, e-commerce

INTRODUCTION

Deal popularity is receiving increasing attention by academics and practitioners alike as a key construct that influences purchase intentions in electronic commerce (e-commerce) environments. Deal popularity indicates the popularity of a product or service within a specific deal duration. Typically

displayed as a running counter showing the cumulative number of deals sold to existing consumers [54]. Deal popularity is used in e-commerce sites such as online groups buying websites (e.g.,groupon.com) and online auction sites (e.g., ebay.com) as a powerful tool to influence existing and prospective consumers' online purchase behaviour [15, 17, 54, 79].

Extant e-commerce research has found that online reviews and star ratings can impact on consumer attitudes towards products and services and ultimately influence consumers' decisions [94-96]. Reviews or ratings are often initiated by extremely satisfied or dissatisfied consumers [1] which may be ignored by new consumers, and thus potentially have little effect on buying decisions [22, 96]. However, the number of online reviews or ratings may also signal information about the popularity of a product or service [94] and can, as a result, serve as a predictor of sales [22, 96]. Indeed, deal popularity as an observable behavioural cue. It can offer instant information concurrently with the deal and is often available for a very limited time (e.g., 1-7 days) [12, 23] and respond to consumers' need for current information [34]. Deal popularity offers thus information about current consumers' preferences and may have stronger impact on consumer attitudes and intentions than other types of historical information such as cumulative number of reviews or ratings. Deal popularity is therefore a salient popularity cue worthy of further investigation.

Extant research has examined the impact of deal popularity from a social influence perspective. For example, recent findings show that consumers use deal popularity to make value inferences in e-commerce settings [54]. By contrast, drawing on social influence theory Kuan et al. [46] found that deal popularity does not influence consumers' attitude and behavioural intentions. In

view of these mixed findings, we aim to enhance current understanding concerning the effect of deal popularity in e-commerce. Furthermore, the role of consumer perceptions concerning product/service quality has been overlooked in extant deal popularity research. With limited cues available in e-commerce environments, the quality of services (e.g., massage services) on offer may be difficult to judge by online consumers [41, 68]. Consequently, consumer decisions to purchase services using e-commerce may be influenced by alternative cues including deal popularity. However, the impact of deal popularity on quality inferences prior to a purchase remains under-explored. Therefore, further research is needed to explore both theoretically and empirically whether deal popularity evokes consumer product/service quality inferences in the process of product/service attitude formation.

While the social influence view driving extant research focuses on consumers' motivational goals to behave effectively [9, 14], in this study we use the online consumers' heuristic information processing as a lens through which to examine consumers' attitude formation toward products/services. Accordingly, we apply cue utilization theory in an attempt to unveil the mechanisms through which deal popularity influences purchase decisions. We aim to provide empirical evidence explaining whether and how deal popularity affects consumers' cognitive reactions and behavioural intentions in e-commerce service shopping environments where consumers often make purchasing decisions based on imperfect information. This study examines the extent to which deal popularity contributes to e-commerce success for services promotions by shaping high quality expectations. In addition to investigating the mechanisms by which deal popularity operates, this study also examines service

quality expectations toward deal popularity across service types, including credence and experience services.

This study contributes to knowledge in three ways. First, we extend extant research on cue utilization. Using cue utilization theory as a basis, our study is the first to conceptualize deal popularity as an extrinsic cue. This conceptualization is useful particularly for service offers in e-commerce where cues are imperatively important in assisting consumers to overcome imperfect information conditions associated with services intangibility. Second, we propose and validate a plausible mechanism of deal popularity and expected service quality, and explain the manner in which these impact behavioural intentions which is neglected in existing research [54, 79]. Specifically, we advance prior research by identifying and explaining the mediating effect of service quality expectations on the relationship of deal popularity and purchase and recommendation intentions. Third, by considering credence and experience services, this study is the first to assess service type as a boundary condition on the relationship between deal popularity and service quality expectations.

Our contribution and findings offer feasible managerial insights for e-commerce success. Indeed, deal popularity can change consumers' purchase intentions in terms of expected service quality prior to a purchase and can, consequently, be leveraged to boost revenue outcomes by affecting consumers' purchase intention and willingness to recommend. Additionally, our findings suggest that the impact of deal popularity outweighs the information barriers that are associated with the intangibility of purchasing services online. This paper is structured as follows. In the next section, we present the theoretical background to this study after which we propose the hypotheses. The method including

sampling, data collection and analysis is explained before findings are discussed and conclusions presented.

THEORETICAL BACKGROUND

Cue utilization

Informational cues associated with products or services play an important role in helping consumers make judgements [18, 40, 65]. Cue utilization theory [65] suggests that cues can be used as surrogate indicators of product or brand quality by consumers. Cues can be categorized as intrinsic or extrinsic [65, 92]. While intrinsic cues are related to the physical composition of the product (e.g., taste or aroma) and cannot be changed without altering the physical properties of the product, extrinsic cues are separate of the physical product and can be manipulated (e.g., price, brand name, and advertising).

While both types of cues are useful, consumers often rely on extrinsic cues, such as country-of-origin [4, 50], price [75], warranties [5], and brand [8, 40, 76] to make inferences about the quality of a product or service. Indeed, cue utilization theory suggests that consumers assign different weights to both intrinsic and extrinsic cues which may have different influences on quality assessment. For example, extant research shows that consumers rely on extrinsic cues when they are not familiar with products, when cues are readily recognizable and interpretable, and when intrinsic cues require expertise that prospective consumers may not possess [75, 76, 92].

As extrinsic cues are often more generalizable across brands and product categories [92], they can be more influential than intrinsic cues when consumers

assess product quality [76]. Zeithaml [92] describes conditions under which consumers rely more on extrinsic rather than intrinsic cues. These conditions include situations in which (1) intrinsic cues are unavailable, (2) evaluation of intrinsic cues takes more effort and time than expected, and (3) quality is difficult to evaluate (e.g., with experience and credence services). By contrast, the impact of intrinsic cues can often surpass that of extrinsic cues when (1) a consumer is consuming the product or service, (2) intrinsic cues are easily searchable, i.e., related to product content and directly associated with product quality, and (3) a consumer's perceived association between the cue and the product is high [76, 92].

This line of argumentation suggested by cue utilization theory is consistent with the heuristic-systematic dual-processing model [10], when information processing is costly [59] or when time to process information exceeds a consumer's processing capacity or time constrains [80], the consumer will lose motivation or incentive to fully scrutinize all available information systematically. Instead, consumers will find shortcuts to process extrinsic cues heuristically to evaluate products or services [10, 62, 80].

Cue utilization in e-commerce

Limited research has examined cue utilization in e-commerce. Notable exceptions include the work of Liu et al. [53], Gafni et al. [31], Lim and Ting [52], and Wells et al. [88] who found that extrinsic cues are associated both with the channel itself and its features, i.e., visual appeal of the website, number of products carried on the website, quality of product photos, and website ease of

use. Accordingly, Fogg et al. [28] argue that consumers do not spend much time in online shopping environments and make decisions based on extrinsic cues.

Other consumers' online behaviour, such as visiting a website or star ratings, has been found to influence potential consumers' reactions [13, 27, 48, 84, 94, 96]. A number of studies have examined the effect of popularity on consumer behaviour by using surrogates such as the number of consumer reviews, star ratings, or a seller's historical sales [11, 13, 89, 96]. Fu and Sim [30] argue that cues derived from the behaviour of previous consumers (e.g., number of views, likes, downloads) and feedback (e.g., comments and ratings) may be deemed as surrogates of product popularity. Indeed, in their study of online viewership, they found that the number of existing views serves as a popularity cue which is indicative of social endorsement and quality credibility which can subsequently create bandwagon effects that further increase viewership.

The rationale of using extrinsic cues is based on consumers' perception of imperfect information of products or services, which in turn forces them to seek cues to inform their decisions [54]. This is particularly common when information concerning products or services is limited (e.g., unfamiliar products or services for which intrinsic cues cannot be assessed). Online shoppers may be more inclined to rely on extrinsic cues when making their purchase decisions [75]. Arguably, extrinsic cues shown on webpages may be used heuristically for quality inferences by consumers who purchase online. Furthermore, social cues in e-commerce environments (e.g., others' behaviour) may be used as extrinsic cues in influencing service quality judgement, attitudes, and purchase behaviours.

HYPOTHESES DEVELOPMENT

Deal popularity

Product or service information shown in websites can constitute cues that prospective consumers use to make inferences about product or service quality. Consequently, these cues may influence the behaviour of prospective online consumers. Indeed, indications of high historical sales of a popular product may positively influence future sales growth [11, 89]. For example, a website counter indicating the number of consumers that have visited an online store constitutes an extrinsic cue of both product [25] or vendor quality [84] which enhances consumers' intentions towards the product or vendor. The quantity of consumer-generated reviews of a product/service has also been found to influence consumers' online behavioural intentions in terms of purchase and recommendations to others [70, 71, 82, 83]. Because popularity is defined as the relative frequency with which consumers choose a product or vendor, by implication, these cues, can describe product or vendor popularity [84].

However, while extant research has examined the effect of popularity on online consumer behaviour using surrogates such as a cumulative historical product sales [11, 89] or number of consumer reviews [13, 96], a growing number of e-tailers are also using deal popularity which constitutes the cumulative number of deals for a product or service sold within a specific time interval [54]. Hence, deal popularity is different to the popularity information studied in prior research using historical sales or reviews. Deal popularity can be considered as an extrinsic cue as it is not inherent to the product or service. As such, it can be a predictor of consumers' perceived value of a deal [17], their

purchase and recommendation intention [39, 51, 54], and coupon redemption behaviour related to e-commerce deals [54]. Subramanian and Rao [79] argue that merchants can leverage information concerning their past deal sales to attract new consumers by displaying deal popularity cues in their e-commerce websites. Accordingly, we hypothesize that:

H1a: Deal popularity is positively related to purchase intention.

H1b: Deal popularity is positively related to willingness to recommend.

While popularity can be an influential cue affecting purchase intentions [19] it can also signal information concerning product or service quality [79, 84]. By implication, it is not unreasonable to expect that deal popularity could influence consumers' pre-purchase quality expectations of a product or service [82, 84, 89]. Indeed, past research examining star ratings and consumer reviews as proxies for product popularity has evidenced the impact of popularity on consumers' product quality perceptions [13, 27, 48, 94, 96]. However, to our best knowledge no study has examined the effect of deal popularity on quality assessment in e-commerce. And yet, deal popularity might be a particularly useful cue for prospective customers of service offers in e-commerce given their intangibility. Thus, we hypothesize that:

H2: Deal popularity is positively related to expected service quality.

Expected service quality can affect consumers' behavioural intentions. For example intangible service attributes, such as responsiveness, can influence consumers' perceived quality which in turn impacts on consumers' willingness to recommend and their purchase intentions [47, 86]. The number of salespeople

in a store was treated as a social cue that influences consumers' interpersonal service quality perceptions and subsequently was found to impact on intentions to visit the store, purchase, and recommend [2]. Past consumers' votes or reviews can influence prospective consumers' product quality assessment or expectations which can in turn influence purchase intentions [27, 48]. Thus, increases in deal popularity could strengthen prospective consumers' confidence in the expected service potentially enhancing their intentions to purchase and recommend services in a deal offering. No prior research exists that has examined this relationship. Furthermore, deal popularity can influence how consumers form pre-purchase service quality expectations which can in turn also affect consumers' willingness to recommend. Thus, we propose the following hypotheses:

H3a: Expected service quality mediates the positive relationship between deal popularity and purchase intention.

H3b: Expected service quality mediates the positive relationship between deal popularity and willingness to recommend.

Service type

To test consumers' heuristic information processing of deal popularity, an adequate services classification was needed. Based on the cost and difficulty of obtaining information, Nelson [64] and Darby and Karni [20] distinguished between search, experience and credence services. Similar to goods, services with search attributes (e.g., dry cleaning) include characteristics which can be evaluated; and their quality can be assessed by consumers prior to the purchase [45, 61]. As consumers are often able to inspect these goods/services

inexpensively prior to purchase, and thus assess their quality [64], additional informational cues may not necessarily be utilized. To examine consumers' use of deal popularity, experience and credence services are thus used in this study because their non-searchable attributes create incentives for consumers to utilize extrinsic information cues.

Experience and credence services can be distinguished based on the difficulty of quality information acquisition prior to and after a purchase [60, 61][20]. Experience services comprise those services the attributes of which can only be assessed after consumption at which point consumers can form judgments about them (e.g., services offered in a beauty salon) [64]. By contrast, the attributes of credence services may not be assessed prior to a purchase nor necessarily sufficiently well after consumption (e.g., insurance) [20].

While quality information may be difficult to obtain for both types of services prior to purchasing them, credence services are typically characterized by greater amount of expertise (e.g., legal services) than experience services [20, 61]. Therefore, consumers without the relevant knowledge may have greater difficulty in judging the quality of credence services. Furthermore, as consumers are likely to be highly involved during the production of credence services, these are typically associated with higher degree of customization than experience services [61, 91]. It follows that credence services are likely to be of a non-standard nature which may lead to both relatively higher quality uncertainty and difficulty of making pre-purchase quality inferences [61, 63].

Service type has been found to influence consumer behaviour. For example, consumers perceived higher risk for credence services than experience services

and thus their likelihood of impulsive buying was stronger for experience services than credence services [77]. In online environments, consumers preferred purchasing experience services to credence services because of the relatively greater product quality uncertainty associated with the latter [43]. Furthermore, as suggested by Zhu and Zhang [96], online consumers may behave differently to those in other settings (e.g., traditional brick and mortar stores), and these differences are often affected by the attributes of services or goods. For example, electronic word-of-mouth has been found to be perceived as more credible for experience services (i.e., language school) than products with conveniently searchable attributes (e.g., books) [69] and credence attributes (e.g., health goods) [66]. By contrast, negative content has been found to be more credible for products with credence attributes than for experience services [66]. Similarly, star ratings of product reviews which is generated by existing consumers have been found to have more pronounced impact on the usefulness of online consumer reviews for experience services (e.g., movies) than for products characterised by credence attributes (e.g., healthy food or photo editing software) [67].

From the perspective of heuristic-systematic information process theory [10], we postulate that service type influences the effect of deal popularity on expected service quality. Owing to the relative variability and non-standardized nature of credence services, consumers cannot assess quality of credence services using prior experience [41] and thus potentially perceive high uncertainty concerning service performance [41, 61]. With imperfect information and without the expertise, consumers are likely to use heuristic cues (e.g., brands or price) that are available and credible to them to form quality

expectations of a credence service [32]. However, when consumers are unable to recognize a new brand of credence services and therefore unable to make quality inferences on such basis, they search for other cues. High deal popularity may signal agreement or consensus of the majority of existing customers [55] which in turn may be used heuristically by consumers to influence their purchase decisions to agree and follow choices made by other consumers. It follows that, when deal popularity cues are available for consumers to use in judging credence services, they may rely on them to form expectations of quality for these services. We, therefore, hypothesize that:

H4a: Under conditions of purchasing credence services, consumers' expectations of service quality for a service with high deal popularity would be higher than expectations of service quality for a service with low deal popularity.

On the other hand, given that experience services are likely to entail lesser expertise and customization relative to credence services, consumers can also form judgement based on prior experience in informing future purchase decisions [41]. It follows that when purchasing experience services, a consumer may form quality expectations by relying on their own experiences in addition to extrinsic cues (e.g., price). This implies that reliance on cues is likely to be shared across more cues for experience services relative to credence services. This lack of reliance exclusivity may suggest that it is not unreasonable to expect that deal popularity may not necessarily exert full impact (in the same way as with credence services) on the formation of consumers' quality expectation for experience services. We, therefore, hypothesize that:

H4b: Under conditions of purchasing experience services, consumers' expectations of service quality for a service with high deal popularity would be no different from expectations of service quality for a service with low deal popularity.

METHOD

To test the hypotheses we conducted a scenario-based experiment.

Design and subjects

A 2 (deal popularity: high *versus* low) x 2 (service type: credence *versus* experience) experimental between-subjects factorial design was used to test hypotheses. The dependent variables are purchase intention, expected service quality and willingness to recommend. The experiment was conducted at a large university in Taipei, Taiwan. Undergraduate students (n=202) participated in the experiment. Among the subjects, 72% were female and 74% were between 20-24 years old. Given its steady growth of online shopping, Taiwan constitutes a suitable research setting that is consistent with the aim of our research. Indeed, Taiwan's e-commerce penetration ranks second globally behind South Korea and followed by China [87]. Online shopping sales in Taiwan were expected to grow 14% in 2015 from 2014, with a 12% annual growth forecast into 2016 [78].

Our choice of a student sample can be justified on two grounds. First, university students are the dominant cohort of e-commerce users [21, 49] and constitute an active group of online shoppers in Taiwan. Second, university students represent a homogeneous sample [72] that is closer to the online consumer population in Taiwan [58]. Indeed, a recent survey shows that among

surveyed internet users, 35.3% are aged 15-24 representing the largest proportion of internet users in Taiwan in 2015 [16].

Stimuli

Deal popularity and service type were manipulated by showing different screenshots of a popular online group buying website showing different deal popularity and sale information for two different services (Appendix 1). The specific number of items sold as part of the deal was used to represent deal popularity (i.e., 1999 as high popularity and 9 as low popularity, respectively). Based on the results of pre-tests of 12 popular services on deal-of-the-day, psychic fortune-telling is chosen as the credence service whereas Karaoke as the experience service as the subjects are familiar with these two services which are relevant to young people's entertainment lifestyle [44, 90]. Price and discount rates were controlled at the same level across conditions.

Sampling and procedure

At the beginning of the experiment, participants were informed that they were participating in research examining their reactions to deal promotion in an online group buying website. Participants completed the online experiment in a computer lab using Qualtrics, a popular tool for online experiments [3]. During the experiment, they were randomly assigned to one of the four experimental conditions, each with 50 subjects in order to satisfy the minimum 30-each-cell rule of thumb requirement [85] and achieve the desired statistical power effect (power=0.99, α = .05) [24, 26]. Each participant read experiment instructions and a purchase scenario corresponding to a screenshot of an online group buying website. They subsequently responded to manipulation check items for deal

popularity before providing demographic information. The experiment was conducted in Chinese. Construct items were translated into Chinese by two bilingual doctoral students at an Australian University and then back into English by another bilingual researcher to ensure semantic equivalence [7]. Sourced from the literature, all the items were rated on 7-point Likert scales (1=strongly disagree; 7=strongly agree). To reduce common method bias, items of the same constructs are separated in the questionnaire. We also used inverse structures for items, ensured respondents' anonymity and pointed out in the cover letter that there were no "right/wrong" answers to minimize the risk of evaluation apprehension [73].

Measures

Three item scales for expected service quality, purchase intention, and willingness to recommend were adapted from Jin and He [42], Lee and Lee [48], and Zeithaml et al. [93], respectively (see Appendix 2). The reliability of selected measures was tested using confirmatory factor analysis. Construct validity was probed for convergent and discriminant validity. Convergent validity was assessed by reviewing factor loading, composite reliability, and average variance extracted (AVE). Internal consistency was assessed by calculating composite reliability. We find that composite reliability of the three constructs is higher than 0.6, the lowest acceptable threshold in exploratory research [29, 35].

Reliability was assessed by examining the construct items' factor loadings. After removing one item from the original expected service quality construct, the remaining items' loadings are both statistically significant and are higher than the lowest required threshold of 0.4 [6, 33] which demonstrates that all items are

reflected in their corresponding construct. AVE for all constructs was above 0.5 [35]. AVEs of each construct (0.62~0.68) are greater than the squared correlations of paired constructs (0.42~0.49) which evidences discriminant validity [29, 35].

Manipulation check

The manipulation of deal popularity were pretested with a sample of 59 subjects at the same university. After reading the information provided in the scenario, pretest subjects responded to questions in relation to the scenario using 7-point Likert scales. Participants assigned in high deal popularity scenarios reported that they felt the size of number of bought in the deal was larger than those assigned in low deal popularity scenarios (Pretest samples: $M_{High}=5.00$ versus $M_{Low}=3.44$; main study: $M_{High}=4.50$ versus $M_{Low}=2.97$). Using analysis of variance (ANOVA), the manipulation was significant for the high *versus* low deal popularity scenarios in both pretest samples and the main study ($F(1,57)=11.823, p=0.001$; $F(1,200)=39.125, p<0.001$).

RESULTS

PROCESS macro based on ordinary least squares (OLS) regression for SPSS [36] was used for hypotheses testing. The analysis was conducted using 10,000 bootstrapped samples. First, we examined a mediation model including deal popularity as the key predictor, expected service quality as the mediator, and subject's purchase intention and willingness to recommend as the dependent variables. We subsequently tested the mediation across two different service types. Specifically, we examined the influence of service type on the indirect association of deal popularity with purchase intention through expected service

quality. PROCESS macro allowed for the estimation of this mediation model.

Table 1 summarizes the model coefficients.

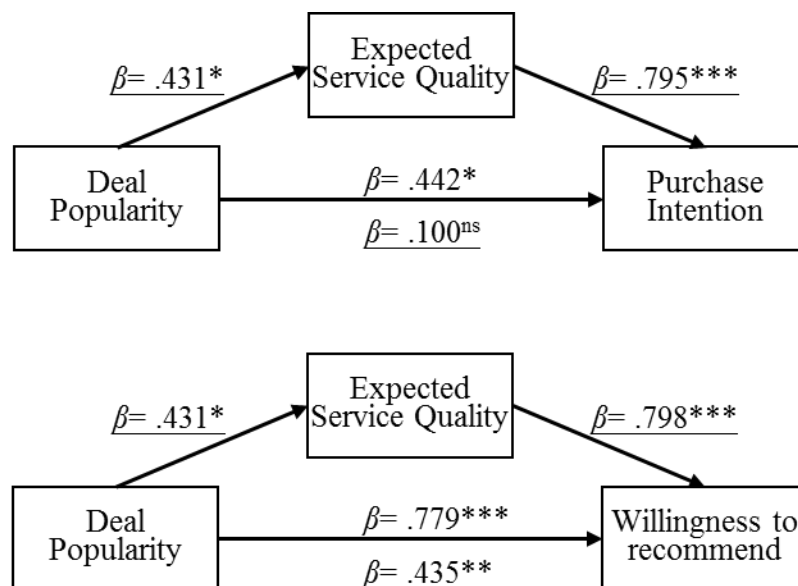
TABLE 1. Results of baseline model

N=202	Expected service quality (ESQ)				Purchase intention (PI)				Willingness to recommend (WR)									
	Coeff.	SE	t	p	LLCI	ULCI	95% BC		Coeff.	SE	t	p	LLCI	ULCI	95% BC			
Antecedent																		
Deal popularity (DP)	0.431	0.166	2.599	0.010	0.104	0.757	0.100	0.160	0.623	0.534	-0.216	0.416	0.435	0.157	2.769	0.006	0.125	0.745
ESQ	---	---	---	---	---	---	0.795	0.067	11.807	<.001	0.662	0.927	0.798	0.066	12.102	<.001	0.668	0.928
constant	3.302	0.117	28.181	<.001	3.079	3.533	0.297	0.249	1.193	0.234	-0.194	0.787	0.222	0.244	0.913	0.362	-0.258	0.703
	$R^2 = 0.033, F(1,200) = 6.756, p = 0.01$				$R^2 = 0.425, F(2,199) = 73.627, p < .001$				$R^2 = 0.463, F(2,199) = 85.927, p < .001$									
Total effect	DP on PI : Effect size: 0.442, SE: 0.205, p=0.032, BC CI [0.038, 0.847] DP on WR: Effect size: 0.779, SE: 0.203, p<0.001, BC CI [0.378, 1.179]																	
Direct effect	DP on PI : Effect size: 0.100, SE: 0.160, p=0.534, BC CI [-.216, 0.416] DP on WR: Effect size: 0.435, SE: 0.157, p=0.006, BC CI [0.125, 0.745]																	
Mediation effect	PI: $k^2 = 0.137$, Bootstrap SE=0.048, Bootstrap BC CI= [0.037, 0.230] WR: $k^2 = 0.132$, Bootstrap SE=0.048, Bootstrap BC CI= [0.035, 0.225]																	

Note. 10,000 bootstrap samples. BC CI= bias-corrected confidence interval

Results indicate that deal popularity was a significant predictor of expected service quality ($\beta=.431$, $SE=.166$, $p=.01$) in the mediation model. The effect of deal popularity on purchase intention was reduced to non-significant, i.e., from $\beta=.442$, $p=.032$ to $\beta=.100$, $p=.534$, while the effect on willingness to recommend remained significant, i.e., from $\beta=.779$, $p<.001$ to $\beta=.435$, $p=.006$, when expected service quality was included in the equation.

Expected service quality was a significant predictor of purchase intention and willingness to recommend ($\beta=.873$, $SE=.085$, $p<.001$; $\beta=.798$, $SE=.066$, $p<.001$). Results suggested an indirect effect by showing the mediation effect size excluded zero on purchase intention and willingness to recommend ($k^2=.137$ and $k^2=.132$, bootstrap analysis based on 95% bias-corrected confidence interval [0.037, 0.230] and [0.035, 0.225]) [74] (see Fig.1). These results indicate that expected service quality accounts for the effect of deal popularity on consumers' purchase intention and willingness to recommend. Hence results support H1a, H1b, H2, H3a, and H3b.



Expected service quality mediates the effect of deal popularity on behavioral intentions. * $p<.05$, ** $p<.01$, *** $p<.001$

FIGURE 1. Baseline model

Further to the baseline model, we also examined the effect of deal popularity on expected service quality across two different service types, namely, experience and credence services. Table 2 summarizes model coefficients. Results indicate that in the both types of services, mediation effect size excludes zero on purchase intention (Credence: $k^2 = .214$, 95% BC CI [0.065, 0.351], Experience: $k^2 = .055$, 95% BC CI [0.002, 0.157]) and willingness to recommend (Credence: $k^2 = .203$, 95% BC CI [0.060, 0.338], Experience: $k^2 = .057$, 95% BC CI [0.002, 0.164]) which suggests a different level of significance between experience and credence services. Evidently, deal popularity remained a significant predictor of expected service quality ($\beta = .664$, $t(95) = 2.642$, $p = .01$) in the mediation model of purchase intention and willingness to recommend for credence services, though it was non-significant for experience services ($\beta = .184$, $t(103) = .895$, $p = .373$). Hence, results support H4a and H4b.

TABLE 2. Baseline model in different service purchase conditions.

Antecedent	Credence service (n=97)						Experience service (n=105)					
	Expected service quality (ESQ)						Expected service quality (ESQ)					
	Coeff.	SE	t	p	95% BC		Coeff.	SE	t	p	95% BC	
				LLCI	ULCI					LLCI	ULCI	
Deal popularity (DP)	0.664	0.251	2.642	0.010	0.165	1.163	0.184	0.205	0.895	0.373	-0.223	0.590
ESQ	---	---	---	---	---	---	---	---	---	---	---	---
Constant	2.900	0.175	16.581	<.001	2.553	3.247	3.696	0.146	25.144	<.001	3.405	3.988
	R ² = 0.068, F(1,95)=6.980, p=0.01						R ² = 0.008, F(1,103)=0.802, p=0.373					
Mediation effect	PI: $k^2 = 0.214$, Bootstrap SE=0.073, Bootstrap BC CI= [0.065, 0.351] WR: $k^2 = 0.203$, Bootstrap SE=0.071, Bootstrap BC CI= [0.060, 0.338]						PI: $k^2 = 0.055$, Bootstrap SE=0.045, Bootstrap BC CI= [0.002, 0.157] WR: $k^2 = 0.057$, Bootstrap SE=0.049, Bootstrap BC CI= [0.002, 0.164]					

Note. 10,000 bootstrap samples. BC CI= bias-corrected confidence interval

DISCUSSION

This research investigates deal popularity as an extrinsic cue and its use by e-commerce consumers. Results confirm cue utilization theory expectations whereby deal popularity is a positive predictor of consumers' expected service quality, which in turn affects behavioural intentions. This study provides strong support for all hypothesized relationships and service type as a boundary condition. Indeed we find that deal popularity has a significant and positive effect on expected service quality which in turn influences purchase intention and willingness to recommend. Furthermore, we provide evidence that service type influences the extent to which deal popularity is effective. That is, the effect of deal popularity on expected service quality is significant for credence services while its effect is not significant for experience services.

Using cue utilization theory and the related research of Coulter and Roggeveen [17] and Luo et al. [54] for the first time in this domain, our findings improve current understanding of the effect of deal popularity on online shoppers' purchase decisions. Indeed, our findings suggest that consumers use deal popularity to make quality inferences concerning services sold at online e-commerce websites. Consistent with past research, our findings support that displaying the number of items sold in a deal does signal deal popularity to prospective buyers [54, 79]. Our subjects manifested greater intentions to purchase and willingness to recommend when exposed to more popular deals (as opposed to lesser popular deals). Our findings also show that consumers' intention to purchase and willingness to recommend is positively affected by deal popularity information which also enhances their expected service quality. Indeed, in deep online discount e-commerce settings, when controlling for price

and discount rate, high deal popularity information appears to increase consumers' service quality expectations, which in turn increases the likelihood that they will purchase and make positive deal-endorsing recommendations.

Furthermore, our results indicate that consumers' utilization of deal popularity to form service quality expectations varies across service types. As predicted, consumers' expected service quality based on deal popularity is significant for credence services and insignificant for experience services. That is, our findings suggest that consumers are more likely to purchase credence services online when they are exposed to high deal popularity.

This is consistent with Fogg et al. [28] who argue that online shoppers tend to use cues heuristically for decision making which is intuitive if consumers are not confident about using other cues (e.g., price or brands) to assess credence service quality. Indeed, available deal popularity information can become an important cue that signals consensus in the majority's choice [55]. When quality uncertainty is a major concern in purchasing credence services online, others' choices imply endorsement (or otherwise) of the credence services' quality sold in deals. Thus, deal popularity can be considered a salient cue that mitigates quality concerns when consumers have insufficient knowledge when attempting to purchase credence services online. This study thus offers evidence that the effect of deal popularity is used as a cue for the purchase of credence services as well as recommendation to prospective consumers. It thus helps mitigate the uncertainty that is associated with the inherently intangible nature and customized properties of credence services.

Implications

Our research extends extant research by using a different theoretical perspective to provide an explanation of how deal popularity influences consumer reactions in e-commerce. Unlike extant research that studies deal popularity from social perspective [46, 54], our research draws on cue utilization theory by focusing on the cue-quality relationship. Accordingly, our study provides insights into the specific components of cue utilization in e-commerce. First, this research adds to the literature by proposing that deal popularity is an extrinsic cue. It advances extant research by examining the relationship between deal popularity and expected service quality in line with cue utilization theory. We find empirical support for the role of deal popularity and the mechanisms by which consumers use deal popularity to form service quality expectations which in turn inform purchase intentions and willingness to recommend a service in a deal.

This research also adds to the e-commerce strand of service marketing literature. Prior research on consumers' online behaviour has found that certain extrinsic cues (e.g., reviews) are more likely to have a positive impact on experience services rather than other types of services [66, 69]. By contrast, our findings demonstrate that online consumers prefer to use deal popularity information to form service quality expectations for purchasing credence services rather than experience services. This paves the way for better understanding of consumers' cue utilization of deal popularity in e-commerce services shopping.

Furthermore, our findings offer insight to e-commerce designers for marketing services efficiently and effectively by displaying deal popularity information on websites. The hurdle of promoting credence services is often

bigger than that of experience services based on consumers' ability to judge quality after the purchase. Furthermore, traditional price/brand-quality relationships may be jeopardized by online price wars amongst e-commerce merchants that create shopping environments of deep discounts. Consumers expect cues that help reduce service quality uncertainty. Thus, providing cues for experience and credence services becomes important for e-commerce design and success. Our findings show that when brand familiarity or product/service knowledge is lacking, deal popularity is used as a cue to make quality inferences. Service marketers can, thus, take advantage of this finding to attract prospective consumers. This might be particularly useful for credence services sold online. We find high deal popularity of credence services reduces consumers' perceived quality uncertainty and increases positive quality expectations.

Limitations and directions for future research

Current research contributes to an emerging understanding of the effect of deal popularity as an extrinsic cue for consumers' online pre-purchase reactions in e-commerce. We suggest three future research opportunities. First, whilst this study has focused on deal popularity, extant research suggests that other cues capturing the behaviour of past consumers may also affect prospective consumers. Further research should examine how multiple cues are utilized by prospective consumers in affecting their desirable outcomes in e-commerce (e.g., purchase intentions).

Second, we test our model by using data collected in Taiwan which is considered as an interdependent culture [56]. Cultural differences may impact on the effect of how deal popularity operates in our model. Indeed, theories

applied in one cultural context may not necessarily offer the same explanation in another [37]. This suggests that further research is needed to replicate this study in Western cultures to further validate the extent to which the relationships unveiled in this study hold (or not) while also investigating the underlying reasons.

Third, whilst we have advanced current knowledge in this area, boundary conditions for using deal popularity are still equivocal. In terms of information processing theory, personal factors such as the need for cognition have been suggested to impact on consumers' cognitive information processing in product/service judgments [55]. The effect of deal popularity might be moderated due to personal factors which is worth examining further. This will help further refine boundary conditions of deal popularity in e-commerce.

CONCLUSION

Our research adds to the growing literature of the impact of deal popularity on consumer reactions [54, 79] and e-commerce of service products. Our key contribution is to provide an alternative perspective concerning the role of deal popularity as an extrinsic cue in e-commerce of service purchase behaviours. We draw on cue utilization theory to achieve our aim. Specifically, we examine the role of deal popularity on purchase intentions and willingness to recommend through expected service quality in online service shopping context. Service type is examined as a boundary condition to contribute to both online services marketing and cue utilization theory. We find that consumers prefer to use deal popularity as a cue to form service quality expectations for purchasing credence services. Our results open an avenue for online services marketing by using deal

popularity to signal service quality and thus reduce the uncertainty of credence services. This research provides practical insights into e-commerce design for e-retailers to inform their strategies for attracting consumers to purchase services online by using deal popularity as a cue.

APPENDIX 1. Examples of screenshots

Buy Now Use Now Valuable deal! Time to have happy singing hours! \$225 per person for up to 4 hours.

\$900 for 4 people (for 4 hours on weekdays or 3 hours on weekends). A pitcher of drink, snacks, and a fruit plate are served. Excellent audio equipments and room decorations for you to enjoy singing with friends.

\$900

BUY



Over 1999 bought

Group successful and continue to buy 75% Off



Buy Now Use Now Tell you about your past, now, and future about Love, Study, and Career!

Can tell from birthday information, palmistry, and face. \$900 per person per hour.

\$900

BUY



Over 9 bought

Group successful and continue to buy 75% Off



APPENDIX 2. Measurements

Purchase intention	PI1	Based on the information provided in the scenario, I am positive towards buying the service in this snapshot.
	PI2	Based on the information provided in the scenario, I have the intention of buying the service in this snapshot.
	PI3*	Based on the information provided in the scenario, I think it is not a good idea to buy the service in this snapshot.
Willingness to recommend	WR1	I will say positive things about the service offered in this snapshot to other people.
	WR2	I will recommend the service offered in this snapshot to someone who seeks my advice.
	WR3	I will encourage friends and relatives to look at this offer.
Expected service quality	ESQ1	What is the likely quality of this service relative to others in the same category? (1=much lower than average quality; 7=much higher than average quality)
	ESQ2	How would you rate the overall quality of this service according to the information provided in the scenario? (1=low quality; 7=high quality)
	ESQ3†	How likely is this service provider to resolve any service failure to your satisfaction? (1=very unlikely; 7= very likely)

*Reverse coded

†Deleted in data analysis to improve composite reliability

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CONCLUSION TO STUDY I

Online Consumers' Responses to Deal Popularity as an Extrinsic Cue

The first study of this thesis provides evidence that online deal popularity can be used as an extrinsic cue to inform consumers' quality expectation toward a service deal which, in turn, influences their purchase intention and willingness to recommend. These findings thus have addressed research issues showing in chapter 1 in relation to the assumptions of utilisation of online deal popularity as a cue for service quality expectation and the influence across service types.

Results show that high deal popularity leads to high purchase intention/willingness to recommend through a high service quality expectation. Furthermore, as expected, when consumers face a purchase situation for credence services, high deal popularity accounts for high service quality expectation while this effect is not found in a purchase situation for experience services. The findings suggest that online deal popularity is more effective in predicting service quality for credence than for experience services. Results provide an avenue for service e-retailers to take advantage of deal popularity in marketing credence services online.

With evidence of the effect of online deal popularity on purchase intention underlying service quality expectation, consumers' multiple cue utilisation provokes the potential influence of cue congruency. Particularly, the congruency between online deal popularity and star rating which are related to a service deal and have been deemed as popularity cues is investigated. Thus, Study II examines the cue congruency effect on online deal popularity by including star rating in experimental scenarios. Considering incongruent cues, the effect of

high online deal popularity when paired with low star rating is further investigated. Moreover, online information authenticity perceived by consumers may influence the manner in which they utilise cues. Furthermore, Study II explores the impact of perceived information authenticity. Therefore, in Study II, an examination of perceived authenticity of deal popularity is conducted to test its moderating role in influencing online deal popularity and cue congruency. Study II is presented in the next chapter.

Chapter 3. STUDY II: Online Consumers' Reactions to Service Deal Popularity: The Role of Cue Congruency and Perceived Information Authenticity

INTRODUCTION

The second study, *Online Consumers' Reactions to Service Deal Popularity: The Role of Cue Congruency and Perceived Authenticity*, is an extension of Study I. The aim of Study II is to investigate the combination of two information cues related to popularity (i.e., deal popularity and star rating) by assessing the cue congruency effect and the influence of perceived information authenticity on online deal popularity.

Online deal popularity and star rating are both popularity cues. While online deal popularity captures current buyers' purchase behaviour and star rating reflects prior users' experience, both cues may not necessarily present consistent information (e.g., high star rating with low deal popularity). While e-retailers may like to display high deal popularity information on their websites, it is unclear how star rating works in conjunction with deal popularity, and how these cues work together to influence online consumer behaviour. An examination of the (in)congruency between these cues and the manner in which they are utilised by consumers to inform service quality and decisions is imperative, though under-researched.

As consumers become increasingly sophisticated in online shopping, they are also more sceptical toward information that is presented to them in online settings (e.g., Luca and Zervas, 2016). Perceived information authenticity from the consumers' viewpoint may impact their acceptance and adoption of online

information for decision-making. Arguably, consumers' perceived authenticity of online deal popularity will influence their use of it to form service quality expectation and purchase intention. However, extant research remains silent in relation to perceived authenticity of deal popularity in online shopping contexts. Thus, Study II addresses these gaps by using two scenario-based experiments to examine the moderating role of cue congruency and perceived information authenticity. Incongruent cues are also examined to explore whether high deal popularity can influence service quality expectation when paired with low star rating.

Study II is presented in a journal article format and is presently under review for a special issue of the European Journal of Marketing entitled *Consumers and Technology in a Changing World*³. The presentation in this thesis is in the required format of the journal, while tables and figures have been placed throughout the article to facilitate reading. The respective contributions of co-authors of this article are outlined in the following page.

³ http://www.emeraldgrouppublishing.com/products/journals/call_for_papers.htm?id=6762

STATEMENT OF AUTHORSHIP

Statement of Authorship

Title of Paper	Online Consumers' Reactions to Service Deal Popularity: The Role of Cue Congruency and Perceived Information Authenticity
Publication Status	Submitted
Publication Details	This research paper is targeted for submission to the special issue of Consumers and Technology in a Changing World in the European Journal of Marketing.

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Contribution to the Paper	I conceptualized research framework from literature review, designed and conducted experiments for data collection and analysis, reported findings, and implemented writing.	
Overall percentage (%)	70%	
Certification:	This paper reports on original research I conducted during the period of my Higher Degree by Research candidature and is not subject to any obligations or contractual agreements with a third party that would constrain its inclusion in this thesis. I am the primary author of this paper.	
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By signing the Statement of Authorship, each author certifies that:

- i. the candidate's stated contribution to the publication is accurate (as detailed above);
- ii. permission is granted for the candidate to include the publication in the thesis; and
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STUDY II

Online consumers' reactions to service deal popularity: The role of cue congruency and perceived authenticity

Abstract

Purpose – The aim of this paper is to investigate the effect of (in)congruency of two common online information cues (deal popularity and star rating) on e-tailing sites. It also investigates the effect of perceived information authenticity on online consumers' reactions to deal popularity cues.

Design/methodology/approach – It presents two between-subjects experiments with a 2 (deal popularity: high versus low) X 2 (star rating: high versus low) and a 2 (deal popularity: high versus low) X 2 (star rating: high versus low) X 2 (perceived information authenticity: high versus low) to explain how cue (in)congruency and perceived information authenticity impact on the manner in which online deal popularity is used by consumers to shape service quality expectation and purchase intention.

Findings – Findings indicate that cue congruency moderates the effect of online deal popularity on purchase intention through service quality expectation. While high deal popularity and high star rating jointly have a strong and significant effect on service quality expectation, the former exhibits similar a strong influence even when paired with low star rating. High perceived authenticity of deal popularity is found to amplify the effect of deal popularity and the interactive effect between cue congruency and deal popularity.

Originality/value – This paper contributes to the service marketing literature about the utilisation of (in)congruent multiple cues particularly related to popularity of an online service deal.

Keywords Deal popularity, Cue congruency, Perceived information authenticity, Service quality, Online shopping

Paper type Research paper

Introduction

A growing number of service firms are turning to deal-of-the-day e-retailers (e.g., groupon.com) who often provide deep discounting (e.g., on average more than 50%) (Edelman *et al.*, 2016). From service vendors' perspective, these online retailing websites provide an opportunity for sales promotion. From consumers' viewpoint, these promotions are attractive but often associated with uncertainty which is exacerbated in online settings. Under these circumstances, information about other consumers' online behaviour becomes increasingly important in influencing consumers' purchase decisions (Keh *et al.*, 2015). Deal popularity and star rating are two common information cues representative of others' online behaviour that can inform about online product/service quality and influence online consumers' judgements and decision making (Flanagin *et al.*, 2014; Kao *et al.*, 2016; Luo *et al.*, 2014).

Deal popularity is a counter shown on a retailer's website offering deals; it shows the cumulative number of deals bought by existing consumers within a specific time duration (Luo *et al.*, 2014). Much recent research has shown the effect of deal popularity to induce prospective consumers' purchases and thus benefit both e-retailers and service vendors (Clancy, 2013; Luo *et al.*, 2014;

Subramanian and Rao, 2016).

Often shown together with deal popularity, star rating shows the average number of stars awarded to a deal. While deal popularity represents current consumers' purchase behaviour (Luo *et al.*, 2014), star rating is awarded by prior consumers showing their positive or negative attitude toward a service based on their consumption experience (Keh *et al.*, 2015).

Consumer purchases (captured by deal popularity) and rating (captured by star rating) are not simultaneous events. Indeed, additional purchases of a service deal are captured automatically and instantly while star rating occurs after a service is consumed. Different deal popularity-star rating combinations are therefore often displayed on websites (e.g., high star rating and low deal popularity or low star rating and high deal popularity).

While e-retailers might prefer high deal popularity, it is unclear how star rating cues work in combination with deal popularity cues to influence online consumer behaviour. A better understanding of whether or how these cues are perceived to strengthen or weaken each other and the conditions under which this is likely to occur, can be useful to marketing strategists and e-retailers when they devise their online strategies, promotional campaigns, and even website design. An examination of the congruency between cues and the manner in which they are utilised by consumers to inform decisions is thus imperative, though it remains under-researched.

Furthermore, as consumers become increasingly sophisticated online shoppers, they are also growing more suspicious toward information presented to them in online settings (Schuckert *et al.*, 2016; Sundar, 2008). Precedents set

by unethical online retailers that have fraudulently manipulated online information (e.g., fraudulent online reviews of Yelp.com) have legitimised these suspicions (e.g., Luca and Zervas, 2016). Indeed, recent research has found that the extent to which online information is perceived to be authentic (or not) can influence consumers' attitude toward a brand (Seok *et al.*, 2016) as well as the manner in which consumers react to such information and adopt it for purchase decisions (Huang *et al.*, 2011).

While perceived information authenticity is often based on consumers' knowledge and internet usage experience (Filieri, 2016), an examination of this construct from consumers' perspective is necessary particularly when studying online information utilisation. However, extant research remains silent in relation to perceived authenticity of deal popularity in online shopping contexts. To this end, this research illuminates the effect of consumers' perceived authenticity of deal popularity as a boundary condition that may moderate the effect of deal popularity.

The aim of this paper is to investigate the impact of (in)congruency of two common online information cues (deal popularity and star rating) on e-tailing sites and that of perceived information authenticity on online consumers' reactions to deal popularity cues.

The remainder of the paper is structured as follows. First, we discuss the theoretical background which forms the basis of hypotheses development. We then provide details of two experiments designed to test the hypotheses and explain the results before discussing the implications of the study. A discussion of further research concludes the paper.

Theoretical background and hypotheses

Cue congruency

Consumers are often presented with multiple cues when making judgments. For example, they may be presented with any combinations of brand name, warranty, country-of-origin and price information which influences consumers' quality perceptions and behavioural intention (e.g., Akdeniz *et al.*, 2013; Miyazaki *et al.*, 2005). The cue congruency effect suggests that cues can be more useful when providing corroborating rather than conflicting information (Maheswaran and Chaiken, 1991; Miyazaki *et al.*, 2005).

This can be explained using the cognitive schema perspective which suggests that consumers interpret and encode information according to their social expectations toward information which in turn is derived from a generic knowledge structure of a person's memory (Stangor and McMillan, 1992). The cognitive schema guides information processing such that congruent information is preferred because it is easier to assimilate into a consumer's existing expectations (Stangor and McMillan, 1992). This suggests that a cue's value is influenced by the presence of other cues (Herr *et al.*, 1991).

Much of the cue congruency research in the marketing literature is centred around its effect on product attitude formation and quality evaluations using experimental designs (see summary of cue congruency studies in Table I). Accordingly, consumers generally prefer congruent and tend to neglect incongruent information (Kardes *et al.*, 2004). Cues that provide congruent information are favourable due to high diagnosticity which enhances cue influences in making convergent judgments (Dick *et al.*, 1990; Purohit and

Srivastava, 2001).

Table I. Summary of empirical research of congruency of extrinsic cues

Study	Cues	Key Findings
Kamins and Gupta (1994)	Spokesperson and Product image	The congruency between a spokesperson's image and a product results in high perceptions of believability and attractiveness of the spokesperson and a favourable attitude toward the product when the spokesperson is a celebrity.
Mitra (1995)	Price and Brand	Price influences product evaluations only when price and attributes are in congruent conditions.
Chao (2001)	Country-of-origin of parts, assembly, and design	Consumers' positive attitude toward a product and purchase intention is significant high when the combination of cues is positively congruent (e.g., US parts x US assembly x US design > US parts x Mexico assembly x US design).
Miyazaki <i>et al.</i> (2005)	Price, warranty/brand/country-of-origin, and intrinsic information.	When intrinsic information is absent, extrinsic cues have significant interactive effects on perceived product quality when cues present congruent combinations.
Josiassen <i>et al.</i> (2008)	Country-of-origin image and country-of-origin of parts/assembly/design	Products' country-of-origin image influences consumers' product quality perceptions and purchase intention only when the congruency of cues is high.
Khare <i>et al.</i> (2011)	Number of star rating (total volume), average number of star rating (valence), and consensus of star rating	High volume does not influence consumers' movie preference when star rating is low, but high volume has an influence when star rating is high. Consensus has significant influences only when volume is high regardless the star rating is high or low.
Akdeniz <i>et al.</i> (2013)	Brand reputation from consumer report/3 rd authority report, price, and warranty.	Consumers' perceived product quality is higher than other cues combinations when cues are positively congruent (e.g., high reputation, high price, strong warranty).
Xu <i>et al.</i> (2013)	Price and popularity icon	Value for money perceptions of a product is high when a popularity cue paired with a moderate product price. Other cue combinations contribute to the same low value perceptions.
Das <i>et al.</i> (2016)	Product-Cause Fit and donation quantifier	Purchase intention is high only when cues are congruent (i.e., high product-cause fit: a product category fits the charity organization and the donation quantifier is concrete for hedonic products).

Diagnosticity refers to the reliability of a cue in differentiating products/services among alternatives (Akdeniz *et al.*, 2013). Consumers' perceived diagnosticity of a set of cues is thus the extent to which they perceive consistent informational influences when they infer about products/services

quality from one cue to another. Thus, a set of consistent cues tends to have high diagnosticity which increases consumers' confidence in their ability to make product/service quality inferences (Miyazaki *et al.*, 2005; Pezoldt *et al.*, 2014).

In contrast, incongruent cues create dissonance which impedes consumers in making judgments (Josiassen *et al.*, 2008). Thus, cues indicating consistent information are perceived to be more reliable and useful to consumers than those which are inconsistent (Dick *et al.*, 1990; Feldman and Lynch, 1988; Purohit and Srivastava, 2001; Richardson *et al.*, 1994). Conversely, cues that provide incongruent information are perceived to be of lower reliability and usefulness in helping consumers infer about products/services quality (Brehmer, 1972; Landy and Farr, 1980; Slovic, 1966).

Cue congruency of deal popularity and star rating

Popularity and star rating cues often are strategically displayed together on e-trailer' websites to reflect the popularity status of a product/service (Zhang *et al.*, 2010). Both have been found to influence consumers' quality perceptions and purchase intention. Findings in prior research suggest that the combination of congruent cues can influence the effect of popularity on consumer behaviour. For example, Keh *et al.* (2015) show that moviegoers' intention to watch a movie is high when both popularity and star rating are consistently high and their intention is low when these cues are both low.

Thus a set of congruent cues related to popularity is likely to be effective in predicting service quality because they can enhance consumers' confidence in using cues for pre-purchase quality judgments (Akdeniz *et al.*, 2013; Miyazaki *et al.*, 2005). That is, a congruent combination of deal popularity and star rating

can amplify the effect of deal popularity. Accordingly, we hypothesise that:

H1. When deal popularity and star rating are congruent, the effect of deal popularity on consumers' service quality expectation is greater than when they are incongruent, which in turn increases their purchase intention.

However, when cues are inconsistent and present conflicting information, the effects of these cues can be mixed. Tsao *et al.* (2015) found that when the number of consumers who write reviews is small, consumers' hotel booking intention is not influenced irrespective of positive or negative reviews. In a study of star rating and popularity of movies, Khare *et al.* (2011) found that while popularity information does not affect consumers' movie preferences when star rating is low, high popularity does influence prospective consumers' movie preferences positively when star rating is high. This can be partly explained by the informational cascades theory (Bikhchandani *et al.*, 1998).

Based on this theory, individual consumers make the same decision as their predecessors when they possess limited information about a product/service. Thus, when facing online promotional service deals, consumers will put more weight on others' purchase decisions which can be inferred from deal popularity information. That is, through observing others' purchase behaviour, the informational cascades of deal popularity occur and outweigh other available information.

For example, the popularity captured by the number of reviews has stronger impacts on movie quality expectation than star rating (Liu, 2006). Duan *et al.* (2009) also provide evidence that ranking information of online software

download services is a persuasive cue that outweighs consumers' star rating regarding the service, demonstrating an informational cascade of online popularity information. We thus hypothesise that other consumers' online purchase decisions cumulated to a large number (high deal popularity) that can overwhelm low service quality expectation derived from low star rating. That is:

H2. When consumers face incongruent cues of high deal popularity and low star rating, consumers' service quality expectation is higher than that of those who face congruent cues of low deal popularity and low star rating.

Perceived authenticity of deal popularity

Since deal popularity is presented as a running counter on a website, it provides up-to-date information that should be an authentic reflection of the real popularity of a deal. However, consumers are often suspicious about online information authenticity (Sundar, 2008). Indeed, authenticity of online information became questionable when consumers noticed that online businesses fraudulently manipulated online information such as reviews on Yelp.com (Luca and Zervas, 2016). This perception undermines the authenticity of online information (Luca and Zervas, 2016). Thus, consumers' subjective perceptions about the authenticity of online information can influence their trust and perceived usefulness of the information (Filieri, 2016).

Perceptions of authenticity in an online context constitute a belief of realism which is related to the experience of virtual reality in cyberspace that is embodied by interactive designs, sensory presentations, documents, and data (Featherman *et al.*, 2006; Lynch, 2000). While construction of online

environments is strategically applied to emulate the traditional offline world, much of the information presented online cannot be easily or independently verified.

Perceived information authenticity plays an important role in information utilisation and consumer reactions. For example, perceived authenticity of electronic word-of-mouth (eWOM) determines consumers' acceptance of the content and their propensity to forward it (Huang *et al.*, 2011). Moreover, perceived authenticity of website content has been found to be associated with consumers' perceived risk in an e-banking context which, in turn, influences their attitude toward the brand (Featherman *et al.*, 2006).

While deal popularity information is evidently important particularly for online shopping of services (Kao *et al.*, 2016; Luo *et al.*, 2014), consumers' perceived authenticity of this information can impact on whether this information will be used (or not) to inform purchase decisions. According to the heuristic-systematic information processing model, when consumers' tendency of heuristic information processing (i.e., effortlessly using extrinsic cues for judgements) fails to yield sufficient judgmental confidence, consumers tend to make efforts to scrutinise information systematically which potentially delays their decisions (Maheswaran and Chaiken, 1991). Therefore, when consumers perceive deal popularity not to be authentic, it is unlikely that they will use it for making quality inferences or purchase decisions.

Thus, the extent to which online deal popularity is perceived to be (in)authentic may strengthen (or undermine) the effect of deal popularity. Therefore, we argue that consumers' perceived authenticity of deal popularity

will moderate the effect of online deal popularity on consumers' expected service quality which, in turn, influences their purchase intention. Hence, we hypothesise that:

- H3.** The effect of deal popularity on service quality expectation is greater for those consumers who perceive authenticity of deal popularity to be high than for those consumers who perceive it to be low which increases their purchase intention.

Authenticity perceptions may influence the congruency effect between deal popularity and star rating on consumer behaviour. That is, when consumers' perceived authenticity of deal popularity is low, the congruent or incongruent cues may not have any effect on the use of deal popularity information for quality inferences or decisions. Therefore, we argue that consumers' perceived authenticity of deal popularity moderates the interactive effect of deal popularity and cue congruency on service quality expectation and purchase intention. Hence, we hypothesise that:

- H4.** When perceived authenticity of deal popularity is high, consumers facing congruent cues and high deal popularity will have higher service quality expectation and purchase intention than those consumers facing incongruent conditions and low deal popularity.

Method

We designed two online scenario-based experiments to test the hypotheses. Full- and part-time students from a large university in Taipei, Taiwan, were recruited to participate in these experiments in exchange for extra course credit.

Participants were all at the undergraduate level from multiple schools with different disciplines and were approached directly in lectures by lecturers in June 2015. Recruitment was approved by the university and students were encouraged to participate voluntarily. In experiment 1, 60% of participants were female and 58.2% aged 18-24, while in experiment 2, 71.5% were female and 77.3% aged 18-24. Table II summaries the two experiments.

Table II. Summary of experiments.

	Experiment 1	Experiment 2
Design	Deal popularity x Congruency	Deal popularity x Congruency x Perceived authenticity
Samples	N=86	N=260
Statistical power for hypotheses tests based on sample size ¹ ($\alpha = 0.05$)	0.97	0.83 ~ 0.99
Measures	Expected service quality, purchase intention	Perceived authenticity, expected service quality, purchase intention

¹Sample size meets the minimum required statistical power (VanVoorhis and Morgan, 2007).

We use student samples for several reasons. Students are the major group of internet users (Lian and Yen, 2014). Particularly those aged 20-29 account for 32.2% of online shoppers amongst internet users in Taiwan (Nielsen, 2016). Thus, the samples conform with the scope of this research setting potentially offering generaliseable results (Lucas, 2003). Additionally, student samples are generally homogeneous which is necessary for exploratory studies of this nature (González-Benito *et al.*, 2015; Lucas, 2003). Taiwan is a suitable research setting for this research because it constitutes one of the leading online markets globally in relation to high e-commerce adoption, representing the second largest and high growth Asian online market behind South Korea (Borromeo, 2015).

Experience services are used in the scenarios of both experiments. Experience services are characterised by intangible attributes that often impede consumers' quality evaluations before consumption which in turn results in greater reliance on extrinsic cues (Sharma *et al.*, 2014; Zeithaml, 1988). In addition, they constitute the majority of service deals promoted at group buying websites, particularly restaurants, beauty spas and massage and entertainment (Luo *et al.*, 2014). A restaurant deal was used in experiment 1, and a karaoke entertainment deal was used in experiment 2. Both are common leisure activities in Taiwan (Chao *et al.*, 2015; Pei and Tsai, 2016).

Experiment 1

Design and stimuli

A 2 (deal popularity: high *versus* low) x 2 (congruency: congruent *versus* incongruent) between-subjects factorial experiment was designed to identify (in)congruency effect as hypothesised in H1 and H2. The dependent variables are expected service quality and purchase intention. Both deal popularity and cue congruency were orthogonally manipulated in order to examine the relative contributions of their effects to expected service quality.

Experiment stimuli were manipulated by displaying screenshots of a popular online group buying website showing differing levels of deal popularity and star rating for a promotional restaurant dining deal. The screenshots (see Appendix) featured a fictitious restaurant including a photo, price, and discount rate which were controlled to the same across stimuli scenarios while the number of deals sold and average star rating were manipulated for (in)congruent combinations.

The specific number of deals sold was used to represent high or low deal popularity in a deal. Based on our observation of 200 deals on a famous Taiwanese online group buying website, we consider more than 1500 deals sold to be high popularity which is consistent with a recent research (cf. Song *et al.*, 2016) and deals sold less than 15 buyers to be low popularity. Accordingly, in this experiment we manipulated deal popularity orthogonally to explore the effect with high *versus* low deal popularity (i.e., 1999 *versus* 13 sold).

Star rating was used as another cue in the featured cue configuration. Average star rating was used to present the rating given to a service in the deal (i.e., 4.5 on a 5-star scale as a high rating and 1 on a 5-star scale as a low rating, respectively). Following the congruency manipulation as in Mitra (1995), deal popularity information and star rating were orthogonally manipulated to vary the congruency of the cues. Under congruent conditions, the high (low) deal popularity cue was paired with a high (low) star rating. The incongruent conditions featured high (low) deal popularity and low (high) star rating.

Manipulation check

A pretest was conducted to check the manipulation of deal popularity and cue congruency. 55 participants read a purchase scenario of either high or low deal popularity with either high or low star rating. They subsequently rated their perceptions toward the number of deals sold using a 7-point Likert scale (1 = Very small; 7 = Very large). They also responded to a three-item measure (Cronbach's $\alpha = .96$) (Rifon *et al.*, 2004) to rate their perceptions of the congruency between deal popularity information and star rating in the scenario on seven-point Likert scales (not compatible / compatible, not a good fit / a good

fit, and incongruent / congruent).

Using ANOVA (analysis of variance), results show a main effect indicating that the larger number of deals sold was perceived to be a high deal popularity ($\text{Mean}_{\text{High}} = 5.07$) condition as opposed to the low deal popularity ($\text{Mean}_{\text{Low}} = 3.04$) condition ($F(1, 53) = 23.25, p < 0.001$). The manipulation of deal popularity was also found to be significant for the main study sample ($\text{Mean}_{\text{High}} = 4.95$ versus $\text{Mean}_{\text{Low}} = 3.30; F(1, 84) = 15.36, p < 0.001$). Similarly, a main effect shows that high (low) deal popularity paired with high (low) star rating was perceived to be a congruent condition as opposed to incongruent combination of high (low) deal popularity paired with low (high) star rating ($\text{Mean}_{\text{Congruency}} = 4.17; \text{Mean}_{\text{Incongruency}} = 2.73; F(1, 53) = 10.22, p = 0.002$). The manipulation of congruency was also found significant for the main study sample ($\text{Mean}_{\text{Congruency}} = 4.67; \text{Mean}_{\text{Incongruency}} = 2.53; F(1, 84) = 43.13, p < 0.001$).

Measures and reliability

Measures were adapted from existing scales in the literature. Three item scales for expected service quality (Cronbach's $\alpha = 0.80$) and purchase intention (Cronbach's $\alpha = 0.78$) were adapted from Jin and He (2013) and Lee and Lee (2009). All items were rated on 7-point Likert scales (1 = strongly disagree; 7 = strongly agree). Items of the same construct were separated in the questionnaire to reduce common method bias (Podsakoff *et al.*, 2003). The experiment was conducted in Chinese. Measurement items were firstly translated into Chinese by two bilingual doctoral students at a major Australian University and then back into English by another bilingual researcher to ensure semantic equivalence

(Brislin, 1970).

Confirmatory factor analysis was used to further test reliability and validity. Factor loadings of each item were statistically significant and satisfied the threshold of 0.4 (Bowen and Guo, 2011; Gefen and Straub, 2005), demonstrating that items are reflected in their corresponding construct. Composite reliability of expected service quality (0.71) and purchase intention (0.75) meets the acceptable threshold in exploratory research ($CR > 0.6$) (Fornell and Larcker, 1981; Hair *et al.*, 2011), showing internal consistency of each item to its construct. Together with average variance extracted (AVE) of the two constructs was all above 0.5 (0.67 and 0.83), assessments of AVE, factor loading, and composite reliability support convergent validity of our measures (Hair *et al.*, 2011). Discriminant validity is evidenced with AVEs of each construct being greater than the squared binary correlations of expected service quality and purchase intention (0.18) (Fornell and Larcker, 1981; Hair *et al.*, 2011).

Sampling and procedure

Participants were informed that they were taking part in promotional deal evaluations of an online group buying website based on their reactions to the deal and would be expected to complete this experiment through a website link. We ensured respondents' anonymity and pointed out that there were no "right/wrong" answers to minimise the risk of evaluation apprehension (Podsakoff *et al.*, 2003). Experiment was conducted in a computer lab where participants were randomly assigned to one of the four between-subject conditions. Each participant read experiment instructions and was asked to examine a screenshot of a promotional deal corresponding to the experiment

condition. Participants subsequently rated the measures of the dependent variables, manipulation check items, and demographic information.

Hypothesis testing

PROCESS macro based on ordinary least squares (OLS) regression for SPSS (Hayes, 2013) was used to test the interaction between deal popularity and cue congruency, using expected service quality as the mediator and purchase intention as the dependent variable. The analysis was conducted using 10,000 bootstrapped samples.

H1 postulates that the congruent presentation of deal popularity and star rating is positively associated with consumers' service quality expectation, which in turn, positively influences their purchase intention. As expected, the results show a significant interaction between deal popularity and cue congruency ($\beta = 1.001$, $SE = 0.372$, $p = 0.009$) while the moderated mediation effect was also significant (effect = 0.661, bootstrap $SE = 0.291$, bootstrap BCa CI [0.215, 1.372]).

Results show that there is no evidence to suggest that deal popularity is associated with purchase intention ($\beta = 0.32$, $SE = 0.321$, $p = 0.322$) and remained non-significant after including expected service quality as the mediator ($\beta = 0.046$, $SE = 0.301$, $p = 0.88$). Consistent with extant research, participants' expected service quality was positively related to purchase intention ($\beta = 0.66$, $SE = 0.16$, $p < 0.001$). Figure I illustrates these relations.

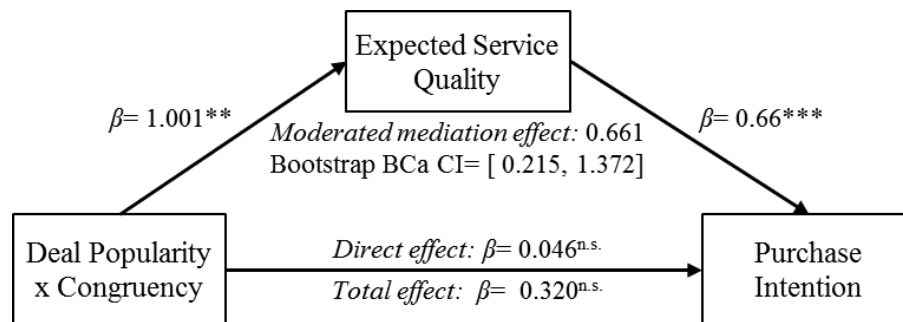


Figure I. The interaction between deal popularity and cue congruency on purchase intention mediated by expected service quality.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, ^{n.s.} non-significant

PROCESS macro provides the probing analysis for conditional indirect effect of the interaction on purchase intention through expected service quality. Data were analysed based on 95% bias-corrected and accelerated bootstrap confidence interval. Results indicate that the effect of deal popularity on purchase intention through expected service quality was positive and excluded zero when both deal popularity information and star rating were presented to be congruent (effect = 0.598, Bootstrap SE = 0.240, BCa CI [0.234, 1.220]). That is, the prediction of deal popularity on purchase intention through expected service quality was not statistically significant when both information cues were presented to be incongruent (effect = -0.063, Bootstrap SE = 0.148, BCa CI [-0.389, 0.228]).

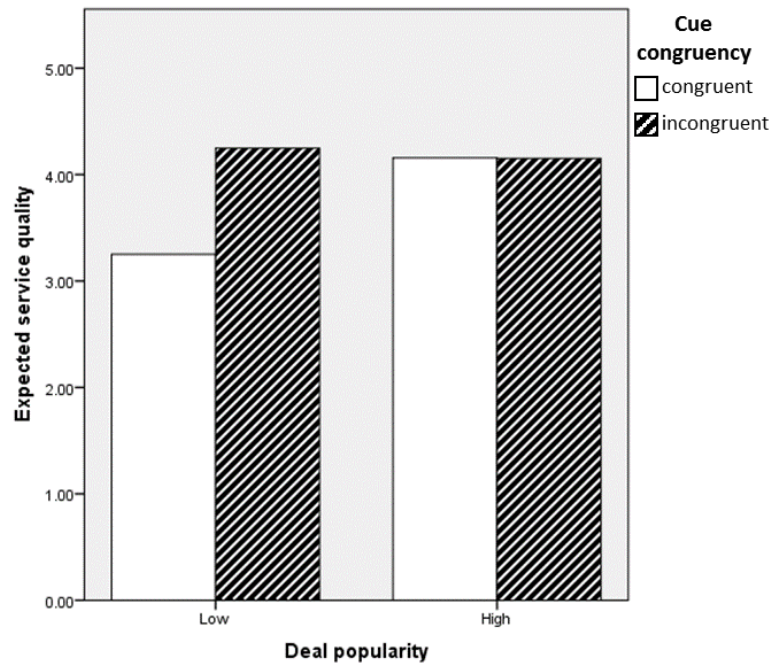


Figure II. Interaction between deal popularity and cue congruency on expected service quality.

Figure II shows the interaction. Findings suggest that when deal popularity and star rating were displayed as congruent combinations, high deal popularity was positively associated with expected service quality which in turn, positively influenced purchase intention. Thus, H1 is supported.

We expected that participants would have higher service quality expectation when they face incongruent cues of high deal popularity and low star rating as hypothesised in H2. Recoding cue combinations into four groups (i.e., high deal popularity and high star rating, low deal popularity and high star rating, high deal popularity and low star rating, and low deal popularity and low star rating), a single factor ANOVA was performed with service quality expectation as the dependent variable.

A significant main effect was observed ($F(3, 82) = 7.009, p < 0.001$). Results of post hoc tests showed a significant mean difference on service quality

expectation between incongruent cues of high deal popularity and low star rating and congruent cues of low deal popularity and low star rating ($M_{\text{HIDP,LoRT}} = 4.152$, $SD = 0.182$ *versus* $M_{\text{LoDP,LoRT}} = 3.251$, $SD = 0.174$; $p = 0.024$). Thus, H2 is supported.

In summary, the results of experiment 1 demonstrate that high deal popularity leads to high expected service quality which increases purchase intention when star rating is also presented as high. This suggests that congruency moderates the effect of deal popularity. In incongruent cue combination (i.e., high deal popularity and low star rating), high deal popularity dominates the influence on service quality expectation.

Although deal popularity information is usually computer-generated, consumers may still be suspicious that its authenticity can be compromised with fraudulent tempering. This concern may not only influence the effect of deal popularity but also the positive effect of congruent cue combination of deal popularity with star rating. We therefore conducted experiment 2 to test the moderating effects of consumers' perceived authenticity of deal popularity which is presented next.

Experiment 2

Design and stimuli

A 2 (deal popularity: high *versus* low) x 2 (cue congruency: congruent *versus* incongruent) x 2 (perceived authenticity: high *versus* low) between-subject experiment was designed in experiment 2. The measure of perceived authenticity of deal popularity was added in attempts to test a two-way and a three-way

interaction as hypothesised in H3 and H4. In addition, experiment 2 was also conducted to provide further robustness of primary results in experiment 1. The two dependent variables were the same as those used in experiment 1.

The scenario used as stimuli consisted of a promotional karaoke deal. The star rating and (in)congruent combinations designs were also same to experiment 1. The number of low deal popularity was slightly adjusted from 13 to single digit 9 to emphasise the low deal popularity. The number of high deal popularity was 1999, the same as in experiment 1.

Manipulation check

A pretest with 57 participants was conducted. To check the manipulation of deal popularity and congruency between deal popularity and star rating, they rated the same items as used in experiment 1.

Using ANOVA, results show a main effect indicating that the larger number of deals sold to others was perceived to be a high deal popularity ($\text{Mean}_{\text{High}} = 5.19$) condition as opposed to the low deal popularity ($\text{Mean}_{\text{Low}} = 2.89$) condition ($F(1, 55) = 31.53, p < 0.001$). The manipulation of deal popularity was also found significant for the main study sample ($\text{Mean}_{\text{High}} = 4.62$ versus $\text{Mean}_{\text{Low}} = 2.81$; $F(1, 258) = 58.06, p < 0.001$). Similarly, a main effect show that high (low) deal popularity paired with high (low) star rating was perceived to be a congruent condition as opposed to incongruent combination of high (low) deal popularity paired with low (high) star rating ($\text{Mean}_{\text{Congruency}} = 3.90$; $\text{Mean}_{\text{Incongruency}} = 2.63$; $F(1, 55) = 10.09, p = 0.002$). The manipulation of congruency was also found to be significant for the main study sample ($\text{Mean}_{\text{Congruency}} = 4.40$; $\text{Mean}_{\text{Incongruency}} = 2.68$; $F(1, 258) = 66.6, p < 0.001$).

Measures and reliability

Measures of expected service quality (Cronbach's $\alpha = 0.81$) and purchase intention (Cronbach's $\alpha = 0.83$) were the same items that were used in experiment 1 while perceived authenticity of deal popularity (Cronbach's $\alpha = 0.97$) was added in experiment 2.

Confirmatory factor analysis was used to further test reliability and validity. Factor loadings of each item were statistically significant and satisfied the threshold of 0.4 (Bowen and Guo, 2011; Gefen and Straub, 2005), demonstrating items are reflected in their corresponding construct. Composite reliability of perceived authenticity of deal popularity (0.83), expected service quality (0.70), and purchase intention (0.74) meet the acceptable threshold in exploratory research ($CR > 0.6$) (Fornell and Larcker, 1981; Hair *et al.*, 2011), showing internal consistency of each item to its construct. Together with average variance extracted (AVE) of the three constructs was all above 0.5 (perceived authenticity of deal popularity: 0.88, expected service quality: 0.69, and purchase intention: 0.81), assessments of AVE, factor loading, and composite reliability support convergent validity of our measures (Hair *et al.*, 2011). Discriminant validity evidenced by that AVEs of each construct are greater than the squared binary correlations between perceived authenticity of deal popularity, expected service quality, and purchase intention (0.08 ~ 0.44) (Fornell and Larcker, 1981; Hair *et al.*, 2011).

Sampling and procedure

Experiment 2 was conducted online in the same manner as experiment 1. That is, participants followed instructions on a website at their own time, space, and

pace.

Hypotheses testing

PROCESS macro based on OLS regression for SPSS (Hayes, 2013) was used to test both two-way (deal popularity x congruency; deal popularity x authenticity) and three-way (deal popularity x congruency x authenticity) interactions, using expected service quality as the mediator and purchase intention as the dependent variable. The analysis was conducted using 10,000 bootstrapped samples.

First, conceptual replications of experimental 1 to further test H1 and H2 were conducted. As expected, the results show a significant interaction between deal popularity and cue congruency ($\beta = 0.751$, $SE = 0.309$, $p = 0.016$) while the moderated mediation effect was also significant (effect = 0.591, bootstrap $SE = 0.256$, bootstrap BCa CI [0.109, 1.094]). Results show that deal popularity was related to purchase intention ($\beta = 0.444$, $SE = 0.187$, $p = 0.018$) but reduced to non-significant after including expected service quality as the mediator ($\beta = 0.167$, $SE = 0.143$, $p = 0.242$). Consistent with extant research, participants' expected service quality was positively associated with purchase intention ($\beta = 0.787$, $SE = 0.057$, $p < 0.001$). Figure III illustrates these relations.

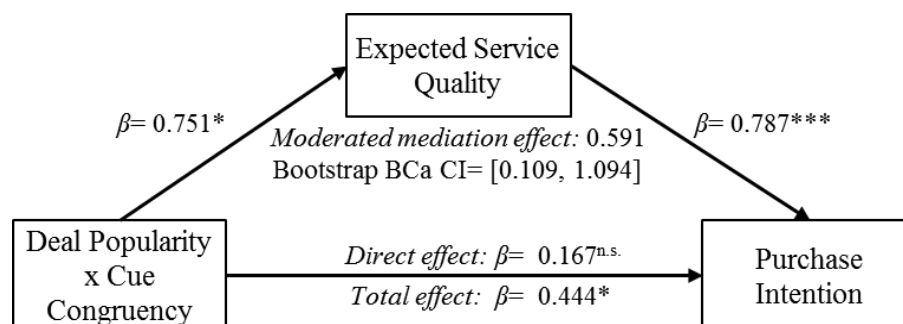


Figure III. The interaction between deal popularity and cue congruency on purchase intention mediated by expected service quality.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, n.s. non-significant

Results of conditional indirect effect indicate that the effect of deal popularity on purchase intention mediated by expected service quality excludes zero only when cues were congruent (effect = 0.559, bootstrap SE = 0.171, bootstrap BCa CI [0.218, 0.897]). The conditional indirect effect was positive suggesting that high deal popularity increases the participants' expected service quality which in turn increases purchase intention when high deal popularity was paired with high star rating. Figure IV shows this interaction.

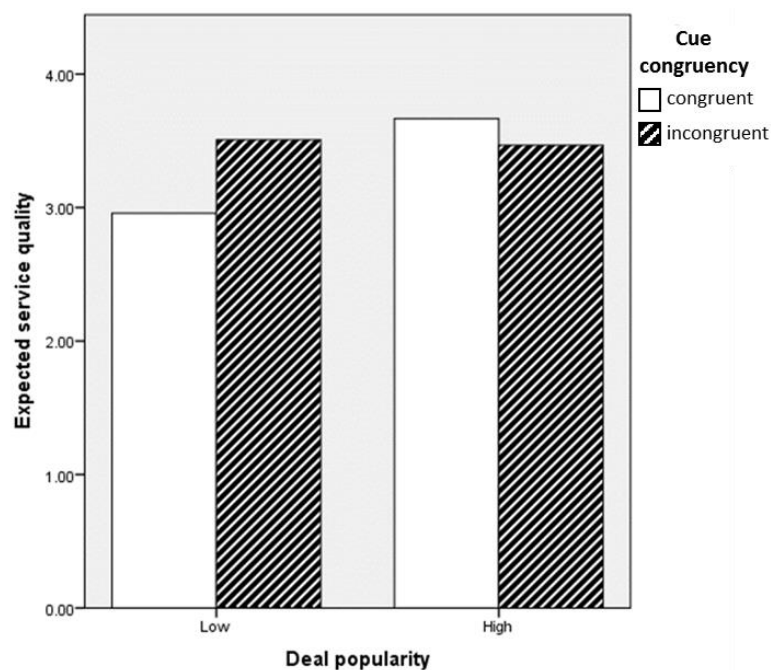


Figure IV. The interaction between deal popularity and cue congruency on expected service quality.

Recoding cue combinations into four groups as in experiment 1 to further test H2 results of a single factor ANOVA (service quality expectation as the dependent variable), showed that a significant main effect was present ($F(3, 256) = 4.196, p = 0.006$). Results of post hoc tests showed a marginal significant mean difference on service quality expectation between incongruent cues of high deal popularity and low star rating and congruent cues of low deal popularity and low

star rating ($M_{\text{HIDP,LoRT}} = 3.467$, $SD = 0.16$ *versus* $M_{\text{LoDP,LoRT}} = 2.957$, $SD = 0.148$, $p = 0.076$). H2 is marginally supported in experiment 2.

Accordingly, results of experiment 2 further support H1 and H2 strengthening the robustness of the hypothesised relationships with a different sample and scenario.

Second, a two-way interaction between deal popularity and perceived authenticity of deal popularity was also examined as per H3. We controlled the perceived authenticity of star rating to rule out possible confounding effects on perceived authenticity of deal popularity. The results show a significant interaction between deal popularity and perceived authenticity of deal popularity ($\beta = 0.374$, $SE = 0.90$, $p < 0.001$) and a moderated mediation (effect = 0.286, bootstrap $SE = 0.073$, bootstrap BCa CI [0.134, 0.423]).

To conduct inferential test using the probing analysis based on 95% bias-corrected and accelerated bootstrap confidence interval provided by PROCESS macro, the percentiles of the distribution of perceived authenticity were used. We defined perceived authenticity to very low (10th percentile=1.00), low (25th percentile=2.00), moderate (50th percentile=3.67), high (75th percentile=4.67), and very high (90th percentile=6.00).

Results indicate that the effect of deal popularity on purchase intention through expected service quality was positive and excluded zero when participants' perceived authenticity of deal popularity to be moderate (effect = 0.527, bootstrap $SE = 0.117$, bootstrap BCa CI [0.316, 0.781]), high (effect = 0.813, bootstrap $SE = 0.153$, bootstrap BCa CI [0.538, 1.124]), and very high (effect = 1.192, bootstrap $SE = 0.230$, bootstrap BCa CI [0.756, 1.671]). Figure

V shows these relations while Figure VI shows a bar chart of percentile distributions. The results support H3.

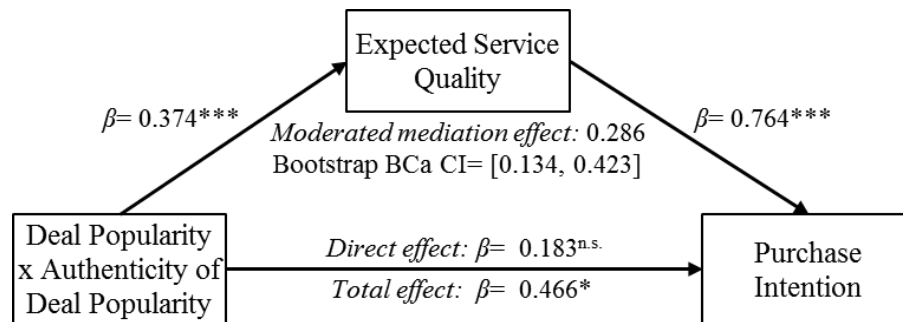


Figure V. The interaction between deal popularity and perceived authenticity of deal popularity on purchase intention mediated by expected service quality.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, ^{n.s.} non-significant

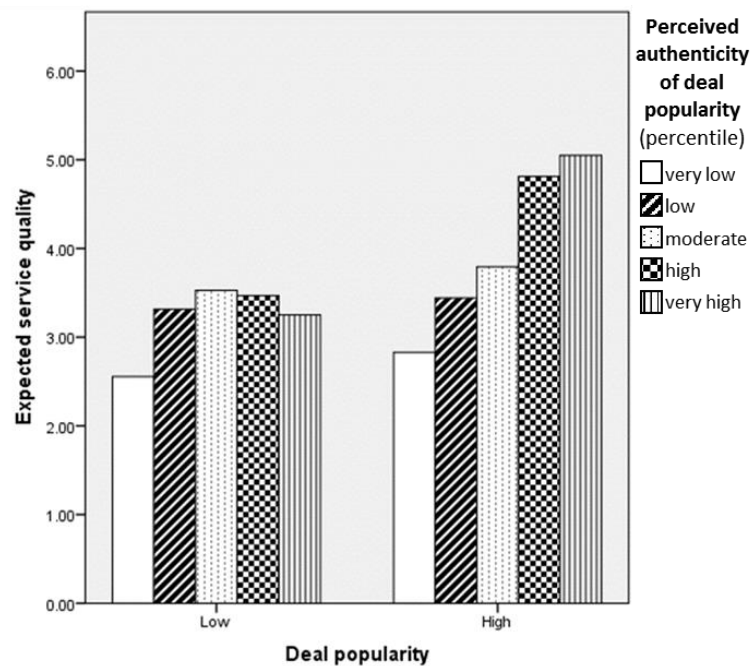


Figure VI. The interaction between deal popularity and perceived authenticity of deal popularity on expected service quality.

Third, a three-way interaction between deal popularity, cue congruency, and perceived authenticity of deal popularity was also tested (i.e., as hypothesised in

H4). By controlling perceived authenticity of star rating, results support our expectations by showing a significant three-way interaction ($\beta = 0.722$, $SE = 0.169$, $p < 0.001$). Participants' expected service quality was also found to be positively associated with purchase intention ($\beta = 0.764$, $SE = 0.058$, $p < 0.001$). Figure VII illustrates these relations.

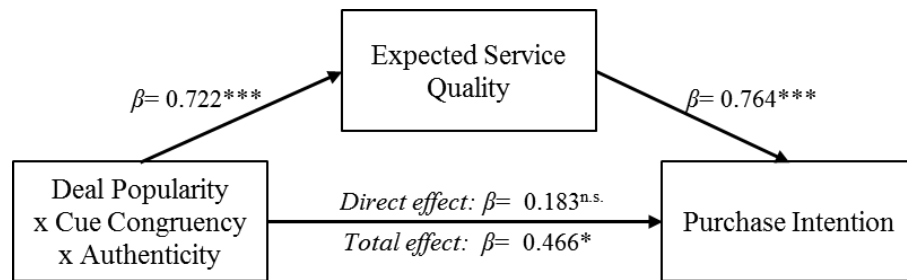


Figure VII. The three-way interaction between deal popularity, cue congruency, and perceived authenticity of deal popularity on purchase intention mediated by expected service quality. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, ^{n.s.} non-significant

Using the same percentiles of the distribution of perceived authenticity of deal popularity as described earlier, the conditional indirect effects show the positive effect of deal popularity statistically excludes zero only if the congruent cue combination is presented and when participants' perceived authenticity of deal popularity is moderate (effect = 0.871, bootstrap $SE = 0.144$, bootstrap BCa CI [0.606, 1.174]), high (effect = 1.421, bootstrap $SE = 0.186$, bootstrap BCa CI [1.068, 1.797]), and very high (effect = 2.153, bootstrap $SE = 0.285$, bootstrap BCa CI [1.596, 2.714]).

This suggests that high deal popularity leads to high purchase intention through high expected service quality when high deal popularity and high star rating are presented at the same time and when participants' perceived authenticity of deal popularity is relatively high.

A significant and negative effect of deal popularity is also found for congruent cue combinations. Results show that when participants' perceived authenticity of deal popularity is very low, high online deal popularity decreases expected service quality which subsequently diminishes their purchase intention (effect = -0.598, bootstrap SE = 0.273, bootstrap BCa CI [-1.164, -0.086]).

Figure VIII shows the interaction using the percentiles of perceived authenticity of deal popularity. Findings show that the effect of high deal popularity on purchase intention through service quality expectation was amplified by high perceived authenticity of deal popularity when cues are congruent (i.e., high deal popularity paired high star rating). Thus, H4 is supported.

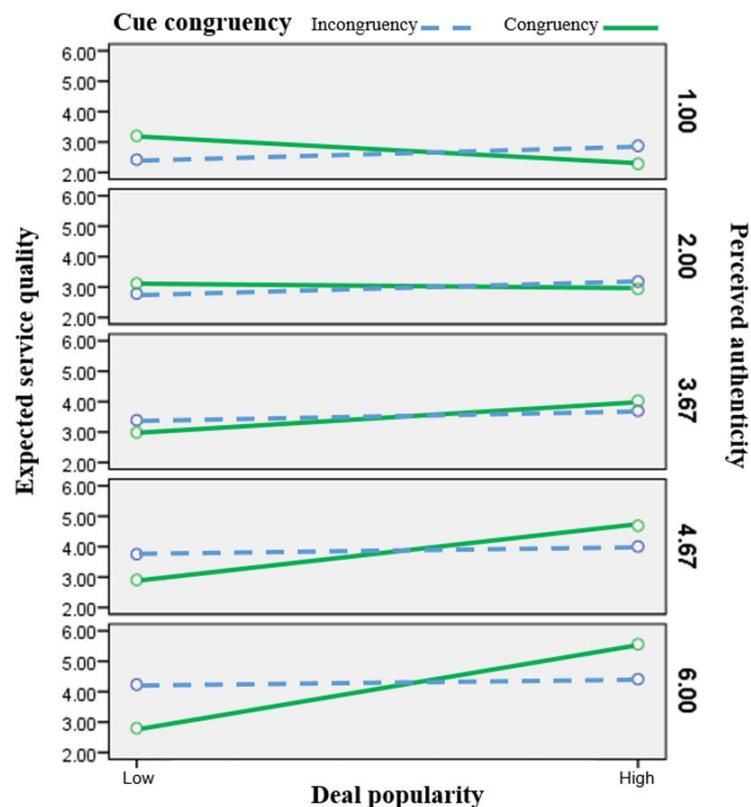


Figure VIII. Three-way interaction between deal popularity, cue congruency, and perceived authenticity of deal popularity on expected service quality.

Robustness testing

To further unpack the moderating effect of perceived authenticity of deal popularity, we recoded the cue congruency variable into four groups (i.e., low deal popularity and low star rating; low deal popularity and high star rating; high deal popularity and low star rating, and high deal popularity and high star rating) and median split the perceived authenticity of deal popularity variable (i.e., high *versus* low). ANOVA was used to examine the extent to which the different combinations of cue congruency influence service quality expectation.

A significant interaction between perceived authenticity and cue congruency was found ($F(3, 252) = 4.74, p = 0.003$). A simple main effect shows that when participants' perceived authenticity of deal popularity is high, cue congruency is related to expected service quality ($F(3, 252) = 9.05, p < 0.001$) but when perceived authenticity of deal popularity is low, the effect of cue congruency on expected service quality is not statistically different ($F(3, 252) = 0.27, p = 0.844$).

Results of planned contrasts suggest that when perceived authenticity is high, the positively congruent cue combination (i.e., high deal popularity paired with high star rating) accounts for a significant prediction of expected service quality in comparison to incongruent cue combinations of high deal popularity with low star rating ($M_{\text{HiDP,HiRT}} = 4.558$ *versus* $M_{\text{HiDP,LoRT}} = 3.971$; $F(3, 252) = 5.41, p = 0.021$, Cohen's $d = 0.53$) and low deal popularity with low star rating ($M_{\text{HiDP,HiRT}} = 4.558$ *versus* $M_{\text{LoDP,LoRT}} = 2.962$; $F(3, 252) = 24.44, p < 0.001$, Cohen's $d = 1.62$).

Service quality expectation of participants assigned to the high deal

popularity and low star rating condition ($M_{\text{HiDP,LoRT}} = 3.971$, $SD = 1.218$) was equivalent to those assigned to the low deal popularity and high star rating condition ($M_{\text{LoDP,HiRT}} = 3.923$, $SD = 1.144$; $F(3, 252) = 1.16$, $p = 0.28$, Cohen's $d = 0.04$) while marginally higher than those assigned to the low deal popularity and low star rating condition ($M_{\text{LoDP,LoRT}} = 2.962$, $SD = 1.084$; $F(3, 252) = 3.44$, $p = .065$, Cohen's $d = .83$).

Figure IX show the interaction. This additional analysis strengthens the argument concerning the cue congruency effect on expected service quality in high perceived authenticity of deal popularity, and thus providing further evidence to support H4.

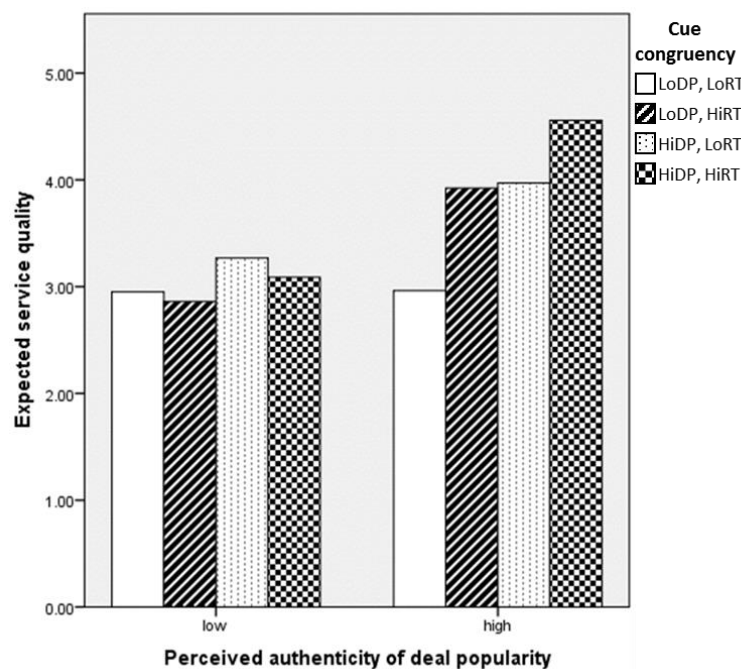


Figure IX. The interaction between cue congruency (recoded) and perceived authenticity of deal popularity (median split) on expected service quality.

In summary, the results of experiment 2 show a significant cue congruency effect and provide further support for H1. The incongruent comparisons

marginally support H2 suggesting the dominant role of high deal popularity when paired with low star rating. The results also provided evidence of a moderating effect of perceived information authenticity supporting H3, and three-way interaction supporting H4. That is, high levels of perceived authenticity of deal popularity amplifies the effect of deal popularity as well as the congruency effect of the two popularity cues.

Discussion

This research appears to be the first study to provide empirical evidence of the cue congruency effect between deal popularity and star rating. Based on cue congruency theory we examine two online information cues related to popularity, deal popularity and star rating. We do so by presenting these cues in congruent and incongruent conditions in different online promotional deal scenarios.

Our results show that consumers' service quality expectation is increased only when both cues are congruently positive. That is, a high deal popularity and high star rating combination increases purchase intention. This suggests that high star rating enhances the persuasiveness of high deal popularity and thus increases consumers' confidence in using deal popularity for making service quality inferences. We also find that the incongruent combination of high deal popularity and low star rating has an impact on service quality expectation. This suggests a dominant role of high deal popularity in driving consumers' inferences of service quality when paired with an incongruent popularity cue.

With growing recent concerns of online information authenticity, this research also appears to be the first to investigate perceived information authenticity from a consumer's viewpoint. Results show that the effect of deal

popularity and of cue congruency are both dependent on perceived authenticity. Findings demonstrate that the cue congruency effect on deal popularity is moderated by consumers' perceived authenticity. High deal popularity leads to high service quality expectation and thus increases purchase intention when consumers face congruent high deal popularity and high star rating and when their perceived authenticity of deal popularity is also high. That is, consumers' perceptions of inauthentic deal popularity information could diminish the effect of deal popularity on service quality expectation and purchase intention, thereby overwhelming the cue congruency effect of high deal popularity and high star rating.

Theoretical implications

Although prior research has investigated and confirmed the effect of cue congruency in online contexts (Xu *et al.*, 2013), little is known about the combination of deal popularity and star rating in relation to consumers' multiple cue utilisation in online shopping environments.

This research confirms the usefulness of cue congruency theory to explain multiple cues utilisation by using experiments focusing on deal popularity and star rating. Our research empirically demonstrates that congruency of these cues amplifies the effect of deal popularity. This examination advances current limited understanding of the two online cues in terms of their combination by showing the strength of congruent cues and the manner in which they can effectively influence purchase intention through service quality expectation. On the other hand, this research also identifies the role of high deal popularity in incongruent cue combinations, indicating its dominance in online popularity cue

utilisation.

The findings also confirm the validity and importance of online information authenticity concerns from a consumer perspective. While these concerns can affect consumers' online information cue utilisation (Featherman et al., 2006; Huang et al., 2011; Sundar, 2008), research evidencing the influence of consumers' perceived authenticity of deal popularity remains scant. Indeed, online deal popularity may arouse consumer suspicion towards using it. In this research we examine consumers' perceived authenticity of deal popularity. We highlight that consumers' perceived information authenticity in online shopping contexts is an issue that critically influences the extent to which online marketing information is used by consumers. As such, our empirical results contribute to an improved understanding of the implications of online information authenticity on consumers' utilisation of deal popularity.

Managerial implications

While e-marketers decide to display deal popularity aiming to influence consumers' service quality expectation and purchase intention, our research provides insight to e-marketers by considering the effects of (in)congruent cues. While marketers can refer to historical data of prior consumers, for those deals that have been rated highly, e-marketers can devise additional marketing strategies to entice consumer purchases by using deal popularity (e.g., using additional discount vouchers to induce loyal consumers' immediate purchases). By doing so, a boosted deal popularity with high star rating deal could result in higher level of service quality expectations and potentially higher sales volume due to congruency effect. While high star rating strengthens the effect of deal

popularity, strategies used to increase deal popularity may also offset any negative effect that occurs when a service deal has low star rating.

Moreover, e-marketers must take into account online information authenticity. According to our findings, consumers' perception of online information authenticity critically influences the predictive value of deal popularity information on service quality expectation. While the reliance of online information is built on consumers' trust of websites, information source, and their prior experience (Filieri, 2016), what e-marketers should consider is to enhance the authentic perceptions of e-retailing brands and their website security. For example, third party authentication systems (e.g., accredited association for data-driven marketing and advertising) can be used to show the website's compliance with relevant business legislation and thus create trust among consumers about the website and the information. Website security can be enhanced by using digital certification (e.g., public key infrastructure (PKI) of well-known reputable certification authorities) and thus further strengthening the authenticity perceptions and image of a retailing website. Consumer experience management system can be established by customer service department to feedback enquiry for deal improvements and thus to increase consumers' positive image toward the website brand.

Conclusion

While the influence of the combination of online reviews and star rating has been documented, little is known about online deal popularity in relation to cue congruency effects. Given the evidence of deal popularity effect (cf. Kao *et al.*, 2016), the presence of star rating should amplify deal popularity rather than

diminish it. With limited understanding of these relationships, this research provides empirical evidence and insight by demonstrating congruency effect of these cues. In addition to the congruency effect, this research also shows the dominant role of high deal popularity in incongruent cue combinations. Furthermore, this research also demonstrates the critical role of perceived authenticity about deal popularity from consumer perspective.

This study points to several avenues for future research. We already know that consumer emotions can influence information processing (Schwarz *et al.*, 1991) and a website design can create emotions of joy and excitement when purchasing services (Kim and Lennon, 2013). We conjecture that emotions can influence online cue utilisation. According to Reisinger and Steiner (2006), consumers' perceived authenticity about an object or a piece of information may be influenced by their emotions that are derived from the perceptions of the surrounding environment. Thus further research could consider the emotional state of consumers in further examining the effect of the deal popularity.

Furthermore, risk perceptions might be associated with online service purchase behaviour. Purchasing service deals online is relatively riskier than purchasing goods (Sharma *et al.*, 2014). The question is whether deal popularity can serve as a cue to reduce consumers' risk perceptions in online service shopping contexts when many others have purchased the same deal. For example, a brand constitutes a cue related to perceived risk of service providers (Jean Jeon *et al.*, 2014). Future research could explore other distinct cues that are linked with risk reduction in online contexts. Cues representing others' online behaviour such deal popularity are evidently useful to both consumers and online merchants to help reduce perceived risk in purchasing promotional deals online.

Appendix. Stimuli

Experiment 1 stimuli

Low deal popularity and low star rating



Photo Source: www.lenordix.com, www.sodahead.com

\$888 [BUY NOW](#)

★☆☆☆☆

UP TO \$2540 VALUE	UP TO 65% DISCOUNT	UP TO \$1652 SAVING
---------------------------------	---------------------------------	----------------------------------

13 SOLD

5 DAYS 12 HOURS 50 SECONDS
LEFT TO BUY

Enjoy exquisite and delicious 3-Course French course with wine for 2 people. 2 entrees, 2 mains, 2 desserts, a bottle of Wynns Shiraz

[Like](#) [Tweet](#) [Email](#)

Low deal popularity and high star rating



Photo Source: www.lenordix.com, www.sodahead.com

\$888 [BUY NOW](#)

★★★★★

UP TO \$2540 VALUE	UP TO 65% DISCOUNT	UP TO \$1652 SAVING
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13 SOLD

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[Like](#) [Tweet](#) [Email](#)

High deal popularity and high star rating



Enjoy exquisite and delicious 3-Course French course with wine for 2 people. 2 entrees, 2 mains, 2 desserts, a bottle of Wynns Shiraz

\$888 BUY NOW



UP TO \$2540 VALUE	UP TO 65% DISCOUNT	UP TO \$1652 SAVING
1999 SOLD		
5 DAYS 12 HOURS 50 SECONDS LEFT TO BUY		

[Like](#) [Tweet](#) [Email](#)

High deal popularity and low star rating



Enjoy exquisite and delicious 3-Course French course with wine for 2 people. 2 entrees, 2 mains, 2 desserts, a bottle of Wynns Shiraz

\$888 BUY NOW



UP TO \$2540 VALUE	UP TO 65% DISCOUNT	UP TO \$1652 SAVING
1999 SOLD		
5 DAYS 12 HOURS 50 SECONDS LEFT TO BUY		

[Like](#) [Tweet](#) [Email](#)

Experiment 2 stimuli

Low deal popularity and low star rating

Buy Now
Use Now

Valuable deal! Time to have happy singing hours! \$225 per person for up to 4 hours.

\$900 for 4 people (for 4 hours on weekdays or 3 hours on weekends). A pitcher of drink, snacks, and a fruit plate are served. Excellent audio equipments and room decorations for you to enjoy singing with friends.

\$900


BUY

☆☆☆☆☆

Over 9 bought

Group successful and continue to buy 75% Off

[Like](#) [Share](#)



Low deal popularity and high star rating

Buy Now
Use Now

Valuable deal! Time to have happy singing hours! \$225 per person for up to 4 hours.

\$900 for 4 people (for 4 hours on weekdays or 3 hours on weekends). A pitcher of drink, snacks, and a fruit plate are served. Excellent audio equipments and room decorations for you to enjoy singing with friends.

\$900


BUY

☆☆☆☆☆

Over 9 bought

Group successful and continue to buy 75% Off

[Like](#) [Share](#)



High deal popularity and high star rating

Buy Now
Use Now

Valuable deal! Time to have happy singing hours! \$225 per person for up to 4 hours.

\$900 for 4 people (for 4 hours on weekdays or 3 hours on weekends). A pitcher of drink, snacks, and a fruit plate are served. Excellent audio equipments and room decorations for you to enjoy singing with friends.

\$900


BUY

★★★★★

Over 1999 bought

Group successful and continue to buy 75% Off

[Like](#) [Share](#)



The image shows a group of four people in a dimly lit karaoke room. A man in a blue shirt and a man in a striped shirt and glasses are standing and singing into microphones. Two women are sitting on a sofa in the background, watching them. There is a table with a fruit plate and drinks in the foreground.

High deal popularity and low star rating

Buy Now
Use Now

Valuable deal! Time to have happy singing hours! \$225 per person for up to 4 hours.

\$900 for 4 people (for 4 hours on weekdays or 3 hours on weekends). A pitcher of drink, snacks, and a fruit plate are served. Excellent audio equipments and room decorations for you to enjoy singing with friends.

\$900


BUY

☆☆☆☆☆

Over 1999 bought

Group successful and continue to buy 75% Off

[Like](#) [Share](#)



The image shows a group of four people in a dimly lit karaoke room. A man in a blue shirt and a man in a striped shirt and glasses are standing and singing into microphones. Two women are sitting on a sofa in the background, watching them. There is a table with a fruit plate and drinks in the foreground.

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CONCLUSION TO STUDY II

Online Consumers' Reactions to Service Deal Popularity: The Role of Cue Congruency and Perceived Information Authenticity

Study II examined the cue congruency effect of service deal popularity. This study has found that positively congruent cue combinations (i.e., high online deal popularity and high star rating) amplify the positive effect of online deal popularity on purchase intention through service quality expectation. In addition, findings show that high deal popularity leads to service quality expectation even when it is paired with low star rating, suggesting its dominant role in an incongruent cue combination.

Furthermore, this study has provided evidence of the role of perceived information authenticity in online cue utilisation. Results show that consumers' purchase intention driven by high online deal popularity through service quality expectation is amplified when their perceived authenticity of deal popularity is high. The findings of a three-way interaction also support the role of perceived authenticity of deal popularity in enhancing the magnitude of the positive interactive effect between online deal popularity and cue congruency.

Study II thus has addressed research issues showing in chapter 1 in relation to the multiple cue utilisation and perceived information authenticity on the use of online deal popularity.

A significant effect of online deal popularity on behavioural intention through service quality expectation is demonstrated by taking into account service types, cue (in)congruency, and perceived information authenticity in Study I and Study

II. However, considering the uncertainty of intangible service deals offered online, the question concerning the effect of online pre-purchase risk perceptions through using online deal popularity comes to the fore: does online deal popularity mitigate consumers' perceived risk surrounding online service deals, and if so, to what extent? Although critically important, these questions remain unanswered in extant literature. Furthermore, given that deal popularity has become a key element in global marketing strategy for borderless e-retailing, the manner and extent to which risk perceptions toward online deal popularity differ across cultures has become an important matter of empirical enquiry that lacks validation in extant research. Study III is designed to explore and explain the association between consumers' risk perceptions and online deal popularity when purchasing online service deals in Australia and Taiwan. Study III is presented in the next chapter.

Chapter 4. STUDY III: A Cross-cultural Assessment of Deal Popularity in e-Commerce

INTRODUCTION

The final study in this thesis, *A Cross-cultural Assessment of Deal Popularity in e-Commerce*, is an examination extending the findings in Study I related to a relationship between online deal popularity and purchase intention by considering consumer risk perception as a driver.

Given that purchasing service deals online involves uncertainty, information capturing others' online behaviour may influence consumers' risk perceptions (e.g., Lee *et al.*, 2011; Zhu and Zhang, 2010). Further, while the internet is increasingly enabling borderless e-commerce, consumers from different cultures may be influenced differently in the manner in which they interpret online information. This means that failure to adequately consider cultural differences may undermine effectiveness of marketing strategies. An assessment of online deal popularity's effects on consumers across cultures is critical in determining its effectiveness.

Thus, the aim of Study III is to provide an alternative explanation of the relationship between online deal popularity and purchase intention from a risk perception perspective between two different cultural backgrounds: Australia and Taiwan. Results provide insights for global e-marketers by showing the different risk perceptions toward online deal popularity from consumers of the two markets.

This paper is currently under review for the Information & Management journal. Its presentation in this thesis is in the required format of the journal, while tables and figures have been placed throughout the paper to facilitate reading. This study evolved from a paper accepted and to be presented in February at the 2017 Australia and New Zealand International Business Academy (ANZIBA2017) Conference (See Appendix B). The conference paper is authored by Karen C. Kao, Sally Rao Hill, and Indrit Troshani with the respective contributions the same as the contribution ratio for this article, which is outlined in the next page.

STATEMENT OF AUTHORSHIP

Statement of Authorship

Title of Paper	A Cross-cultural Assessment of Deal Popularity in e-Commerce
Publication Status	Submitted
Publication Details	This research paper is currently under review for publication in Information & Management.

Principal Author

Name of Principal Author (Candidate)	Karen Chia-yin Kao	
Contribution to the Paper	I conceptualized research framework from literature review, designed and conducted experiments for data collection and analysis, reported findings, and implemented writing.	
Overall percentage (%)	70%	
Certification:	This paper reports on original research I conducted during the period of my Higher Degree by Research candidature and is not subject to any obligations or contractual agreements with a third party that would constrain its inclusion in this thesis. I am the primary author of this paper.	
Signature	Date	Nov. 22, 2016

Co-Author Contributions

By signing the Statement of Authorship, each author certifies that:

- i. the candidate's stated contribution to the publication is accurate (as detailed above);
- ii. permission is granted for the candidate to include the publication in the thesis; and
- iii. the sum of all co-author contributions is equal to 100% less the candidate's stated contribution.

Name of Co-Author	Sally Rao Hill	
Contribution to the Paper	Prof. Rao Hill provided constructive suggestions in research framework, advices and sources for data analysis in Australia, and the editing services. Percentage of contribution: 15%	
Signature	Date	22/11/16

Name of Co-Author	Indrit Troshani	
Contribution to the Paper	Prof. Troshani provided constructive suggestions in research framework, advices and sources for data analysis in Australia, and the editing services. Percentage of contribution: 15%	
Signature	Date	22/11/16

Please cut and paste additional co-author panels here as required.

STUDY III

A Cross-cultural Assessment of Deal Popularity in e-Commerce

Abstract

Deal popularity information has become readily accessible on many e-commerce websites. The purpose of this paper is to examine the effect of service deal popularity on consumer reactions in Australia and Taiwan. Results of an experiment show that Australian (Taiwanese) respondents perceive high (low) performance and psychological risk when encountering high service deal popularity which in turn reduces (increases) their purchase intention for online service deals. Results provide insight to global e-commerce organisations concerning how deal popularity can be leveraged as a risk reduction strategy for Taiwanese consumers but with caveats for their Australian counterparts.

Keywords Service deal popularity, online group buying, risk, culture, Australia, Taiwan

1. Introduction

E-commerce retailers face fierce competition as they operate in an increasingly lucrative marketplace. E-retailers are constantly developing and revising their strategies as they identify and pursue growth opportunities. A recent survey of online consumers across 26 countries indicates that 63% searched for service information online, 52% compared e-retailing prices, and 57% purchased from an e-retailer outside their country of residence in the six months prior to the survey [54]. E-commerce sales worldwide are expected to reach US\$3.4 trillion in 2019 up from US\$1.55 trillion in 2015 [68]. With a sharp

growth trend of online shopping worldwide, further research is imperative that investigates the influence of culture on the behaviour of online consumers [67].

Research to date indicates that cultural influences on consumer reactions to e-commerce information vary across different contexts. Recent studies have found that consumer reactions to e-marketing strategies differ across cultures. For example, individuals from different cultures experience different types of emotions when facing different website design features [17, 46, 67]. Likewise different cultures pose different social bonding requirements toward use of online social commerce [52] while provoking different risk perceptions toward online consumer ratings [37]. These studies culminate with recommendations that e-marketing strategy must consider the cultural context of target consumers. While information presented on e-commerce websites plays a key role in influencing the purchasing behaviour of consumers [52, 55], the impact of such information across cultures remains under-researched.

Deal popularity is an important example of such information that is being increasingly used on e-commerce sites. Deal popularity is defined as the cumulative number of deals sold to consumers. It is prominently displayed at e-commerce websites, particularly online group buying websites. It is updated in real time to show the number of deals bought within a specific deal duration [42]. This information often prompts immediate action by consumers. For example, deal popularity has been found to impact on consumers' pre-purchase quality expectation [34], product value perceptions [15], purchase intention [34, 42], and coupon redemption behaviour [42].

These findings suggest that deal popularity can benefit e-commerce practitioners and vendors [40, 70]. However, deal popularity in previous research has been examined mostly in single country settings. Given the borderless nature of e-commerce, the present study makes a cross-cultural assessment of deal popularity effects. It extends existing research by examining the differential effects of deal popularity on consumers' risk perceptions and purchase intention in Australia and Taiwan.

That is, the aim of this study is to examine the differential effect of service deal popularity on purchase intention through consumer risk perceptions between Western and Eastern cultures, specifically focussing on Australia and Taiwan as examples of each culture, respectively. Particularly, this research extends current understanding by investigating the mediating role of risk perceptions from an observational learning perspective in a across cultural context. Accordingly, our findings have implications for e-retailers operating globally and inform their strategies about how they can take advantage of online deal popularity to influence consumer reactions to service deals.

2. Theoretical underpinning and hypotheses

2.1 National culture and consumer behaviour

Culture has been defined as the collective mental programming that shapes one's beliefs, values, attitudes, and behaviour patterns and distinguishes members' of one group from those of another [28, 33]. Cultural knowledge is formed through manifestations of values, heroes, rituals, and symbols, where values play the major role in shaping perceptions and behaviour [29]. Cultural

values can shape an individual's preference of a certain state of affairs relative to that of another individual holding different cultural value [29, 31].

Much research has compared Western and Eastern cultures which represent individualist and collectivist value systems, respectively. In particular, the content of marketing information is processed differently across cultures [33]. For example, Tai and Chan [71] find that cultural values affect consumers' focus on specific information cues in advertising, such that people from Hong Kong prefer to focus on promotional and price cues while people from the US prefer to look at functional information about a service.

Given that the Internet may minimise the cultural barriers that are often difficult to overcome for the marketing in traditional methods such as advertising at local TV channels (Nicovich and Cornwell, 1998), some international marketing strategies such as price and brand name are likely to be universally standardised (Dawar and Parker, 1994). However, cultural difference should be taken into account as a barrier to international marketing strategies (Samiee, 1998), particularly to those can influence consumers' online shopping behaviour across cultures (Ashraf *et al.*, 2014). For example, Mazaheri *et al.* [46] demonstrate the emotional dimensions of website informativeness and how these are stronger for Chinese than for North American consumers. They also find that website informativeness influences the extent to which consumers perceive service tangibility, and that this relationship is stronger for North American than Chinese consumers. Davis *et al.* [17] compare internet shoppers in the US and China. They find that consumers' behavioural and emotional responses to environmental online store cues (e.g., website background colour) vary between US and Chinese consumers. These findings show that the influence of online

information is interpreted differently across cultures and thus the cultural influence needs further research.

While Australia and Taiwan have a similar population (24.2 million *versus* 23.5 Million), number of active internet users (60% *versus* 62%), and gross domestic product (GDP) based on purchasing power parity (PPP) (1.14 *versus* 1.15 trillion) [1, 47, 80, 81], they are characterised by distinct cultural values [26, 28, 29]. Based on Hofstede et al. [29]'s cultural value dimension scores, Australians score high in individualism, masculinity, and indulgence, while the Taiwanese score relatively high in power distance, uncertainty avoidance, and long term orientation. Accordingly, the contrast of individualism-collectivism is considered as the strongest dimension in cultural comparison in consumer behaviour research [79]. Additionally, Hall (1976) argues that culture influences information processing which differentiates what individuals from different cultures notice and how they filter information. He posits that the interpretation of information is based on the context across cultures. The high-low-context continuum is the degree to which an individual derives meaning that is conveyed by context (Hall, 1976). Some cultures such as Taiwan and Japan rely to a great extent on context in communication and thus they represent a high-context communication culture where the meaning is transmitted through physical environments or internalised in a person.

By contrast, in a low-context communication culture such as Australia and the US, the meaning is explicitly transmitted in text or speech (Smith et al., 2013). The high-low context culture affects the way people think, the degree to which they associate themselves with others and the manner in which they interpret messages from others [45, 65].

2.2 *Observational learning and deal popularity*

Observational learning posits that behaviour is learned by observing others' actions as a model to follow in conjunction with environmental cues [5]. Indeed, environmental stimuli can elicit desired behaviour. Individuals can spare themselves trial-and-error by emulating the behaviour of competent models in attempts to respond to stimuli appropriately with matched social values [4]. Specifically, behaviour can be shaped by direct or vicarious experiences with models that exemplify attitude, value, and social responses [4].

On the one hand, observers can learn a behaviour through classic and operant conditioning by being exposed to paired stimuli and given reinforcement incentives by taking the form of direct contact [5]. Learning can, thus, be achieved by verbal communication or visual imagery. On the other hand, vicarious learning takes place in the absence of physical experiences without direct contact with others. That is, individuals who intently observe others' actions can be affectively conditioned through learning the experiences of others indirectly.

According to observation learning theory, behaviour cannot be learned through observations without cognitive recognitions. Indeed, the association between behavioural responses and stimuli is prompted by individuals' cognitive interpretations. Observable behaviour transmits signals that individuals can observe and perceive, and subsequently decide whether to adopt or reject a possible course of action implied from the observed behaviour [8]. Individuals' responses are mediated by cognitive interpretations (e.g., perceived threat and avoidance contemplations) rather than being simply evoked by conditioned

stimuli. For example, in a study with patients in a kidney adoption market, Zhang [87] finds that observing prior kidney donation refusals leads to negative quality perceptions of the refused kidney, thereby increasing the refusal rate of kidney donation which suggests that prospective consumers' cognitive inference of kidney quality evaluations is triggered by observational learning.

Consumers often assess information heuristically to formulate judgements and often agree with the consensus that represents the majority's choices [43]. The majority's choices constitute the popularity of a product/service and tend to facilitate positive observational learning [14].

Several studies provide evidence that observational learning can take place and influence individual decisions as long as the encountered problems are similar. Tucker and Zhang [73] examine the effect of online popularity rankings of wedding service providers in terms of historical clicks on prospective consumers' website clicking behaviour. Their research focuses on vendor quality perceptions derived from the choices of prior website visitors, such that the greater the number of clicks a vendor's website receive, the higher the perceptions of vendor quality which results in high attractiveness of e-commerce vendors in top popularity rankings.

Similarly, the study by Cai et al. [11] demonstrates that diners in a restaurant have the dispositions to follow prior diners' choices by ordering the top five ranked dishes displayed on a menu plaque. They ascribe the increased chance of ordering the popular dishes to the effect of observational learning through which new diners' choices are influenced by prior diners' choices. They also manage to distinguish the observational learning effect in terms of familiarity with the

restaurant and find that observational learning predicts better for infrequent diners.

Luo et al. [42] provide empirical evidence to support the effect of deal popularity on consumer behaviour from an observational learning perspective. Their findings suggest that by observing high deal popularity at deal-of-the-day group buying websites, the likelihood of purchasing a product/service is increased and the coupon redemption time is decreased. Similarly, Subramanian and Rao [70] demonstrate that group buying websites showing deal popularity information attract new consumers, who make inferences about vendor quality from deal popularity information by using observational learning. Furthermore, Liu and Sutanto [41] and Li and Wu [40] find that online deal popularity can induce new orders by potential consumers as they observe the increasing number of deals sold to others.

2.3 Perceived risk in e-commerce

Online buyers often believe that by imitating others' behaviour they are reducing risks involved with a purchase. Perceived risk is a psychological construct that captures expectations of adverse consequences and uncertainty [19]. While adverse consequences refer to the magnitude of loss expected to be incurred in achieving a particular buying goal, uncertainty is defined in terms of an individual's beliefs of the probability of the occurrence of adverse consequences [19].

Consumers perceive higher levels of risk when shopping online [7, 32, 76, 78]. This is attributable to the inherent separated nature of online retailing whereby consumers seek to buy products/services without physically examining

them (i.e., the products) nor having closer involvement in the retailers' service production [36]. That is, consumers purchase a product/service at a website and then wait for the product delivery or consume the purchased service at a physical store at a later time after the purchase.

Under these circumstances, the uncertainty about possible adverse consequences of buying a product/service online may increase due to the difficulty in examining the product/service prior to a purchase [23] and due to the intangibility of online retailers' services [36]. Most researchers have associated risk with uncertainty about potential loss. Thus, perceived risk in online shopping is defined as a subjective expectation of loss by a consumer in a particular online purchase [23, 69].

Perceived risk is a multidimensional construct consisting of various types of loss, namely, performance, psychological, social, physical, financial, and time [19, 69]. Among these types of risks, two key components were broadly classified into non-personal and personal factors, namely, performance risk and psychological risk [59]. In their two-factor classification, performance risk is related to financial, performance, physical, and time risks while psychological risk is about social and psychological risks. The two key risk types are also frequently cited by online shoppers, particularly for service consumptions studies [23, 36, 48, 75].

Specifically, performance risk refers to the expectation of whether a product/service will perform as expected in achieving a consumer's buying goals and the extent to which it achieves these goals [23, 30, 36], such as the expected outcome after seeing a chiropractor, for example. Psychological risk is related to

the possible “loss of psychological well-being” due to consuming a product/service [36], such as the possible anxiety caused by buying an unknown or non-branded educational service online.

Several studies have suggested an association between perceived risk and purchase intention. Specifically, consumers’ perceived risk negatively influences their intention to make decisions [66, 84]. In online shopping contexts, performance and psychological risk have been found to be the reason for low purchase intention and non-purchase online [2, 16, 23].

2.4 Impact of service deal popularity on consumer reactions

Extant research suggests that services are perceived to be riskier than goods because of their intangible (i.e., cannot be touched), heterogenic (i.e., unlikely to be uniform), and perishable nature (i.e., cannot be inventoried) [48, 50, 57]. These properties tend to increase the risk perceived by online consumers.

When purchasing services online, consumers are likely to be influenced by the interpersonal information available in the website which they can use in order to reduce risk associated with a new purchase [39, 63]. As suggested by Murray [51], consumers often use others’ opinions as means of vicarious learning from external sources prior to purchasing services in attempts to reduce pre-purchase uncertainty and risk perceptions.

Given the quality uncertainty of services, consumers may consequently be forced to rely, to a greater extent, on external sources such as word-of-mouth [37, 38, 51, 86, 88], best-seller icons [82], or brand reputation [48] to form pre-purchase quality perceptions. In this vein, popularity

information could be useful in reducing pre-purchase risk perceptions associated with services because it may be perceived by prospective online buyers as the preferred choice of many others.

Zhu and Zhang [89] argue that the popularity information from an increased number of online reviews can result in incremental sales of a service, assuming that consumers use the information to reduce the likelihood of post-purchase regret. In the context of group buying behaviour, Wang et al. [77] find that consumers feel safe in making a purchase decision that is the same as that of a large group of people, suggesting that collective choice signals product popularity and can help reduce perceived pre-purchase risk.

In online contexts, Keh et al. [37] argue that the volume of consumer reviews indirectly reflects a product/service's popularity which can be used to reduce the uncomfortable feeling of risk perceptions in decision making. Their findings show that popularity information can reduce perceived risk and increase purchase intention. Similarly, Luo et al. [42] find that service deal popularity information displayed at group buying websites increases consumers' purchase intentions and expedites coupon redemptions. These findings are attributable to the role of consumers' risk reduction strategy by observing and following the majority's choices.

2.5 Consumer reactions to service deal popularity across cultures

Culture impacts on how consumers learn in terms of marketing signals, such as price cues [17] and product popularity information (e.g., star ratings) [37]. Previous studies have provided evidence that differing consumer attitudes towards products/services are often attributed to cultural values. For example

culture has a moderating effect on the relationship between brand consciousness and price-quality evaluations [6], price sensitivity and purchase intention [3], online consumer review and perceived risk [37]. It is therefore plausible to expect that national culture can influence consumers' interpretation of service deal popularity information.

More specifically, individualistic culture values independent choice, personal freedom, and self-actualisation [56]. Consumers from an individualist culture perceive cues related to product/service descriptions of performance and quality to be more informative [71]. They prefer informative cues at online stores because they feel that these cues help them better understand a service that is offered online, therefore making it to be perceived as less intangible [46]. Informative cues explicating service details, thus, can enhance the positive attitude toward a service and the website offering it for consumers with individualist values [46].

Further, individualism promotes the decontextualised self rather than relying on social context [56]. As deal popularity is social based information and does not contain essential information concerning the inherent quality of a service, individualists are unlikely to view it as a useful cue for service performance inferences.

On the contrary, deal popularity information may even lead to a negative assessment of a service for individualists. Prior research suggests that high popularity may lead to a sense of low service performance satisfaction for consumers from individualist cultures who tend to envisage a crowding situation of many others using the same service at the same time [20, 61]. In turn, this

sense could increase perceived performance risk in a pre-purchase situation for individualists. Therefore, it is hypothesised that:

H1a: For Australian consumers, higher service deal popularity is associated with higher perceived performance risk, and lower purchase intention.

Furthermore, people from individualist cultures centralise their personal life on goal achievement, control, and uniqueness [56]. In many Western cultures characterised by individualism and independence, individuals desire to distinguish themselves from others, such that they often make reference to their own thoughts and feelings, rather than referencing others' thoughts, feelings, or actions [44].

Being unique and distinctive is valued by and is one of the consequences of individualism [56]. The psychological trait of need for uniqueness has been found to influence consumers' positive attitude toward online customisation service (e.g., tailored shirts) [58] and choosing less popular product options [12]. As a result, for consumers from individualist cultures, a large number of consumers using the same service may evoke psychological discomfort resulting from perceived threat of uniqueness deprivation. As individualists, Australians may thus perceive stronger psychological risk at the thought of buying the same service deal which in turn, reduce their purchase intention. Therefore, high service deal popularity may have a negative effect on Australian consumers' psychological risk perceptions. Accordingly, we hypothesise that:

H1b: For Australian consumers, higher service deal popularity is associated with higher psychological risk, and lower purchase

intention.

On the opposite, individuals in a collectivist culture such as that of Taiwan, rely on a tight social framework and expect others to look after them [29]. Concern for the connectedness and social interdependence is upheld in collectivistic cultures [17]. Furthermore, the high score in uncertainty avoidance suggests that the Taiwanese are not comfortable with uncertainty and ambiguity [29]. From the standpoint of the “We” consciousness of collectivism [29] and the tight connectedness with others in a context [26, 65], Taiwanese consumers from this cultural background are expected to exhibit significant reliance on members in the same society through observing others’ behaviour online.

In addition, collectivist cultures are highly contextual. Individuals belonging to these cultures build their identities according to social expectations, involve themselves to a large degree in relationships with others [71], and are guided by socio-emotional factors that pay more attention to the interpersonal climate than task completion [64]. Collectivists are also capable to empathise and connect with others’ feelings [72].

Since collectivists have been found to have high perceived psychological and performance risk in buying services [35] and are likely to hesitate to buy online [85], collectivist consumers are also likely to exhibit a strong predisposition to seek advice from others [56]. Collectivists tend to seek approval from others when encountering high psychological risk, and thus, when the number of users of a service increases, their perceived psychological risk associated with a purchase is likely to be diminished [35].

Yamaguchi [83] coined the “group diffusion effect” in perceived psychological risk. This effect suggests that individuals in collectivist cultures feature interdependence to their group as they feel safer when they are exposed to risk in a larger group than when they are on their own. A service deal with high popularity may thus reduce perceived pre-purchase psychological risk which in turn increases their purchase intention. We therefore hypothesise that:

H2b: For Taiwanese consumers, higher service deal popularity is associated with lower perceived performance risk, and higher purchase intention.

Collectivists tend to ascribe meaning of social events to situational variables as causal factors [49]. Therefore, popular items are often believed to have acceptable quality and can thus help reduce perceptions of performance risk. For example, a large number of Chinese buyers joining an offline group buying activity find that buying a product/service together with many others can ease their concerns about the expected product/service performance [77]. Similarly, in an online group buying context, Luo et al. [42] find that Chinese consumers prefer to buy a deal with high deal popularity suggesting that high deal popularity fuels perceived deal quality. Accordingly, this is considered as a strategy to reduce the risk perception concerning performance issues.

Indeed, the number of online ratings signalling a service popularity and quality can reduce perceived risk for consumers from strong collectivist cultures [37]. Thus, high service deal popularity signals an endorsement of service quality, reassuring those who may hesitate or have doubts prior to a purchase. Thus, high service deal popularity can reduce perceived performance risk and potentially

increase prospective consumers' purchase intention for consumers from collectivist cultures. Accordingly, we hypothesise that:

H2b: For Taiwanese consumers, higher service deal popularity is associated with lower perceived performance risk, and higher purchase intention.

3. Methodology

This study compares the effect of service deal popularity on consumer responses by using a scenario-based experiment to test our hypotheses.

3.1 Design and participants

To test the hypotheses, a factorial (high *versus* low service deal popularity) between-subject experimental design was used to investigate Australian and Taiwanese consumers' reactions towards service deal popularity. 93 Taiwanese and 94 Australian participants took part in this online experiment. 84.6% of the respondents were aged 20-44 and of these 69.9% were female in the Taiwanese sample while 84% of the Australian respondents were aged 25-44 and of these 46.8% were female.

In Taiwan sample, respondents were 79.6% aged between 20 and 24 recruited from a university. Using student samples is acceptable for two key reasons. First, previous cross-cultural research has suggested that student samples usually are characterised by generalizability of the results (e.g., Chan *et al.*, 2007; Cousins, 1989; Davis *et al.*, 2008; Tai and Chan, 2001), particularly because of their familiarity with online shopping environments. Indeed, student samples are appropriate for theory testing (Smith *et al.*, 2013).

Second, a recent survey shows that 32.2% of a Taiwanese sample who purchase online in the past three months during the survey period were aged 20-29, and constitute the majority of online shoppers in Taiwan (Nielsen, 2016a). Our sample can, thus, be considered to be consistent representative trends in Taiwan.

By contrast, according to a report from Australian Communications and Media Authority (ACMA) (2015), 60% of Australian internet users are reported to have online shopping experience, and of these those aged between 25 and 54 are most likely to purchase online. In the report, the age group of 35-44 contributes the most sales of online shopping, which is followed closely by the age group of 25-34. Participants in the Australian sample are thus consistent with trends representing internet users in Australia. Accordingly, our samples collected in both countries were appropriate for the context and research objective.

3.2 *Stimuli*

Deal popularity was manipulated by showing a screenshot of a service deal from a group buying website⁴ displaying different deal popularity. The specific number of deals bought by other consumers was used to represent deal popularity (i.e., 1999 *versus* 9 representing high and low deal popularity, respectively). Experience services accounts for the majority of service deals promoted at group buying websites, particularly restaurant dining, beauty spa, and entertainment services [40, 42]. While restaurant dining service is the

⁴ Deal popularity is the information that is often displayed at group buying websites not only in Taiwan (e.g., www.gomaji.com) but also in Australia (e.g., scoopon.com.au). At some retailing website such as ebay.com.au, retailers also decide to show this information for products. This information is thus a common information that can be found at group buying websites in both Australia and Taiwan.

common deal that can be found at group buying websites, with neutral gender concerns, a restaurant dining deal was used as the purchase scenario for Australian participants. By contrast, given the entertainment lifestyle of Taiwanese consumers, particularly the age trend of our participants, Karaoke services are broadly considered as an important leisure choice for young adults [13]. A Karaoke service was, thus, chosen as the purchase scenario for Taiwanese participants. Information such as price, discount rate, and star ratings was controlled across scenarios. The stimuli for Australian and Taiwanese participants are thus believed to have the same frame of reference considering the population of online shopping trend and our participants and the purchase scenarios for the countries based on our user trend in terms of age.

3.3 Pretesting

A pretest was conducted two months prior to data collection to check the manipulation of service deal popularity. Australian ($n = 60$) and Taiwanese ($n = 56$) participants read a purchase scenario of either high or low deal popularity and rated their perceptions toward the number of deals bought by others using a 7-point Likert scale (1 = very small; 7 = very large). Results show a main effect, such that the larger number in a service deal was perceived to be a high deal popularity ($\text{Mean}_{\text{Australia}} = 4.83$; $\text{Mean}_{\text{Taiwan}} = 4.69$) condition as opposed to the low deal popularity ($\text{Mean}_{\text{Australia}} = 3.27$; $\text{Mean}_{\text{Taiwan}} = 3.04$) condition (Australia: $F(1, 58) = 16.17, p < 0.001$; Taiwan: $F(1, 54) = 10.79, p = 0.002$). The manipulation was found to be significant for the main study sample also (High deal popularity: $\text{Mean}_{\text{Australia}} = 5.83$; $\text{Mean}_{\text{Taiwan}} = 4.75$; Low deal popularity: $\text{Mean}_{\text{Australia}} = 3.22$; $\text{Mean}_{\text{Taiwan}} = 2.84$; Australia: $F(1, 92) = 56.08, p < 0.001$; Taiwan: $F(1, 91) = 23.34, p < 0.001$). Based on the results of pretesting, it

supports the experiment to move on a new batch of sample collection for hypotheses testing.

3.4 Measures

Measures were adapted from existing research. Three items of performance risk (Cronbach's $\alpha_{\text{Australia}}$: 0.86; Cronbach's α_{Taiwan} : 0.77) and four items of psychological risk (Cronbach's $\alpha_{\text{Australia}}$: 0.90; Cronbach's α_{Taiwan} : 0.87) were adapted from Keh and Pang [36] while three items of purchase intention (Cronbach's $\alpha_{\text{Australia}}$: 0.78; Cronbach's α_{Taiwan} : 0.79) were adapted from Lee and Lee [38].

All items were rated on 7-point Likert scales (1 = strongly disagree; 7 = strongly agree). Items of the same construct were separated in the questionnaire to reduce common method bias [60]. For the Taiwanese participants, the experiment was conducted in Chinese. Measurement items were firstly translated into Chinese by two bilingual doctoral students at a major Australian University and then back into English by another bilingual researcher to ensure semantic equivalence [10].

Confirmatory factor analysis was used to further test reliability and validity. Factor loadings of each item were statistically significant and satisfied the threshold of 0.4 [9, 24], demonstrating items are reflected in their corresponding construct. Composite reliability of each of the three constructs in both Australian and Taiwanese samples meets the acceptable threshold in exploratory research (CR > 0.6) [22, 25], showing internal consistency of each item.

Together with average variance extracted (AVE) for the three constructs (all above 0.5), assessments of AVE, factor loadings, and composite reliability support convergent validity of our measures [25]. Discriminant validity is evidenced by AVEs of each construct being greater than the squared binary correlations of constructs [22, 25]. Table I summarises the details of construct assessment.

Table I. Construct reliability and validity.

Country	Construct	Mean	SD	Cronbach's Alpha	Composite Reliability	PFR	PSR	PI
	Performance risk (PFR)	4.15	1.41	0.86	0.71	0.67 ^a	0.34 ^b	0.26 ^b
Australia	Psychological risk (PSR)	3.44	1.54	0.90	0.74		0.69 ^a	0.19 ^b
	Purchase intention (PI)	3.94	1.53	0.78	0.71			0.83 ^a
	Performance risk (PFR)	4.98	1.20	0.77	0.65	0.56 ^a	0.27 ^b	0.21 ^b
Taiwan	Psychological risk (PSR)	4.12	1.46	0.87	0.68		0.60 ^a	0.22 ^b
	Purchase intention (PI)	3.68	1.39	0.79	0.72			0.78 ^a

Note: ^a AVE of each construct; ^b Squared correlation coefficients.

3.5 *Sampling and procedure*

Participants were informed that they would be taking part in a study of consumer reactions toward a service deal promoted at a group buying website. After reading a brief list of instructions, they were randomly assigned to one of the two deal popularity conditions in a service deal. Sample size of each deal popularity condition in both countries satisfied the 30-each-cell rule of thumb for conducting experiments [74] and achieved a satisfactory statistical power effect (power > 0.95, $\alpha = 0.05$) [21]. Participants were also asked to read the information in a screenshot of an online group buying service deal and were subsequently requested to rate measures of perceived performance and psychological risk and purchase intention in the service deal. Before being asked to provide demographic information, participants were asked to answer a manipulation check item of service deal popularity. In the cover page, we assured participants that their responses would be treated confidentially and also indicated that there were no right/wrong answers to minimise the risk of evaluation apprehension [60].

4. **Results**

PROCESS macro based on ordinary least squares (OLS) regression was used to test the effect of service deal popularity between the two country samples, using perceived performance and psychological risk as the mediator and purchase intention as the dependent measure. The analysis was conducted using 10,000 bootstrapped samples [27].

As anticipated, both perceived performance and psychological risk play a significant mediating role in the Australian and Taiwanese samples. Interestingly,

the results reveal that service deal popularity was a significant predictor of perceived performance risk and psychological risk in both countries, though in opposite directions. Tables II and III summarise the assessed coefficients of the Australian and Taiwanese samples.

In the Australian sample, respondents' perceived performance risk ($\beta = 0.601, p = 0.039$) and psychological risk ($\beta = 0.692, p = 0.031$) were significantly and positively related to service deal popularity. By contrast, in the Taiwanese sample the respondents' perceived performance risk ($\beta = -0.707, p = 0.004$) and psychological risk ($\beta = -0.823, p = 0.006$) were significantly but negatively related to service deal popularity. Consistent with previous research, respondents' performance risk and psychological risk were significantly and negatively related to purchase intention both in the Australian (performance risk: $\beta = -0.536, p < 0.001$; psychological risk: $\beta = -0.415, p < 0.001$) and Taiwanese samples (performance risk: $\beta = -0.376, p = 0.002$; psychological risk: $\beta = -0.442, p < 0.001$).

In the Australian sample, service deal popularity was not related to purchase intention ($\beta = -0.505, p = 0.113$) and remained non-significant after including performance risk ($\beta = -0.183, p = 0.521$) and psychological risk ($\beta = -0.219, p = 0.464$) mediators. However, in the Taiwanese sample, a significant and positive relationship between service deal popularity and purchase intention was found ($\beta = 0.793, p = 0.005$) although the effect was reduced to non-significant after including performance risk ($\beta = 0.527, p = 0.06$) and psychological risk ($\beta = 0.429, p = 0.10$) mediators. Figure I summarises these relationships for both samples.

When performance risk and psychological risk were included as mediators, a significantly indirect effect was observed in the samples of both countries. H1a and H1b predict the mediation role of perceived performance risk and psychological risk on service deal popularity and purchase intention for Australian consumers, and hypothesise a positive effect of service deal popularity on both types of risk.

Data were analysed based on 95% bias-corrected and accelerated bootstrap confidence interval. Using the indirect effect size suggested by Preacher and Kelley [62], the effects excluded zero suggesting the mediation effects of Australian respondents' perceived performance risk ($k^2 = 0.111$, BCa CI [0.018, 0.240]) and psychological risk ($k^2 = 0.096$, BCa CI [0.021, 0.204]). Together with the evidence of positive effect of service deal popularity on perceived performance and psychological risk found in the Australian sample, results of significantly indirect effect fully support both H1a and H1b.

H2a and H2b predict the role of performance risk and psychological risk as mediators of service deal popularity and purchase intention for Taiwanese consumers, hypothesising a negative effect of service deal popularity on both types of risk. The indirect effects excluded zero showing the mediation effect of Taiwanese respondents' perceived performance risk ($k^2 = 0.096$, BCa CI [0.022, 0.217]) and psychological risk ($k^2 = 0.136$, BCa CI [0.045, 0.255]). Together with the evidence of a negative relationship between service deal popularity and performance and psychological risk, respectively, the significant indirect effect found in Taiwan sample supports both H2a and H2b.

Table II. Results for the mediation effect of perceived performance risk.

Country	Antecedent	Performance risk (PFR)					Purchase intention (PI)						
		Coef. β	SE	<i>t</i>	<i>p</i>	95% BC LLCI	95% BC ULCI	Coef. β	SE	<i>t</i>	<i>p</i>	95% BC LLCI	95% BC ULCI
Australia (n=94)	Service deal popularity (DP)	0.601	0.288	2.090	0.039	0.030	1.173	-0.183	0.284	-0.645	0.521	-0.747	0.381
	Performance risk (PFR)	---	---	---	---	---	---	-0.536	0.101	-5.333	<.001	-0.736	-0.336
	Constant	3.813	0.216	17.651	<.001	3.384	4.243	6.271	0.436	14.377	<.001	5.405	7.138
	R square	$R^2 = 0.045, F(1,92) = 4.370, p = 0.039$											
Total effect	DP on PI : Effect size: - 0.505, SE: 0.316, $p = 0.113$, BC CI [- 1.133, 0.122]												
Direct effect	DP on PI : Effect size: - 0.183, SE: 0.284, $p = 0.521$, BC CI [- 0.747, 0.381]												
Mediation effect DP-PFR-PI	Effect: -0.322, Bootstrap SE=0.173, Bootstrap BC CI= [- 0.728, -0.044] $k^2 = 0.111$, Bootstrap SE=0.057, Bootstrap BC CI= [0.018, 0.240]												
Taiwan (n=93)	Service deal popularity (DP)	-0.707	0.240	-2.946	0.004	-1.184	-0.230	0.527	0.276	1.907	0.060	-0.022	1.076
	Performance risk (PFR)	---	---	---	---	---	---	-0.376	0.115	-3.260	0.002	-0.605	-0.147
	Constant	5.313	0.165	32.186	<.001	4.985	5.641	5.303	0.639	8.298	<.001	4.033	6.573
	R square	$R^2 = 0.087, F(1,91) = 8.678, p = 0.004$											
Total effect	DP on PI : Effect size: 0.793, SE: 0.278, $p = 0.005$, BC CI [0.241, 1.344]												
Direct effect	DP on PI : Effect size: 0.527, SE: 0.276, $p = 0.060$, BC CI [- 0.022, 1.076]												
Mediation effect DP-PFR-PI	Effect: 0.266, Bootstrap SE=0.145, Bootstrap BC CI [0.060, 0.637] DP-PFR-PI: $k^2 = 0.096$, Bootstrap SE=0.050, Bootstrap BC CI [0.022, 0.217]												

Note. 10,000 bootstrap samples. BC CI= bias-corrected confidence interval

Table III. Results for the mediation effect of perceived psychological risk.

Country	Antecedent	Psychological risk (PSR)						Purchase intention (PI)					
		Coeff. β	SE	<i>t</i>	<i>p</i>	95% BC		Coeff. β	SE	<i>t</i>	<i>p</i>	95% BC	
						LLCI	ULCI					LLCI	ULCI
Australia (n=100)	Service deal popularity (DP)	0.692	0.315	2.197	0.031	0.066	1.317	-0.219	0.297	-0.736	0.464	-0.808	0.371
	Psychological risk (PSR)	---	---	---	---	---	---	-0.415	0.096	-4.328	<.001	-0.605	-0.224
	Constant	3.049	0.236	12.894	<.001	2.579	3.518	5.492	0.364	15.084	<.001	4.768	6.215
	R square	$R^2=0.05, F(1,92)=4.826, p=0.031$											
	Total effect	DP on PI : Effect size: -0.505, SE: 0.316, $p=0.113$, BC CI [- 1.133, 0.122]											
	Direct effect	DP on PI : Effect size: -0.219, SE: 0.297, $p=0.464$, BC CI [- 0.808, 0.371]											
	Mediation effect	Effect: - 0.287, Bootstrap SE=0.144, Bootstrap BC CI [-0.632, -0.056]											
	DP-PSR-PI	$k^2=0.096$, Bootstrap SE=0.045, Bootstrap BC CI [0.021, 0.204]											
	Service deal popularity (DP)	-0.823	0.292	-2.820	0.006	-1.403	-0.243	0.429	0.258	1.664	0.100	-0.083	0.941
	Psychological risk (PSR)	---	---	---	---	---	---	-0.442	0.089	-4.977	<.001	-0.618	-0.265
Constant	4.505	0.201	22.432	<.001	4.106	4.904	5.295	0.435	12.187	<.001	4.432	6.159	
R square	$R^2=0.08, F(1,91)=7.95, p=0.006$												
Total effect	DP on PI : Effect size: 0.793, SE: 0.278, $p=0.005$, BC CI [0.241, 1.344]												
Direct effect	DP on PI : Effect size: 0.429, SE: 0.258, $p=0.100$, BC CI [- 0.083, 0.941]												
Mediation effect	Effect: 0.364, Bootstrap SE=0.152, Bootstrap BC CI [0.120, 0.730]												
DP-PSR-PI	DP-PSR-PI: $k^2=0.136$, Bootstrap SE=0.053, Bootstrap BC CI [0.045, 0.255]												

Note. 10,000 bootstrap samples. BC CI= bias-corrected confidence interval

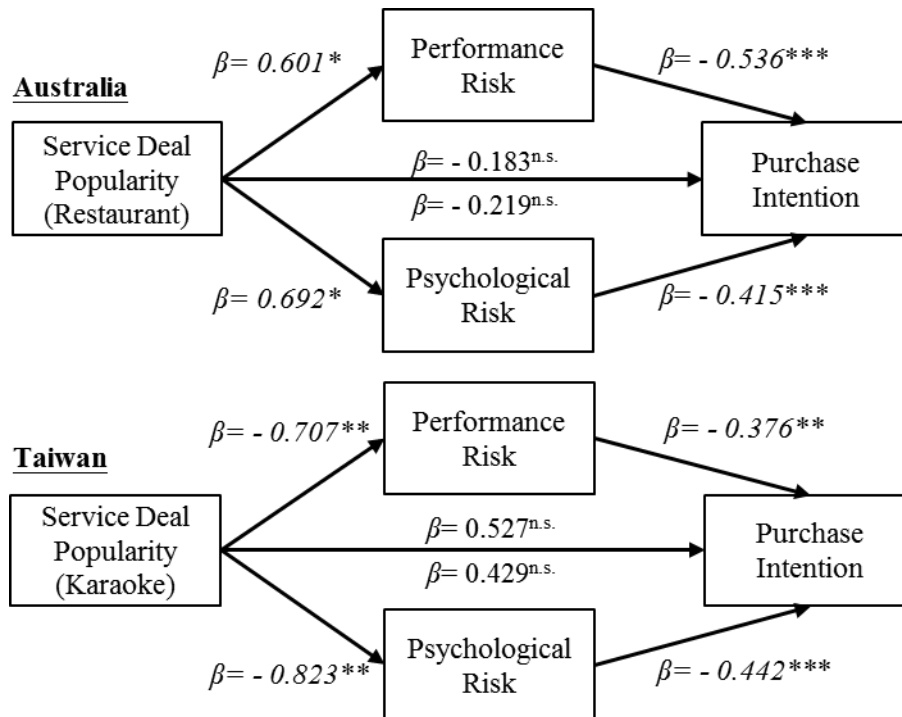


Figure I. The effect of deal popularity on purchase intention mediated by perceived performance risk and psychological risk in Australia and Taiwan.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, n.s. non-significant $p > 0.05$

5. Discussion and implications

Our findings confirm that consumers' national culture does influence their reactions towards online service deal popularity information. As expected, consumer perceived performance and psychological risk mediate the effect of service deal popularity on purchase intention both in the Australian and Taiwanese samples. However, the respondents' perceived performance and psychological risk toward service deal popularity runs in opposite directions in the two countries. Specifically, our findings suggest that high deal popularity increases Australian consumers' performance and psychological risk perceptions which in turn lowers their purchase intention. The opposite effect occurs for Taiwanese consumers.

To the best of our knowledge, this is the first empirical attempt that investigates risk perception as a mediator of service deal popularity and purchase intention relationships. This study is also the first to show that Australian and Taiwanese consumers react differently toward online service deal popularity information, thus providing evidence of the nuanced effect of cultural differences in observational learning.

This study has implications for e-commerce practitioners in both in Australia and Taiwan. The effect of service deal popularity is significantly different between Australia and Taiwan, suggesting that it is not supposed to be used universally across countries. It is likely to work for Taiwanese consumers but may backfire when used with Australian consumers. Our findings can inform e-marketing strategy concerning the directions of how consumers from the two cultures interpret online service deal popularity and its effect on consumers' risk perceptions.

For consumers from individualist cultures, service deal popularity may not be used as a dominant source of information if marketers are attempting to enhance consumers' attitude toward buying a service deal online. Consumers from individualist cultures require explicit information about service content rather than symbolic cues for decision making [46]. Other types of information may be provided such as detailed information about service content by using photos and clear descriptions of service personnel involved in order to mitigate perceived performance and psychological risk for consumers from individualist cultures.

By contrast, consumers from collectivist cultures have a general predisposition to follow other consumers' behavioural signals to reduce perceived risk. Accordingly, service deal popularity information representing others' actual purchase behaviour could be effectively used to inform strategies that target consumers in e-commerce settings providing service deals. Overall, this research provides practical insight for e-commerce organisations globally concerning how to leverage on service deal popularity in two examples of Western (i.e., Australia) and Eastern (i.e., Taiwan) markets.

6. Limitations and further research

As with any research, this study has several limitations. The average age of respondents in our samples is relatively young and may not necessarily represent the entire population in the two countries. Considering aging trends of global population, future research could replicate our study by sampling across older age groups. For example, consumers older than 40 are leading the growth of online shopping in Taiwan [53] while the largest increase in Australia is observed for those aged over 45 [1].

Furthermore, we used the secondary data to identify national culture (e.g., the scores of dimensions of national culture) [29] and to differentiate the cultural values between Australia and Taiwan. Although national culture changes very slowly [29], the use of secondary data as a proxy of national culture may ignore the individual differences within a country [18]. Future research should include cultural measures to ensure the match of sample and identified culture at an individual level. While we have advanced current understanding of service deal popularity, other variables such as goals and motivation could also be carefully

considered when examining the effect of deal popularity. For example, consumers' consumption goals may influence their assessment of online information, such that the effect of service deal popularity may be disparate in terms of consumers' cognitive attitude and behavioural intention.

7. Conclusion

Consistent with prior research suggesting that cultural background can explain the variance in consumer attitudes and behaviour toward online website information [17, 46], we find that consumers from Australia and Taiwan react differently when observing online service deal popularity. Our findings suggest that consumers from individualist cultures request specific information about service content, such that they can envisage the service prior to purchase [46]. Our findings also support extant research that consumers from collectivist cultures prefer to follow others' behaviour based on their observation of information signals that affects risk perceptions [77]. Our findings suggest that the impact of high service deal popularity at online service retailing websites does help Taiwanese buyers to reduce both their perceived performance and psychological risks towards purchasing services online. By contrast, Australian consumers facing high service deal popularity perceive high performance and psychological risks when buying service deals online.

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CONCLUSION TO STUDY III

A Cross-cultural Assessment of Deal Popularity in e-Commerce

The third and final study explored and explained consumer risk perceptions toward online deal popularity, considering cultural differences. Study III thus has addressed research issues showing in chapter 1 in relation to the risk perceptions and cultural difference toward the use of online deal popularity.

Results show that consumer risk perceptions mediate the effect of online deal popularity on purchase intention. However, this effect is found to vary between consumers from Australia and Taiwan. For Australian consumers, who are considered to be individualists, high online deal popularity leads to high perceived performance risk and psychological risk, and thus, their purchase intention is diminished. However, for Taiwanese consumers, who are considered to be collectivists, high online deal popularity is used to reduce their perceived performance risk and psychological risk toward buying a service deal online, which in turn, increases their purchase intention. Findings identify the cultural influence on the effect of online deal popularity, demonstrating that consumers from different cultures process online deal popularity differently.

Chapter 5. THESIS CONCLUSION

5.1 INTRODUCTION

The final chapter summarises the thesis. An overview of the research is provided in terms of a summary of the key findings, and theoretical and managerial implications of the three studies reported in this thesis. Limitations are also discussed, and directions for future research are provided.

5.2 OVERVIEW OF THE RESEARCH AND FINDINGS

This thesis is comprised of three related studies, each focusing on the key construct of online deal popularity for service deals. Each study has been written in journal article format.

Online deal popularity is being increasingly used on e-retailing websites showing the number of deals purchased by existing consumers. Online deal popularity is considered to be key information which consumers use to inform their purchase decisions and e-marketers adopt to boost online sales in short periods of time (e.g., 24 hours or a week) (Clancy, 2013; Luo *et al.*, 2014; Song *et al.*, 2016). Although the positive effect of online deal popularity on e-retailing sales is well documented, research explaining how online deal popularity operates is scant.

Questions remain of how online deal popularity affects consumers' cognitive and behavioural reactions toward online service deals. In this thesis, three studies are conducted that explain the mechanisms of how purchase intention and

willingness to recommend affected by online deal popularity are mediated by key constructs of consumer service quality expectation and risk perceptions. The boundary conditions of service type, national cultures, cue congruency, and perceived information authenticity are also examined. Figure 5.2.1 summarises the findings correspondent with research issues and objectives of each study in this research.

RESEARCH ISSUES		OBJECTIVES	FINDINGS
Study I	<p>Using online deal popularity as a quality cue.</p> <p>The influence of service type on the use of online deal popularity.</p>	<p>To investigate the effect of online deal popularity on behavioural intentions through service quality expectation.</p> <p>To examine the effect of online deal popularity on service quality expectation across two service types.</p>	<p>High online deal popularity increases consumers' service quality expectation which, in turn, increases purchase intention and willingness to recommend.</p> <p>The positive effect of online deal popularity on purchase intention and willingness to recommend through enhancing service quality expectation is stronger for credence service deals than for experience service deals.</p>
Study II	<p>The influence of multiple cue utilisation on the use of online deal popularity.</p> <p>Perceived information authenticity on the use of online deal popularity.</p>	<p>To examine the moderating influences of cue congruency and perceived authenticity of deal popularity on the effect of online deal popularity on purchase intention through service quality expectation.</p> <p>To explore the dominant role of online deal popularity in incongruent cue combinations.</p>	<p>High online deal popularity enhances purchase intention through service quality expectation when star rating is presented as high and when perceived information authenticity is high.</p> <p>High online deal popularity positively influences service quality expectation even when incongruently paired with low star rating.</p> <p>Cue congruency effect influences service quality expectation only when perceived information authenticity is high.</p>
Study III	<p>Risk perceptions toward online deal popularity.</p> <p>Cultural difference in perceived risk toward online deal popularity.</p>	<p>To investigate the effect of online deal popularity on purchase intention through risk perceptions.</p> <p>To examine the effect of online deal popularity on risk perceptions across two cultures.</p>	<p>The positive effect of online deal popularity on purchase intention is mediated by risk perceptions but differs between Australian and Taiwanese samples.</p> <p>High online deal popularity decreases performance risk and psychological risk which in turn increases purchase intention in the Taiwanese sample.</p> <p>High online deal popularity increases performance risk and psychological risk which in turn decreases purchase intention in the Australian sample.</p>

Figure 5.2.1 Summary of the research and findings.

5.2.1 Study I: Online consumers' responses to deal popularity as an extrinsic cue

Whether experience or credence in nature, services are intangible, a feature that impedes consumers' pre-purchase evaluations of their quality (Darby and Karni, 1973; Mitra *et al.*, 1999). Quality inferences are assumed to be even more difficult for a service deal offered online. Extrinsic cues such as brand name (e.g., Nepomuceno *et al.*, 2014) and price (e.g., Chiu and Chen, 2014) are thus widely used for service quality evaluations.

However, online promotional deals (e.g., at groupon.com) are often characterised by deeply discounted prices, unfamiliar brand names and new service operators, other extrinsic cues for these service deals are used which can affect quality expectation in pre-purchase situations. While e-retailers enjoy the positive effect of online deal popularity on sales (Luo *et al.*, 2014; Subramanian and Rao, 2016), the manner in which it influences behavioural intention whilst being used as a cue for service quality expectation remains under-explored.

Based on cue utilisation theory (Olson, 1972), online deal popularity is identified in this study as an extrinsic cue that is assumed to affect service quality expectation. Thus, the cue-quality conceptualisation is applied to test the relationship between online deal popularity, service quality expectation, and behavioural intention whilst accounting for service type.

The findings support the mediating role of service quality expectation. This suggests that high online deal popularity enhances consumers' service quality expectation in pre-purchase situations, which in turn, increases their purchase intentions and willingness to recommend a service deal to others. It is also found

that the effect of high online deal popularity on service quality expectation is distinct for credence services, while the effect is not significant for experience services. This is because online deal popularity signals consensus in the majority's choice implying credence service quality when consumers often feel difficulty in predicting service quality by using other cues (e.g., price or brands).

This study takes a first step in identifying the role of online deal popularity as an extrinsic cue that can inform service quality prior to purchase. Study I contributes to cue utilisation theory in the e-commerce strand of service marketing literature by furthering the understanding of online deal popularity. Specifically, the effect on behavioural intention through service quality expectation across service types is investigated and evidenced. Online e-retailers can thus take advantage of these findings to inform online promotional strategies by creating a popularity effect, particularly for credence services.

5.2.2 Study II: The role of cue congruency and perceived information authenticity in online consumers' reactions to service deal popularity

Study II reveals the importance of the boundary conditions of cue congruency and perceived online information authenticity. Consumers often use multiple cues for product/service quality judgments and purchase decisions (Zeithaml, 1988). Cue congruency suggests that congruent cues can enhance a cue's diagnosticity which affects the manner in which consumers use cues (Maheswaran and Chaiken, 1991; Miyazaki *et al.*, 2005).

Although prior research has acknowledged the congruency effect by examining multiple extrinsic cues such as the combination of price and third-party rating

(Akdeniz *et al.*, 2013) or price, brand and warranty (Miyazaki *et al.*, 2005), the investigation of online popularity cues in conjunction with other cues has received little attention. This study aims to investigate the effect of cue (in)congruency between two common online cues related to popularity, namely, online deal popularity and star rating, on consumer service quality expectation and purchase intention. Both cues are often displayed together on e-retailing sites. However, the manner in which star rating enhances or diminishes the effect of online deal popularity is unknown.

In addition, consumers' perceived online information authenticity is important to their product/service attitude and purchase decisions (e.g., Pan and Chiou, 2011; Senecal and Nantel, 2004) while limited research has provided evidence of its influence in online shopping contexts. With the pervasive growth of online shopping trends (Statista Inc, 2016), perceived authenticity about information on e-retailing sites is thus considered to be a critical variable that can influence online consumers' attitude and behavioural intention. Therefore, this study examines the moderating effect of perceived authenticity of deal popularity on online deal popularity and cue congruency.

The findings of two experiments support the cue congruency effect. Results show that congruent cue combinations and high perceived information authenticity amplify the effect of online deal popularity on purchase intention through enhancing service quality expectation. Results also indicate an influence of the incongruent combination of high deal popularity and low star rating on service quality expectation. This suggests the dominant role of high online deal popularity when another cue is incongruently presented with it.

Study II contributes to the cue congruency theory in service marketing literature by supporting the notion that congruent cues of online deal popularity and star rating have positive influences on consumers' reactions, while providing evidence of the dominant role of high deal popularity in an incongruent cue combination.

This study also contributes to the literature by demonstrating the influence of online information authenticity from a consumer perspective in online shopping. E-retailers can gain insights from these findings by taking advantage of high deal popularity in both congruent and incongruent cue combinations while improving consumers' perceived information authenticity on e-retailing sites.

5.2.3 Study III: A cross-cultural assessment of deal popularity in e-commerce

Online shopping often triggers risk perceptions due to uncertainty and adverse consequence of a purchase (Bhatnagar and Ghose, 2004; Ingham *et al.*, 2015; Wang and Head, 2007; Wang *et al.*, 2016). In particular, when buying services online, information about other consumers' behaviour has a strong influence on potential consumers' risk perceptions and purchase behaviour (Murray, 1991). While in online consumers rely to a great extent on other consumers' behaviour such as best seller information for decisions (Xu *et al.*, 2013) to reduce the uncertainty of product/service quality, it is important to explore whether online deal popularity is a cue related to consumers' risk perceptions prior to their purchase decision making.

Observational learning theory suggests that consumers will follow others' behaviour to avoid adverse consequences and spare themselves potentially

costly trial-and-error efforts (Bandura, 1969). This study identifies that the effect of online deal popularity is related to consumers' risk perceptions which in turn can influence consumers' purchase intentions. However, cultural values may influence consumers' interpretation of this information.

Culture studies are imperative for marketers operating in the global e-retailing marketing if they are to devise appropriate strategies that target local markets effectively (Luna and Gupta, 2001). Online deal popularity is used generally on the borderless e-retailing websites. However, the extent to which online deal popularity can be suitably employed universally and the manner in which it affects consumers' risk perceptions are questions that remain unanswered. This study thus examines the effect of online deal popularity on purchase intention, by considering the mediating role of risk perceptions across two countries: Australia and Taiwan.

Results confirm the effect of online deal popularity on risk perceptions which in turn influences purchase intention. However, this effect operates in opposite directions between the two selected cultures. For Australian consumers, higher online deal popularity leads to higher perceived performance and psychological risk which in turn, reduces their purchase intentions. By contrast, Taiwanese consumers perceive lower performance and psychological risk when facing higher online deal popularity, which increases their purchase intentions. The findings provide insight into global e-retailers to devise online deal popularity as a risk reduction strategy for Taiwanese market but with caveats for Australian markets.

5.3 LIMITATIONS AND FUTURE RESEARCH

While the research methods and processes were carefully designed, there are several limitations of the research that must be acknowledged. First, Study I and Study II both used convenient student samples. For a more robust examination, future research could adopt samples of different population.

In addition, the results of culture comparison in Study III are based on the secondary data using culture assessment score dimensions of Australia and Taiwan (Hofstede *et al.*, 2010). This approach may ignore the individual differences within a country (de Mooij, 2015). Future research could include cultural measures at an individual level to ensure the match between samples and identified cultures.

While the three studies are designed with scenario-based experiments, future research could yield relevant insights into the effect of online deal popularity by using field research. Furthermore, the design of purchase scenarios among studies is gender-neutral. Future research could consider a variety of different gender-specific services based on market segmentation to provide a deeper understanding of the effect of online deal popularity on consumer behaviour. Moreover, the studies in this thesis are designed with experimental scenarios mainly for group consumption deals (e.g., US\$49 coupons for two consumers dining together). Whether the extent of individuals' social engagement (e.g., the frequency of using social networks) influences the effect of online deal popularity for group consumption deals may provide further insight into better understanding the effectiveness of online deal popularity.

5.4 SUMMARY

This chapter has provided an overview of the findings, contributions, and implications for theory and practice based on the studies reported in this thesis. Limitations and future research directions conclude the thesis. In summary, the findings demonstrate the effect of online deal popularity as a cue that is relevant to service quality expectation and risk perceptions through which purchase intention and willingness to recommend are influenced. Boundary conditions of service type, cue congruency, perceived information authenticity, and national culture are found to influence the effect of online deal popularity, providing a deeper understanding of conditions that can change, diminish, or strengthen the effect of online deal popularity.

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APPENDICES

APPENDIX A: Paper presented at SERVSIG 2016

Examining the influences of deal popularity on credence and experience services

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EXTENDED ABSTRACT

Introduction

Fellow consumers' purchases seem to influence potential consumers' decision making in an online shopping environment. A number of studies have provided evidence that consumers are influenced by consumer generated contents (e.g., reviews and star ratings) (Park & Lee, 2008; Park, Lee, & Han, 2007; Torres, Singh, & Robertson-Ring, 2015; Tsao, Hsieh, Shih, & Lin, 2015), website counters that indicating the number of consumers visited a webpage (Eroglu, Machleit, & Davis, 2001; Tucker & Zhang, 2011), and records of historical sales of a product (Chang & Yi, 2014; Ye, Cheng, & Fang, 2013). Service deal popularity (e.g., deal popularity of a dining or cruise package) has emerged as a cue that consumers may use in making online purchase decisions. Deal popularity refers to a cumulative number of deals for a product or service sold within a deal interval (Luo, Andrews, Song, & Aspara, 2014). Using cue utilization theory (Olson & Jacoby, 1972), we propose that deal popularity serves as a cue to signal quality and influence consumers' purchase intention.

The inherited nature of intangibility, heterogeneity, and perishability presents barriers for consumers to purchase online service deals. Experience and credence service differ in that experience service quality can be evaluated through consumers' sensory experience and they can use it for future purchase decision whereas consumers do not have enough information and confidence to evaluate credence service quality even after several consumptions (Jean Jeon, P. Dant, & M. Gleiberman, 2014). Extant research of deal popularity suggest that deal popularity has impacts on consumers' purchasing service deals online (e.g., Coulter & Roggeveen, 2012; Luo et al., 2014). Our study extends this line of

research in examining the specific effects deal popularity has on consumers across two service types: experience and credence services (Darby & Karni, 1973; Mitchell & Greatedorex, 1993; Mitra, Reiss, & Capella, 1999).

Thus the research question is raised by discussion thus far, “To what extent does the use of deal popularity as a cue in quality inference across service types?”

When purchasing experience services, the quality uncertainty can be mitigated by past similar sensory experience (Jean Jeon et al., 2014; Mitra et al., 1999), high deal popularity should multiply consumers’ confidence in judging experience service quality and thus to agree to the majority’s choice. On the other hand, when purchasing credence services, consumers’ perceived uncertainty of quality due to lacking of relevant knowledge disable them to evaluate credence service quality even when physically experienced (Mitra et al., 1999). Thus, consumers may need to process information systematically for purchasing credence services. Other consumers’ purchase behaviour did not provide detail service contents related to credence services and might not be an indicative quality cue for potential consumers to assess quality confidently. However, this influence of services types on the relationship between the utilization of deal popularity and quality inference is under investigated and yet is important for e-retailers in online service marketing.

Different types of services have been found to influence consumer behaviour such as perceived stronger risk for credence services than for experience services, stronger impulsive buying for experience services than for credence services (Sharma, Sivakumaran, & Marshall, 2014), and preference to purchase experience service than credence services in online shopping environments (Keh & Pang, 2010). Other consumers' online behaviour (e.g., electronic word-of-mouth) also has been found to influence consumer behaviour

differently in terms of product/service attributes. That is, consumers' perceived electronic word-of-mouth is more credible for experience services than for products of searchable or credence attributes (Pan & Chiou, 2011; Park & Lee, 2009). Results of prior research can be concluded that service quality uncertainty impacts on consumers' behaviour and information processing. Thus, it is reasonable to assume that consumers' quality assessment prior to a purchase based on deal popularity will differ between experience and credence service types.

Thus we hypothesize that H1: Deal popularity is positively related to expected service quality, H2: Expected service quality is higher for experience than for credence service, H3a: In purchasing experience services, consumers' expectation of service quality with high deal popularity would be higher than low deal popularity, and H3b: In purchasing credence services, consumers' expectation of service quality with high deal popularity would be no different from low deal popularity.

Method

We used a 2 (service types: experience vs. credence) x 2 (deal popularity: high vs. low) between-subjects experimental design to test hypotheses. The specific number of items sold was used to represent deal popularity (i.e., 1999 as high popularity and 9 as low popularity). Psychic fortune-telling was used as a credence service and Karaoke as an experience service. Participants (n=200) were required to answer a three-item scale of expected service quality adopted from Jin and He (2013) and one-item of manipulation check for deal popularity using 7-point Likert scales. Manipulation was significant for the high vs. low deal popularity scenarios.

Results and Discussion

The results support our proposed positive relationship between deal popularity and expected service quality. The results also support that consumers' expected service quality is higher for experience services than credence services. Whereas, contrary to our prediction, the positive effect of deal popularity on expected service quality was significant in credence service purchase conditions while was insignificant in experience service conditions.

As suggested by Fogg et al. (2003), online shoppers often do not spend much time and effort to search for and process information and used to take advantage of using cues heuristically. This may be intuitive if consumers believe that the majority's choice is always correct and directly related to quality when they are not confident using other cues (e.g., price or brands) to assess credence service quality. High deal popularity representing consensus can overwhelmingly change consumers' attitude when consumers heuristically process the cue and thus they incline to agree to and follow others' choice (Chaiken, 1980). Our results show that consumers use deal popularity heuristically to form their quality expectation of credence services.

On the other hand, consumers often make decisions according to their past experience. When purchasing experience services, consumers may prefer using their own past experience to deal popularity cue for quality assessment. That is, past experience similar to the experience service in a deal dominates consumers' quality assessment prior to a purchase of the experience service online.

Theoretical implications

This research proffers contributions in threefold. Firstly, we extend research on deal popularity. Prior studies have investigated that deal popularity affects

consumers' purchase and recommendation intention (Coulter & Roggeveen, 2012; Luo et al., 2014). We advance prior research by proposing the relationship between deal popularity and expected service quality drawn on cue utilization theory. Second, we contribute to cue utilization theory by introducing deal popularity as a cue for quality inference in online service shopping environments. Third, we provide evidence that in purchasing credence services, consumers use deal popularity as a cue for quality assessment prior to a purchase online. This finding contradicts to extant service literature yet opens an avenue for e-retailers to market credence services online by displaying deal popularity on webpages.

Conclusion

Our research examines the effect of deal popularity on consumers' service quality assessment prior to purchase by drawing on cue utilization theory and heuristic information processing model in online service shopping context. In addition to contributing to theories, our findings add to the literature of online service marketing in terms of consumers' utilization of deal popularity for service quality assessment. Our research provides valuable implications to online service marketing by suggesting e-retailers display deal popularity information on webpages to mitigate consumers' perceived quality uncertainty of purchasing credence services online.

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**APPENDIX B: Paper presented at Australia and New Zealand
International Business Academy 2017**

ANZIBA 2017- Competitive Paper
Track: No.5. International Marketing and Internationalization

**Cultural Difference in Perceived Risk: the Case of Purchasing
Online Service Deals**

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Cultural Difference in Perceived Risk: the Case of Purchasing Online Service Deals

Abstract

This paper examines how online deal popularity information influences consumers' perceived risk in online service shopping contexts in two cultures (e.g., in Australia and Taiwan). It tests a research model using a scenario-based experiment. The findings support the model and demonstrate the variance across the two cultural groups. The results show the association between service deal popularity and consumers' perceived risk toward a service deal online with risk perceptions varying significantly between the two cultures. Specifically, findings show that high deal popularity leads to high risk perceptions for Australians data, while the Taiwanese perceive low risk when facing high online service deal popularity information.

Keywords: Culture, risk, deal popularity, online consumer behaviour, service shopping

Introduction

The idea of a global store at your doorstep propels marketers to administer marketing strategies globally to catch up with the growing and lucrative e-commerce. Indeed, a recently report of an online survey in 26 countries indicates that among participants 63% of them looked up service information online, 52% compared e-retailing prices, and 57% purchased from an e-retailer outside their country in the past six months (Nielsen, 2016b). These online behaviours contribute to revenues of global e-commerce. Indeed, e-commerce sales

worldwide are projected to grow to 3.4 trillion US dollars in 2019 up from 1.55 trillion US dollar in 2015 (Statista Inc, 2016). While global marketers are busy analysing of advantages and drawbacks of implementing marketing universals, academic research presents inconsistent conclusions of the impact of cultures on consumer reactions to marketing information. For example, Dawar and Parker (1994) find that there are few differences in use of quality signals, e.g., brand name and price, across cultures. Conversely, Mazaheri, Richard, Laroche, and Ueltschy (2014) studying online consumer reactions suggest that cultures influence consumers' emotions toward atmospheric cues at websites and thus affect their attitude toward services sold online. Similarly, Smith, Deitz, Royne, Hansen, Grünhagen, and Witte (2013) find cultures influence consumers' attitude toward the information displayed at websites and subsequently influences their intentions to purchase online. With the phenomenal potential in the growth of online shopping worldwide, an investigation of online consumer behaviour by examining cultural influence is imperative for academic literature and global marketing (Smith et al., 2013).

This research examines differences in consumers' cognitive reactions to online information from two countries: Australia and Taiwan. Both countries share the similar attributes in population and the percentage of internet users (ACMA, 2015; Mehra, 2016), whilst they represent distinct cultural values according to the dimensions proposed by Hofstede and his colleagues (1994; 2010). From the perspective of observational learning, we explain that consumers' perceived risk toward buying a service promoted at group buying websites is associated with the service deal popularity information displayed at websites and is culturally different. Online service deal popularity is the information visually displayed at

websites indicating a cumulative number of service deals bought by other consumers within a certain deal duration (Luo, Andrews, Song, & Aspara, 2014). While previous studies have shown that service deal popularity information significantly influences consumers' online service deal purchase intentions (Luo et al., 2014), online coupon sales (Li & Wu, 2013), and the profit of vendors and websites (Subramanian & Rao, 2016), literature investigating the association of service deal popularity and perceived risk of purchasing service online remains under-developed. Moreover, prior studies use single country samples to examine the effect of service deal popularity, which may not suffice to satisfy marketers' understanding in terms of global website marketing strategy across countries for service industry. The aim of this research is to examine cultural differences in consumers' perceived risk toward purchasing services online from observing service deal popularity information across the two countries.

Theoretical background

Culture has been defined as a collective mental programming that shapes one's beliefs, values, attitudes, and behaviour patterns and distinguishes members' of one group from those of another (Hofstede, 1994; Kale, 1991). According to Hofstede et al. (2010), culture values are individuals' preference of a certain state of affairs over others. Based on their research at national level, six dimensions of national cultures are proposed to distinguish countries from each other, namely, power distance, individualism, masculinity, uncertainty avoidance, long term orientation, and indulgence. Over the years, the cultural values paradigm of Hofstede (1994) has been widely adopted in examining cultural differences in marketing discipline and is highly regarded (e.g., Babin, Borges, & James, 2016; Oyserman, Coon, & Kemmelmeier, 2002; Reimann, Lünemann, & Chase, 2008;

Tai & Chan, 2001). Among these dimensions, the contrast of individualism-collectivism is suggested as the strongest dimension in cultural comparison research (Weber & Hsee, 1998). This cultural value can help researchers better understand online consumer behaviour in terms of cultural difference by comparing the two countries, Australia and Taiwan. Regarding the cultural value dimension score of Hofstede et al. (2010), Australians are high in individualism, while Taiwan rates high in collectivism. The high score in individualism means that Australians prefer to take care themselves prior to maintaining a relationship of members in the society (Hofstede et al., 2010). By contrast, the low score in individualism indicates that individuals in Taiwan rely on a tight social framework and expect others to look after them (Hofstede et al., 2010). We argue that the distinctiveness of cultural difference between Australia and Taiwan in cultural value of individualism-collectivism will influence people's cognitive attitude toward their observations of others' online purchase behaviour. To this point, we present a review of observational learning theory.

Observational learning (Bandura, 1977) posits that behaviour is learned by observing others' actions as a model in conjunction with environmental cues. Based on the theory, behaviour cannot be learned through observations without cognitive recognitions. In other words, behavioural responses are triggered by observable stimuli through which signals are transmitted which help perceivers decide to follow or avoid an action exemplified by others (Bikhchandani, Hirshleifer, & Welch, 1998). This suggests that observations can lead to cognitive interpretation of the observable stimuli. For example, Zhang (2010) finds that the rate of kidney donation refusals increases by the negative quality inferences drawn by patients in the queue from observing earlier refusal records

in kidney donation market. Several studies have found the influence of observational learning on consumer behaviour, such as online electronic product purchase decisions (Chen, Wang, & Xie, 2011), vendors' website visit behaviour for wedding services (Tucker & Zhang, 2011), and dish choices at restaurants (Cai, Chen, & Fang, 2009). Recently, deal popularity information has emerged as an observable cue in e-retailing environments that has been found to influence consumers' online purchase intentions. For example, Luo et al. (2014) examine the effect of deal popularity on consumers' service purchase intention in pre-purchase situations and the coupon redemption behaviour in post-purchase situations. Likewise, several studies suggest that consumers' purchase intentions will be increased through their observing others' purchase decisions which can benefit the vendors and websites (Li & Wu, 2013; Liu & Sutanto, 2012; Subramanian & Rao, 2016). Extant research has provided important evidence supporting the direct relationship between the effect of deal popularity and purchase intentions. However, according to observational learning theory, it is assumed that a cognitive reaction such as perceived risk can be elicited by observing this information online.

Consumers' perceived risk refers to a belief of the probability that adverse consequence will occur and thus incur costs regarding to achieving a purchase goal (Dowling, 1986). In online shopping contexts, the perceived risk is higher compared to a purchase at bricks-and-mortar stores due to the intangibility of online shopping service provided by websites (Bhatnagar & Ghose, 2004; Keh & Pang, 2010). In addition to the intangibility of online shopping services, the unavailability of examining a product/service prior to a purchase further increases the uncertainty about the adverse consequence of buying a

product/service online (Forsythe & Shi, 2003). Particularly, purchasing services are considered of high risk because of the inherent attributes of intangibility, heterogeneity, and perishability (Mitchell & Greatorex, 1993; Murray & Schlacter, 1990; Zeithaml, 1981). Under the circumstance of purchasing services, interpersonal association is a source to reduce pre-purchase uncertainty (Price & Feick, 1984). Thus, learning from other consumers' opinions or purchase experience can be used in attempts to reduce purchase uncertainty and risk perceptions (Murray, 1991). Much research has shown an association between external sources and consumers' quality and risk perceptions, for example, the sources from word-of-mouth (Murray, 1991; Zeithaml, 1981; Zhang, Ye, Law, & Li, 2010) or brands (González-Benito, Martos-Partal, & San Martín, 2015; Mitchell & Greatorex, 1993). Service deal popularity indicates others' purchase decisions of a service can thus be considered a useful information to mitigate the extent of pre-purchase risk perceptions. For example, Luo et al. (2014) examine the effect of service deal popularity on consumers' service deals purchase intentions by indicating this effect may partially due to consumers' predispositions to follow others' behaviour in attempts to avoid possible adverse consequences of buying services online.

Literature in consumer research has suggested that cultural influences may cause different patterns of consumer behaviour (Luna & Gupta, 2001). Several studies have provided evidence that consumers with different cultural values react differently toward product/service information, such as brand consciousness to quality evaluation (Bao, Zhou, & Su, 2003), price image to purchase intentions (Babin et al., 2016), and website information to service attitude (Mazaheri et al., 2014). Particularly, Erdem, Zhao, and Valenzuela (2004) finds that the

differences in risk behaviour across countries drive consumers' store brand attitude differently. In line with prior research, we therefore take national cultures into account for examining consumers' perceived risk to service deal popularity information.

While people from collectivist cultures have the disposition to involve themselves in a relationship with others possessing the "we" conscious, interdependent features, and tend to gain approval from others, observing and following others' behaviour helps them to assure the rightness of a choice in terms of risk reductions (Keh & Sun, 2008; Tai & Chan, 2001). In an online shopping context with potentially confounding information of deep discounted pricing and unfamiliar service brands, it is assumed that consumers in collectivist cultures will use deal popularity information to reduce their perceived risk toward the thoughts of purchasing a service online. We, therefore, hypothesise that:

Hypothesis 1: For Taiwanese consumers, the higher service deal popularity, the lower perceived risk.

Conversely, people from individualist cultures prefer explicit and informative information which provides knowledge about a product/service rather than using implicit cues for quality or performance inferences (Tai & Chan, 2001). Additionally, individualism promotes internal self-responsibility and pursue uniqueness of being one of its kind, and therefore, people in this culture prefer to follow and behave according to their own thoughts and feelings rather than referring to others' thoughts, feelings, and actions (Singelis & Brown, 1995). Since deal popularity information does not provide specific knowledge about a

product/service, it is unlikely that this information can reduce perceived risk toward buying a service online for people from individualist culture on the one hand. On the other hand, when deal popularity information indicates that a number of others purchase and use the uniform service, the idea of being uniqueness is conflicted. Moreover, Pons, Laroche, and Mourali (2006) indicate that when consumers from individualist culture encountering the same number of others using a service, they tend to feel more crowded, threatened in privacy, and less appreciate and satisfy the service than do of people from collectivism cultures. Therefore, it is arguable that consumers from individualist cultures may perceive high risk toward the thought of buying the service online and using it offline contrary to consumers from collectivist cultures. We, accordingly, hypothesise that:

Hypothesis 2: For Australian consumers, the higher service deal popularity, the higher perceived risk.

Methodology

We use a scenario-based experimental design to investigate Australian and Taiwanese consumers' perceived risk toward service deal popularity information. Service deal popularity information was manipulated at two levels by showing the number of service deals bought by other consumers (high: 1999 versus low: 9). Australian participants were recruited using panel data service of Qualtrics (n=65) while Taiwanese participants were recruited in a university in Taipei (n=60) in exchange for financial reward or extra course credit. Samples reflected the major internet shopping group in Australia (78.5% at age between 25~44) and Taiwan (81.7% at age between 18~24) (ACMA, 2015; Nielsen, 2016a).

Experimental stimuli were manipulated by displaying a screenshot of a service deal from a group buying website, from which a karaoke service was displayed to Taiwanese and a restaurant service was used for Australian participants. Across the scenarios, in addition to deal popularity information was manipulated, we controlled the brand by using fake names and kept rest information the same. The measurement of perceived risk was adapted from Keh and Pang (2010) using a seven-point Likert scale (1= strongly disagree, 7= strongly agree). Items were translated into Chinese and back into English by two bilingual researchers to ensure the semantic equivalence (Brislin, 1970). Participants were instructed to read a scenario that they were randomly assigned and to answer measurement and manipulation check items before providing demographic information.

Results

Results of independent sample *t*-tests indicate the manipulations of service deal popularity information for the two countries were successful (Australia: $t = 5.24$, $p < 0.001$, $M_{High} = 5.47$ versus $M_{Low} = 3.12$; Taiwan: $t = 3.70$, $p < 0.001$, $M_{High} = 4.50$ versus $M_{Low} = 2.64$). Table 1 presents the results of ANOVA suggesting that the effect of service deal popularity information significantly influence participants' perceived risk (Australia: $F(1, 63) = 4.60$, $p = 0.036$; Taiwan: $F(1,58) = 5.03$, $p = 0.029$). Hypothesis 1 predicts a negative relationship between service deal popularity information and perceived risk for Taiwanese samples. Results support this proposed relationship in the Taiwan sample. Specifically, samples from Taiwan faced high service deal popularity information had lower perceived risk compared to those facing low service deal popularity information (MeanHigh= 4.31 versus MeanLow= 4.93). Hypothesis

2 predicts a positive relationship between service deal popularity information and perceived risk for Australian samples. Findings confirm this hypothesised relationship in the Australia samples, suggesting high service deal popularity information leads to high perceived risk (MeanHigh= 5.13 versus MeanLow= 4.35).

Table 1. Results of the perceived risk toward service deal popularity (DP) across the two countries.

Perceived Risk	Australia	Taiwan
<i>F</i>	4.6	5.03
df	63	58
<i>p</i>	0.036	0.029
Mean High DP	5.13	4.31
Mean Low DP	4.35	4.93

Concluding discussion

Cultural difference across countries lead to heterogeneous consumer behaviour and retailing strategies for one country may not have the same influence to other countries (De Mooij & Hofstede, 2002). To this point, this study examines perceived risk of a service deal toward service deal popularity information across two countries, namely, Australia and Taiwan. From the cultural perspective of individualism versus collectivism proposed by Hofstede (1993), we provide evidence that consumer behaviour varies in online service shopping environments across countries by the different extent of risk perceptions toward the service deal popularity information. According to the cultural dimension score of Hofstede et al. (2010), both Australia and Taiwan are countries of

relatively high risk aversion (51 versus 69) compared to other countries. However, consumers from these two countries react differently in their mental process of online information interpretation. With the concept that culture as a collective phenomenon shared among its members of the same society (de Mooij, 2015), national cultural differences can explain the variance of consumers' risk attitude toward a service deal by observing others' online purchase behaviour. Congruent with previous research suggesting that encountering the same information, consumers interpret the message of information differently across individualist and collectivist cultures (e.g., Davis, Wang, & Lindridge, 2008; Tai & Chan, 2001). Our findings confirm that consumers from individualist cultures request specific information that is indicative of a service content in order to transfer service intangibility to tangibility (Mazaheri et al., 2014). By contrast, our findings also support extant research that consumers from collectivist cultures prefer to follow others' behaviour based on their observation in terms of risk perceptions (Wang, Zhao, & Li, 2013). The findings suggest that the impact of high service deal popularity at online service retailing websites helps Taiwanese subjects to reduce their perceived risk towards purchasing the service online. By contrast, Australian consumers facing high service deal popularity perceive high risk to buying the same service deal that has been bought by a number of others.

Accordingly, this study makes contributions to theory. From perspective of observational learning (Bandura, 1977), service deal popularity information triggers consumers' perceived risk toward buying the service online. The effect of service deal popularity is positively related to perceived risk in Australian sample but negatively related to perceived risk in Taiwanese sample. This

supports the concept of observational learning that consumers observe others' behaviour and cognitively interpret the situation in an environment and then decide to follow or reject others' behaviour. To the best of our knowledge, we are the first to study consumers' perceived risk toward the service deal popularity information in a pre-purchase situation of online service shopping. Moreover, this study links consumers' perceived risk to service deal popularity by comparing its effect on Australian and Taiwanese samples. Our study shows that Australian and Taiwanese consumers react differently toward the service deal popularity information. Both Australian and Taiwanese subjects' perceived risk is significantly related to the service deal popularity information although the direction of the relationship is opposite. We provide evidence that cultural difference influences individuals' information interpretation in terms of others' online purchase behaviour. Based on our findings, global marketers can find directions of how consumers from different countries interpret the service deal popularity information and its effect on consumers' perceived risk when marketers want to leverage service deal popularity as the information to affect consumers' pre-purchase attitude toward buying a service online. For consumers in individualist cultures, the service deal popularity may not be designed as a predominant information to blunt consumers' attitude toward buying a service deal online. Other types of information should be reinforced such as detail information about a service content or price discount in order to mitigate perceived risk for consumers of individualism. By contrast, consumers in collectivist cultures generally have a predisposition to follow other consumers' behaviour to reduce perceived risk and thus the service deal popularity information representing others physical purchase behaviour could be a prominent strategy to attract consumers' following behaviour for a service deal

online. Overall, our research contributes to consumers' cognitive interpretation of service deal popularity information from perspective of observational learning and the comparison of the effect of service deal popularity information across the two national cultures and thus can provide practical insights for global marketers in leveraging service deal popularity information for different national cultures.

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