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Unlucky for some? Are some hotel rooms and floors really unluckier than others?

Stephen Pratt and Pia Kwan

Abstract

Purpose – Different cultures believe that some numbers are “lucky” and other numbers are “unlucky”. The purpose of this paper is to determine to what extent hotels follow numerological superstitions in their floor and room numbering, if more accidents or complaints occur on unlucky hotel floors compared to other floors and if more accidents or complaints occur in unlucky hotel rooms compared to other rooms.

Design/methodology/approach – For the first research objective, an audit of hotels in a particular destination, Hong Kong, is taken capturing the number of floors and rooms on each floor and determining if “unlucky” numbers are used. For the second and third objectives, the accident and complaint database of one upscale hotel in Hong Kong across a five-year period is investigated.

Findings – The authors find that hotels do follow superstitious numbering, with “unlucky” numbers not being included in floor or room numbering. Chinese superstition is more likely to be followed than Western superstition. The non-inclusion of “unlucky” numbers is more likely for hotel floors than for hotel rooms. In the case study hotel, they found no significant differences in the number of accidents and complaints between unlucky and other rooms and floors across the five years of analysis.

Originality/value – Superstitions surrounding numbers can affect decisions made by individuals and businesses and can have significant economic consequences. There is little academic research into how the hotel sector is impacted by numerology superstitions.

Keywords Superstition, Hotels, Culture, Chinese, Unlucky, Numerology

Paper type Research paper

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Introduction

Superstitions are beliefs or practices resulting from ignorance, fear of the unknown, trust in magic or chance (Foster and Kokko, 2009). Superstitions falsely attribute causation (Hanks et al., 2016). According to Malinowski’s psychological theory, superstitions serve to fill the void of the unknown. Superstitions are followed to reduce anxiety (Malinowski, 1948). Superstitious beliefs can affect “rational” decision-making and have an impact on consumer behaviour and business decisions (Kramer and Block, 2008). Superstitions can change human behaviour and can alter both the supply and demand of goods and services (Ng et al., 2010). Superstitions are observed in all societies, from traditional to modern, throughout time. One aspect of superstition involves numerology, that is, some numbers are deemed lucky and other numbers are seen as unlucky.

The number “4” pronounced in Mandarin, Cantonese and Japanese has a similar sound to the word “death”. As such, the number four is associated with death and perceived to be bad luck. Similarly, “14” and “24” are homophones for “must die” and “easy to die”, respectively (Panesar et al., 2003). Conversely, the number “8” is associated with good luck and prosperity since it is a homophone for these words. It was no coincidence that the Beijing Summer Olympics of 2008 opened on the 8th day of the 8th month at 8 p.m.

In Western culture, the number “13” is associated with bad luck; with the date Friday the 13th considered a particularly unlucky day. The term for the fear of the number “13” is

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“triskaidekaphobia” (Tufan and Hamarat, 1997). Several reasons have been proposed as to why “13” is unlucky. This may be linked to the fact that there were 13 people at Jesus’ last supper consisting of Jesus and the 12 apostles. At that last supper, Judas Iscariot, the disciple who betrayed Jesus, was the 13th person to sit at the table (Adams, 1992). Another hypothesis is that King Philip IV of France ordered the arrest, and subsequent torture and death, of the Knights Templar on Friday the 13th October, 1307 (Kurtz, 1995). One further hypothesis relates to Full Moons. A calendar year with 13 full moons instead of the usual 12 resulted in timekeeping issues for the monks in charge of the calendars (Rao, 2010). The extra full moon in the year changed the regular timing of church festivals, and hence “13” was considered unlucky.

In Western countries, many hotels do not have a 13th floor. The actual 13th floor is numbered “14” or designated as “12a” or similar. Some streets do not contain the house number “13” and some towns do not contain a street named “13th Street”. In Chinese culture, the 4th floor is treated like the 13th floor in the West. Many hotels skip the 4th floor (and sometimes the 14th, 24th etc. if they have this many floors) and continue numbering from 5. Mok and Defranco (2000) note that Chinese consumers are more sensitive to product or services, which concern numbers. There is an aversion to the number four. “A Chinese tourist once checked into a hotel in the USA. When he found out he was given room 104, which means “certainly dead,” his face darkened and he immediately asked for a change of room” (Mok and Defranco, 2000, p. 111).

Despite the reporting of anecdotes such as these, there is little academic research into superstition or numerology in the tourism and hospitality sector. There has been some research into the influence of superstition on consumer and producer behaviour (Tsang, 2004), but little for hotels or the hospitality industry. In tourism literature specifically, there is little research on superstition, although Buzinde *et al.* (2012) examined the broader issue of the philosophy of *fengshui* and *fengshui* tours.

Therefore, this research seeks to understand to what extent hotels are influenced by superstitious numbers, using the case of Hong Kong. The questions that this research seeks to answer are as follows:

- RQ1. To what extent do hotels follow superstitious numbering of floors and rooms?
- RQ2. Do more accidents or complaints occur on unlucky hotel floors compared to other floors?
- RQ3. Do more accidents or complaints occur in unlucky hotel rooms compared to other rooms?

Literature review

Superstitious consumer behaviour

The research on how superstition affects behaviour is diffuse, with contributions across a range of applications including travel, health, business, finance and real estate. To the authors’ best knowledge, there is little research into how the impact of superstition, and specifically numerology, has affected the hospitality sector.

It is difficult to say how superstitious, in general, different nationalities are, though some cultures are more sensitive to superstition. Superstition, including lucky/unlucky numbers is one of the cultural considerations that need to be observed by casino operators in order to enhance customer service toward Chinese gamblers (Han, 2011). Rittichainuwat (2011) finds that the supernatural, including the belief in ghosts and having bad luck, is a more significant travel barrier among Asians than Westerners. Xu (2015) notes that in Red tourism, (tourism associated with Communist heritage sites and other sites preserving Chinese Communist identity) a segment of tourists attached superstitious beliefs to the “Red” elements of their travel experience.

Panesar *et al.* (2003) seek to determine whether deaths from heart attacks occur more among Hong Kong Chinese population on the 4th, 14th and 24th day of the month compared to other days. They find the mean number of deaths on the 4th, 14th and 24th day of the month was not significantly different from the mean number of deaths on the other days of the month. However, this result contrasts with Phillips *et al.*'s (2001) study conducted in the USA, which found that, compared to a control group of Caucasians, cardiac mortality in ethnic Chinese and Japanese peaked on the 4th of the month. The authors attribute this to psychologically stressful occasions.

In the business field, Simmons and Schindler (2003) examine the numbers at the end of prices shown in Chinese advertisements using a sample from newspapers in Hong Kong, Taiwan and Shanghai. The rationale for examining the price endings is that businesses have some control over these numbers, whereas the beginning digits of prices are determined by costs and necessary profit margins. Simmons and Schindler (2003) find that there is an overrepresentation of "8" and an underrepresentation or avoidance of the number "4" in price endings. They argue this is evidence of superstitious practices in the Chinese marketplace. The implication is that businesses should take into account these superstitions when considering their target market.

A recent study by Jeong and Crompton (2017) analyzes the price endings of five tourism services in three different cultures, one of the cultures being Chinese. Jeong and Crompton (2017) find that an 8-digit price ending is more commonly used in China than any other number. In fact, "8" is used at the end of prices in 43 per cent of occasions across music concerts, sports events, live theatre, restaurants, and hotels. The prevalence of price endings using "8" was consistent across all service categories. For the hotel category, this applied to both low-priced and high-priced hotels: there were no statistically significant differences in the frequency that "8" was used as a price-ending.

A Chinese airline paid ¥2.33m (US\$280,000) for the phone number "8888 8888" as it is deemed to be very auspicious (BBC, 2003). Many airlines, such as British Airways, Cathay Pacific, and KLM use flight numbers containing the number 88 or 888 for flights into and out of China (Jeong and Crompton, 2017). For example, the KLM flight number from Hong Kong to Amsterdam is KL0888.

Kramer and Block (2008) examine the issue of superstition surrounding consumer satisfaction and product failure by demonstrating that consumers are less satisfied with a product for which they hold superstitious beliefs, with respect to colour, product quantity, or the numbers used in its price. With respect to car licence plates, Ng *et al.* (2010) find, in Hong Kong, that those containing an "8" sell for a premium, while those containing a "4" sell at a discount, on average. Substituting the number "7" with the number "8" in an ordinary 4-digit licence plate, results in a premium of approximately US\$400. Alternatively, replacing the number "7" with the number "4" would allow the plate to be discounted for US\$69, all else being equal.

In finance, Tufan and Hamarat (1997) examine the performance of the Turkish and Russian stock markets, comparing the 13th day of the month with the remaining days of the month. They can find no evidence that the 13th day of the month has an effect on stock exchanges trading behaviour. Similarly, Auer (2015) concludes there is no evidence that financial returns in the precious metals market on Friday the 13th are significantly lower than on any other regular Friday over the period July 1996 to August 2013. In the Asian stock markets, Auer and Rottmann (2014) investigate whether the occurrence of Friday the 13th has a significant impact on the conditional means and variances of returns in seven emerging Asian stock markets: India, Indonesia, Malaysia, the Philippines, South Korea, Taiwan and Thailand. In general, they find no effect. Neither do they find any evidence that the unlucky 4 negatively influences these Asian stock markets in a significant way.

However, when it comes to housing and real estate, the impact of superstitious numbers does appear to have some effect. Investigating the primary real estate market in

Saint Petersburg, Russia, [Antipov and Pokryshevskaya \(2015\)](#) found a clear negative effect of the 13th floor on demand for apartments compared to the two adjacent floors, and a significant effect of preference towards the 7th floor compared to the two neighbouring floors (with 7 being perceived as a lucky number). [Shum et al. \(2014\)](#) find evidence of the superstition surrounding Chinese numbers impacting the secondary real estate marketing in Chengdu, China. New apartments on floors ending in “8” are sold almost seven days faster on average, compared to apartments on other floors. Those same “lucky” apartments, compared to other floors, fetch a price premium of ¥235 per square metre. They also find that buyers of these “lucky” apartments are likely to be superstitious in other areas of their life, namely they are more likely to have ‘8’s in their phone numbers. In Hong Kong, [Chau et al. \(2001\)](#) find that individuals are willing to pay a premium for a “lucky” property, that is, property associated with the number “8”. But the prevailing economic conditions also come into play. They reveal that apartments with lucky floor numbers are sold at a significantly higher price during property booms than during property slumps.

In sum, numerological superstitions do not seem to have an influence on health or the financial markets but do influence business and real estate decisions. Surprisingly, there is little to no research on the impact of superstition in the tourism and hospitality field. This research makes a contribution in this area.

Theories of superstition

The concept of superstition can be understood as the incorrect establishment of cause and effect ([Foster and Kokko, 2009](#)). [Scheibe and Sarbin \(1965, p. 145\)](#) notes that “a superstition may be said to exist whenever an individual persistently or repeatedly behaves as if his/her subjective estimate of the result of that behaviour is significantly different from an objective (scientific) estimate of the effect of that behaviour.” Some scholars have described superstitions as irrational or primitive beliefs based on inadequate information ([Scheibe and Sarbin, 1965](#)). However, while the beliefs are based on incorrect information, they serve a purpose. Following superstitions can be used as a heuristic or “shortcut” to rational and causal thinking, in which an individual can use this heuristic to fill in the information gaps ([Beck and Forstmeier, 2007](#)).

The most common theoretical explanations of superstition have been provided by [Skinner \(1948\)](#) and [Malinowski \(1948\)](#). A behavioural psychologist, [Skinner \(1948\)](#) experimented with pigeons, using operant conditioning technique, whereby the birds were given food at random intervals. The pigeons were behaving as though their actions were causing the food to arrive – an incorrect attribution of the cause and effect. Skinner interpreted this as superstitious behaviour; causal connections between experiences that have nothing to do with one another. Accidental events are misrepresented as essential contingencies. The majority of human superstitions are unexplained from a society’s perspective. Many individuals are not aware of the origin of superstitions ([Scheibe and Sarbin, 1965](#)).

[Malinowski \(1948\)](#) states superstitions have a vital role to play in a society’s culture. [Malinowski’s \(1948\)](#) theory seems more appropriate in this research’s context as it relate to societal practices. Observing Trobriand Islanders, Malinowski noticed that when the villagers fished in the lagoon, they did not follow any magical rituals, as fishing conditions there were safe and secure. However, when the villagers went into the open sea to fish, which was dangerous and uncertain, they practiced magical rituals to ensure their safety. People turned to magic and superstitions when facing circumstances beyond their control. This theory has been used to explain the use of magic and superstitions in other contexts ([Keinan, 2002](#)). People engage in superstitious behaviour in order to reduce anxiety when they in are situations beyond their control. Other scholars have claimed that individuals undertake superstitious behaviours, to give an illusion of control over uncertain situations ([Whitson and Galinsky, 2008](#)). It helps them feel better about the situation, rather than

helping to control the situation (Talmont-Kaminski, 2016). In Malinowski's theory, superstition serves to fill the void of the unknown and to reduce anxiety (Tsang, 2004).

Talmont-Kaminski (2016) reconcile Malinowski's motivational explanation of superstition and Skinner's cognitive explanation of superstition by examining the issue from an evolutionary point of view. Talmont-Kaminski (2016) note that "emotions have a vital role to play within broadly understood cognition" (p. 107). Emotions can direct decision-making so that negative emotions are a sign that some situations or outcomes need to be avoided. If magical or superstitious practices are believed to lower the probability of these negative outcomes, then individuals will engage in these practices to lower anxiety. This anxiety also directs individuals' behaviour.

Leading up 1997, several scholars noted increasing uncertainty in Hong Kong with respect to what would happen to the British territory under the "one country, two system" model proposed after the handover to the People's Republic of China (Chan, 2001; Leiper and Hing, 1998). In the context of hotel numerology, that is, the numbering of hotel rooms and floors, we hypothesize in this study that as Hong Kong switched from being a British colonial territory to a Special Administrative Region of the People's Republic of China, there is likely to be an increase in the use of number-based superstitions. Hotel owners and management are likely to be using superstition to combat increasing uncertainty and reduce anxiety of their increasingly Chinese visitors.

Method

Regarding *RQ1*, the most appropriate method is to undertake an audit of hotels in a particular destination. We implement a case study analysis of Hong Kong hotels. Hong Kong Special Administration Region of China is a combination of East and West. Reflecting the Hong Kong Tourism Board's branding of *Asia's World City*, Hong Kong is a unique mix of western and eastern influence. For the 156 years before 1997, Hong Kong was under British rule. On July 1, 1997, the territory reverted back of Chinese sovereignty. Hence, there is the possibility that both East and West numerical superstitions apply to hotel numerology.

An audit is conducted of all hotels in Hong Kong. A list of accommodation establishments was obtained from the Hong Kong Tourism Board website. As of September 2016, there are 211 hotels in operation (Hong Kong Tourism Board, 2016). The audit involved searching on the internet, telephoning or visiting each listed property to count the total number of floors of each hotel and the number of rooms per floor. The constructed database indicated whether there was a 4th floor, 14th floor, 24th floor, [...], for those hotels that had that number of floors; whether there was a 13th floor, for those hotels that had 13 or more floors; whether hotels had room numbers ending in "4"; and whether hotels had room numbers ending in "13". Other hotel characteristics were recorded in the audit, such as whether the hotel was an internationally branded or independent hotel, the Average Daily Rate of the hotel and the year of construction/refurbishment (before/after 1997).

A profile of the accommodation establishments audited can be found in Table 1. Of the 211 establishments audited, 42.7 per cent belong to an international chain or brand and 52.1 per cent were classified as Tariff A, the Hong Kong Tourism Board's designation for up-scale hotels. This categorization is partly based on Average Daily Room Rate. Almost three-quarters (73.5 per cent) of the accommodation establishments in Hong Kong have been built or significantly refurbished since the handover in 1997.

To answer the research questions of whether in actuality, more accidents or complaints occur on unlucky floors compared to other floors and whether in actuality more accidents or complaints occur in unlucky rooms compared to other rooms, we also take a case study approach. While we recognize that scientific method rules out "superstition" and justification of supernatural occurrences, superstitious beliefs can still affect "rational" decision-making

Table I Accommodation audit

<i>Accommodation type</i>	<i>Frequency</i>	<i>(%)</i>
<i>International brand</i>		
Yes	90	42.7
No	121	57.3
<i>Hotel category</i>		
Tariff A	110	52.1
Tariff B or below	101	47.9
<i>Built or refurbished year</i>		
1997 or before	56	26.5
After 1997	155	73.5
Total	211	100.0

and can have an impact on consumer behaviour and business decisions (Kramer and Block, 2008). If individuals act on superstition, this may become a self-fulfilling prophecy. It is not the superstition itself that we expect to have a magical effect but humans' reaction and response to the culturally formed superstition that can effect behaviour (Phillips *et al.*, 2001). The case study approach provides holistic comprehension through an analysis of the identified phenomenon. Case studies are an empirical inquiry of a contemporary phenomenon in a real life context to study organizations, individuals, processes, structures and other events (Yin, 2009). Yin (2009) further describes the case study as a comprehensive research strategy incorporating different methods of data collection and analysis.

The context of this research is an upscale hotel situated in the tourist area of Kowloon, Hong Kong. The hotel opened in 2011 and has 262 rooms, three restaurants, conference facilities, a 500-seat ballroom, heated outdoor swimming pool, health club and spa area. This hotel is representative of similar four- and five-star hotels in the area. This hotel is classified as a "Tariff A" hotel by the Hong Kong Tourism Board, placing the hotel in the luxury category.

Using propriety data from the hotel, we scanned through the daily event reports of the hotel, capturing both complaints data and accidents. The data range from 1 January 2012 to 31 December 2016 – a period of five years. In this database, the location (floor and room number) of the complaint or accident is recorded. Further, we note the date and nature of the incident. We consider an accident or complaint to be "unlucky" if the incident affects either the hotel guest or the hotel. For example, some incidents are predominately unfortunate for the guest such as a guest complaining about a noise disturbance. Others incidents are predominantly unfortunate for the hotel such as property damage discovered in a hotel room. Still other incidents involve both guest and hotel such as a guest requiring medical assistance. The data were aggregated by month for tractability and to match with the occupancy data that was only available on a monthly basis. Table II shows the number of incidents (complaints and accidents) by year and month. Across the five years, 3,229 incidents are recorded in the daily event reports. On average, 645.8 incidents are recorded each year. 2014 was the year with the highest number of incidents at 777 and 2012 was the year with the lowest number of incidents (549). An average of 53.8 incidents is recorded each month. Hence, there are approximately 1.77 incidents per day recorded at the hotel and with 262 rooms, there are approximately 2.5 incidents per room per year, on average.

Looking at incidents only by the floor and room may not give an accurate picture of whether a room or floor is "unlucky" because different floors and rooms are used more often than others. The occupancy of the room needs to be taken into account. We obtained monthly occupancy rates for each room in the hotel for the five-year period. Table III shows aggregated occupancy rates by month and year. The average occupancy rate was 86.6 per cent with a high of 91.5 per cent in 2016 and a low of 80.0 per cent in 2012.

Table II Number of incidents in hotel by month and year

Month	2012	2013	2014	2015	2016	Total
January	52	31	51	80	54	268
February	35	21	38	44	38	176
March	44	38	53	65	64	264
April	35	44	61	43	53	236
May	32	28	50	64	56	230
June	30	55	54	49	69	257
July	57	65	54	57	57	290
August	73	74	54	61	51	313
September	54	75	69	61	53	312
October	53	77	104	54	39	327
November	42	48	107	54	42	293
December	42	52	82	43	44	263
Total	549	608	777	675	620	3,229

Table III Occupancy rate by month and year

Month	2012	2013	2014	2015	2016	Total
January	73.91	76.95	88.00	88.11	81.32	81.66
February	74.40	66.86	90.27	89.33	72.65	78.70
March	78.23	81.68	91.96	89.44	91.62	86.58
April	71.96	79.39	91.65	86.02	91.76	84.16
May	74.01	74.91	89.18	84.34	96.74	83.83
June	75.89	75.59	86.96	89.82	91.83	84.02
July	85.32	83.50	89.73	86.78	94.20	87.91
August	92.18	90.51	96.18	92.50	95.08	93.29
September	78.87	90.65	86.53	80.89	94.96	86.38
October	84.49	96.82	90.20	88.73	96.33	91.31
November	85.38	98.07	90.11	89.82	96.18	91.91
December	85.87	97.56	85.52	82.91	95.11	89.39
Total	80.04	84.37	89.69	87.39	91.48	86.60

The likelihood of a room or floor being unlucky will take into account these occupancy rates. In the earlier months of the year, 2015 and 2016 have significantly higher occupancy rates than in 2012 and 2013. This could mean that there are more complaints or accidents in those years due to the occupancy being higher.

The hotel floors are numbered to the 28th floor. In actuality, there are 24 floors. The 4th, 13th, 14th and 24th floor are not listed in the hotel. The 4th floor (listed as the 5th floor) does not contain any rooms and the 24th floor (listed as the 28th floor) is a restaurant and hence excluded from the analysis. [Table IV](#) shows the floor layout of the hotel. Hence, we aim to assess whether the 16th floor (really the 13th floor as there is no 4 or 13) or the 17th floor (really the 14th floor as there is no 4, 13, or 14) are unluckier than others, as measured by more frequent complaints or accidents, controlling for occupancy rates. We undertake a similar analysis for the room numbers. For this particular hotel, there are room numbers ending in "4" and "13" so we test whether more complaints or accidents occur in the rooms ending in "4" or "13" compared to other rooms, taking into account occupancy rates.

To triangulate the data, a short interview, lasting approximately ten minutes, was held with the "Rooms and Guest Experience" Executive of the hotel. The researchers presented the results of the room and floor analysis to the Executive. The Executive was asked to clarify any possible idiosyncrasies of the hotel and asked to provide feedback on whether guests mentioned any superstitions concerning room numbers and floor numbers.

Table IV Layout of case study hotel

<i>Actual</i>	<i>Floors Listed</i>	<i>Type</i>
24	28	Restaurant
23	27	Rooms
22	26	Rooms
21	25	Rooms
20	23	Rooms
19	22	Rooms
18	21	Rooms
17	20	Rooms
16	19	Rooms
15	18	Rooms
14	17	Rooms
13	16	Rooms
12	15	Rooms
11	12	Rooms
10	11	Rooms
9	10	Rooms
1-8	1-3, 5-9	Other uses

Results

The incidence of hotels with floors numbered “4”, “13”, “14” and “24” is shown in [Table V](#). The percentages shown are adjusted to take into account those floors that exist. For example, some hotels do not have a 14th or 24th floor because they are not that high. Other hotels do not have the possibility of a 4th floor because they commence at level 5 or higher. Hence, the percentages show, of those that could possibly have a 4th floor, 11.4 per cent have a floor labelled “4”. This is lower than for the 13th floor. Over one-fifth (21.8 per cent) of hotels label one of their floors the 13th floor. Only 9.6 per cent of hotels with a 24th floor use that moniker and 12.9 per cent of hotels with a 14th floor name that floor the “14th”. The Chinese numerical superstitions, the labelling of “4” or derivatives of “4”, are much lower.

Naming rooms with perceived unlucky numbers is much more common. Of those with 13 or more rooms on a floor, almost nine in 10 (89.4 per cent) have a 13th room and about three-quarters of those with at least four rooms on their floors, have a named (XX04) room.

Using independent *t*-tests, we investigate whether there is any relationship between the type of the hotel (international brand versus independent brand) and the adherence to numerology superstitions. Internationally branded or chain hotels are significantly less likely to have a 13th floor (15.0 per cent vs 27.3 per cent; *p*-value = 0.04), perhaps reflecting their need to accommodate international travellers, both Western and Eastern cultures. These internationally branded hotels are also less likely to have 4th room (67.1 per cent vs 82.7

Table V Percentage of accommodation establishments where floor/room exists

<i>Unlucky floor/room</i>	<i>Total (%)</i>	<i>International brand</i>		<i>Hotel category</i>		<i>Built or refurbished year</i>	
		<i>Yes (%)</i>	<i>No (%)</i>	<i>Tariff A (%)</i>	<i>Tariff B or below (%)</i>	<i>1997 or before (%)</i>	<i>After 1997 (%)</i>
4th Floor	11.4	9.6	12.8	11.9	10.8	6.3	13.4
13th Floor	21.8	15.0*	27.3	18.9	24.7	10.0*	26.4
14th Floor	12.9	10.3	15.1	11.4	14.5	12.5	13.0
24th Floor	9.6	8.5	10.6	12.0	6.8	14.3	8.8
Room 4	75.9	67.1*	82.7	80.4	71.4	100.0*	66.2
Room 13	89.4	82.4*	98.3	90.5	87.9	98.1*	83.8

Note: *Indicates a statistically significant difference at the 95 per cent level of confidence with the adjacent column

per cent; p -value = 0.014) or a 13th room (82.4 per cent vs 98.3 per cent; p -value = 0.001) compared to independent hotels in Hong Kong.

Likewise, we want to determine if there is any relationship between the quality of hotel (measured by the Tariff category) and adherence to numerology superstitions. The independent t -tests reveal there were no statistically significant differences between Tariff A hotels and Tariff B or below hotels with respect to numbering floors and rooms.

Finally, in 1997, Hong Kong reverted back to a Special Administrative Region of China. We want to determine if those hotels opening or refurbished after 1997 adhere more to the Chinese numerology superstitions (that is, omitting a 4th floor, 14th floor, or 24th floor) compared to older hotels during British rule which are hypothesized to adhere more to Western numerology superstitions (omitting a 13th floor). However, we note there were no statistically significant differences in the numbering of floors between pre-handover and post-handover in terms of Chinese numerology. Results show that in the British colonial period, there were significantly less 13th floors labelled as such than in the post-handover era (10.0 per cent vs 26.4 per cent; p -value = 0.04). For the room numbering, there was less attention paid to numerology in the British colonial period with both higher incidences of both room numbers ending in “4” and “13” compared to the post-1997 period. Overall, there is no attention paid to numerology in room endings. This holds for the Chinese unlucky number less than for the Western unlucky number, where only two-thirds of Hong Kong hotels (66.2 per cent) have rooms ending on “4” (of those that have at least four rooms on their floors) compared to 83.8 per cent of hotels that have rooms ending in “13” (of those who have at least 13 rooms on their floors).

To determine whether more accidents or complaints occur on unlucky floors or whether more accidents or complaints occur in unlucky rooms, we analyzed the incident data from the case study hotel. Incidents of complaints and accidents on the unlucky floors and rooms are compared with the incidents on the other floors and rooms. We estimate the likelihood of an incident that would occur in any particular room for any particular month. In total there are 15,720 records in this database (262 rooms \times 12 months \times 5 years = 15,720). Table VI shows that the overall proportion of incidents that occur in any one room in any particular month is 18.0 per cent. The proportion of incidents reported was slightly lower in 2012 (15.1 per cent) and slightly higher in 2014 (21.0 per cent). We then conduct independent sample t -tests comparing the probability of incidents that occur on the “13th” floor (labelled 16th floor in the hotel), the “14th” floor (labelled 17th Floor in the hotel), the 4th room, 13th room and 14th room on each floor.

There were no significant differences ($p > 0.05$) between “unlucky” and other rooms and floors across the five years of analysis with one exception. In the year 2013, there was likely to be more accidents and complaints in those rooms ending in XX13 than in other numbered rooms throughout the hotel. In the months of 2013, rooms ending in XX13 had an incident 23.6 per cent of the time compared to 17.0 per cent for other numbered rooms ($p = 0.040$).

Table VI Incidence of incidents occurring on “unlucky” and other floors and rooms

Year	Total (%)	“13th” Floor		“14th” Floor		Room 4		Room 13		Room 14	
		Yes (%)	No (%)	Yes (%)	No (%)	Yes (%)	No (%)	Yes (%)	No (%)	Yes (%)	No (%)
Total	18.0	16.0	18.2	16.5	18.1	15.7	18.1	20.7	17.9	17.5	18.0
2012	15.1	11.0	15.5	12.3	15.4	15.6	15.1	18.1	15.0	11.9	15.3
2013	17.3	15.8	17.4	16.2	17.4	12.2	17.6	23.6*	17.0*	17.9	17.3
2014	21.0	20.6	21.0	18.4	21.2	17.8	21.2	21.5	20.9	19.0	21.1
2015	18.5	14.5	18.8	18.4	18.5	16.1	18.6	23.6	18.2	19.0	18.4
2016	18.1	18.0	18.1	17.1	18.2	16.7	18.2	16.7	18.2	19.6	18.0

Note: * $p = 0.040$

However, the above analysis does not take into account room occupancy. It could be that rooms ending in “13” are occupied more often than other rooms and therefore are more likely to have accidents or complaints occur in those rooms. The following analysis adjusts for this. We take the number of incidents for each room and adjust this by the occupancy rate then multiply this by 100 for ease of interpretation. This statistic can be interpreted as the likelihood of an incident occurring in each room for every 100 occupied nights. We again conduct independent sample *t*-tests between the unlucky rooms and floors and the other numbered rooms and floors (Table VII). There were no significant differences ($p > 0.05$) between unlucky and other rooms and floors across the five years of analysis taking into account the occupancy rates. In 2012, incidents on the 13th floor were less likely to occur than on other floors. This goes against the commonly held superstitious thinking. More importantly, the difference found in room “13”s versus other rooms in 2013 no longer holds. This is because the occupancy rate in room “13”s was relatively high compared to other rooms.

Follow-up discussions with the “Rooms and Guest Experience” executive of the hotel confirmed that room xx13 is occupied more frequently than other rooms because this room has a harbour view, rather than a city view. In all other respects, the layout of the rooms was the same, regardless of their number.

Discussion

Superstitious beliefs and behaviour are instances where subjective beliefs are attributed to outcomes where no such objective influence exists (Kramer and Block, 2011). Superstitious beliefs result in incorrect attribution of cause and effect and can invoke irrational behaviour (Foster and Kokko, 2009). Superstitions can influence many facets of life. Numerology is one area where superstitions exist. In Western culture, the number 13 is perceived to be an unlucky number. Conversely, in Chinese culture, the number 4, and its derivatives, is deemed unlucky. This research sought to determine to what extent hotels follow superstitious numbering in their floors and rooms. Using Hong Kong as a case study, we find that the large majority of hotels follow numerological superstitions with the numbering of their floors and rooms. Of those hotels where the floor existed, only about 1 in 10 hotels listed a 4th floor and 1 in 5 hotels listed a 13th floor. Superstitious room numbering is less common than floor numbering. We note that, while a large proportion of hotels follow superstitious floor numbering, it is surprising that room numbers are less likely to. Given that a room number is more personal to an individual hotel guest (they refer to their room number when charging items to their room, they see the number on the room door when they enter), it is surprising that more hotels do not follow superstitious room numbering.

International brand hotels are more likely to omit unlucky floors and rooms in the floor plans in Hong Kong. We might have expected independent and local brand hotels to follow superstitious numbering, at least as often as internationally branded hotels. This is because independent and local brand hotels would be familiar with numbering customs in the

Table VII Likelihood of an incident occurring for every 100 occupied nights

Year	Total	“13th” Floor		“14th” Floor		Room 4		Room 13		Room 14	
		Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Total	0.220	0.182	0.223	0.192	0.222	0.183	0.222	0.234	0.219	0.216	0.220
2012	0.205	0.136*	0.211*	0.153	0.209	0.229	0.204	0.218	0.205	0.149	0.208
2013	0.228	0.178	0.232	0.185	0.232	0.139	0.234	0.283	0.226	0.243	0.228
2014	0.242	0.234	0.243	0.212	0.244	0.193	0.245	0.235	0.242	0.232	0.243
2015	0.220	0.164	0.225	0.231	0.219	0.175	0.223	0.262	0.218	0.221	0.220
2016	0.204	0.197	0.205	0.181	0.206	0.182	0.205	0.173	0.205	0.233	0.202

Note: * $p = 0.045$

context of Hong Kong. But this was not the case. Internationally branded hotels were more likely to follow superstitious numbering of their floors and rooms. While Hong Kong was under British rule, it was more likely that hotels excluded a 13th floor. There is no statistical difference in the hotels that named a 4th floor before or after handover. After the handover in 1997, hotels in Hong Kong were less likely to number any of their rooms, xxx4 or xx13.

Implications

The above findings contribute theoretically to our understanding of superstition. With the change in political status of Hong Kong in 1997 from a British territory to a Special Administrative Region of the People's Republic of China, the macro-environment for hotels was uncertain. Following superstitious numbering of hotel rooms was a way to cope with uncertainty. Hotels were less sure about their source markets and the extent to which their hotel guests might be superstitious. Following superstitious numbering also allow them to reduce uncertainty-induced anxiety.

For one particular hotel using their proprietary data, we also investigated whether there were more accidents and complaints on unlucky floors and in unlucky rooms. This hotel was one that renumbered their unlucky floors. A designated 4th, 13th, 14th and 24th floors were omitted. As the 4th and 24th floors did not contain hotel rooms, we test whether the actual 13th and 14th floors (designated 16th and 17th floors) had more negative incidents, compared to other floors. After adjusting for occupancy rates, we find that unlucky floors (16th and 17th) and unlucky rooms (xx04, xx13, xx14) were just as likely to have accidents occur in them and complaints from guests staying in those rooms as any other floors or rooms. There were no mysterious superstitious effects occurring in those floors and rooms.

These latter results present evidence that numerical superstitions are largely illogical. Despite arriving at a more conventional conclusion, in that we report statistically insignificant results for the presence of superstition, it is critical that such studies are undertaken so that this "common knowledge" is confirmed through scientific methods.

From a managerial perspective, given that the tourism and hospitality sector is getting more and more globalized, and tourists from different cultures are travelling to new and different destinations, there is a need for hotels to cater to a more diverse profile of hotel guests. Given there is little downside to following superstitious numerology and only an upside, all hotels, not only internationally branded hotel, should follow Western and Chinese superstitious numbering of their floors and rooms. The downside would be the cost of renumbering of their floors and rooms to omit unlucky numbers. The upside would be that superstitious hotel guests would not be troubled by these superstitions, ask to change rooms or even check-out of the hotel if assigned an unlucky floor or room. Given that hotels cannot tell which, or how many, of their guests are superstitious, it does not make sense that hotels would continue to use unlucky numbers in their floor and room plans.

If hotels are going to continue with sequential numbering of rooms and floors, as [Shum et al. \(2014\)](#) and [Ng et al. \(2010\)](#) have shown in their research, guests could be offered a discount to stay in the rooms and floors perceived to have unlucky numbers. A price reduction could be offered for those rooms so that hotel guests who are not influenced by these superstitions will benefit from a better deal. Non-superstitious hotel guests would profit from these discounts. [Abrate and Viglia \(2016\)](#) offer clear implications on how tangible attributes of hotel rooms, such as the number of the floor and room, can be used to implement price tactics (versus more strategic ones). Through the use of a hedonic price function approach, hotel practitioners can determine the value of a hotel room as a bundle of objective attributes rather than homogeneous entities. Hence, hotel revenue managers can determine the "value" of a superstitious room or floor and adjust the price of that room accordingly.

Limitations and future research

One limitation of this is using only one context from which to draw implications. However, as per [Hanks et al.'s \(2016\)](#) recommendation, this research is conducted in a Chinese context, rather than a Western context. A gap this research fills, also pointed out by [Hanks et al. \(2016\)](#), is that this research focuses on negative superstitions, whereas their research focuses on positive superstitions. An obvious extension to the research would be to replicate the research in other destinations. Hong Kong provides a useful context with which to explore both Chinese and Western numerological superstitions in one destination. Other contexts, such as dominantly Western destinations or other Asian destinations could be explored so that broader generalizations can be made. Given the growth of the outbound Chinese tourism market, a better understanding of Chinese superstitions would help destination marketing organizations cater to their needs. To analyze whether incidents occurred in unlucky rooms and on unlucky floors, we used the complaints and accident data from one Hong Kong hotel. As might be expected, many hotels do not want to share the frequency and nature of their complaints and accidents with those outside of their organization. These data were proprietary. Having the data from just one hotel is a limitation. If possible, a wider range of complaint and accident data from different hotels would enable more generalizability of the results.

The hotel in this case study did not name their 13th and 14th floors. While we did not find any negative superstitions associated with the numbering of floors in this hotel, could it be that this was because the hotel had already renumbered the floors, omitting the unlucky floors? Future research might compare those hotels that do label their floors “4”, “13”, “14” etc. with those that omit those “unlucky” floors.

This research takes a supply-side view of numerology superstitions in hotels. Future research could explore the influence of superstitions on decision-making among hotel guests, that is, from a demand-side approach. There is a growing interest in heuristic decision-making in both tourism and hospitality research ([Nguyen, 2016](#); [Sirakaya and Woodside, 2005](#)) and more broadly ([Kahneman et al., 1991](#); [Kahneman and Tversky, 1979](#)). Further research into different types of superstitions that could affect tourist decision-making is also needed.

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