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Magical Contagion and Commemorative Plaques: Effects of Celebrity Occupancy on Property Values

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Abstract

In many places commemorative plaques are erected on buildings to serve as historical markers of notable men and women who lived in them – London has a Blue Plaque scheme for this purpose. We investigated the influence of commemorative Blue Plaques on the selling prices of London real estate. We identified properties which sold both before and after a Blue Plaque was installed indexing prices relative to the median prevailing sales prices of properties sold in the same neighborhood. Relative prices increased by 27% (US$165,000 as of July 2020) after a Blue Plaque was installed but not in a control set of properties without Blue Plaques, sold both before and after a Blue Plaque was installed in close proximity. We discuss these findings in relation to the theory of magical contagion and claims from previous research suggesting that people are less likely to acknowledge magical effects when decisions involve money.

KEYWORDS: Contagion; Kudos; Superstition; affect; intuitive evaluation

Magical Contagion and Blue Plaques: Effects of Celebrity Occupancy on Property Values

The idea that celebrities confer value on objects they once owned or merely touched is confirmed by regular reports of celebrity artifacts sold at auctions. For example a guitar once owned by John Lennon sold for US$2.4m at auction in 2015 (Siddle, 2015). An online search for the same model and year guitar (a 1962 Gibson J-160E) indicates that the current market price for the same model and vintage of guitar – albeit one not ever owned by John Lennon – is about US$2,500. Numerous other examples are documented by Blair (2017) including Brazilian footballer Pele's 1970 World Cup final shirt, sold in 2002 for £157,750, the piano shown in the film Casablanca, sold for US$3.4 million in 2014, and "Star Trek" actor William Shatner's kidney stone, which he sold for US$25,000 in 2006.

While an increase in the perceived value of products by virtue of their association with famous individuals is not particularly noteworthy – many advertisements make effective use of celebrity endorsements (Bergkvist & Zhou, 2016) –these highly prized items manifest a very specific effect localised to one item which is not extended to a class of other items. Thus, although demand for, and hence the price of, other guitars made by the manufacturer of John Lennon's guitar may have increased somewhat as a direct result of their association with – and implied endorsement by – John Lennon, the extraordinary price paid for the particular guitar previously owned by John Lennon is not achieved by any other guitars of the same make, model and year and is thereby not explicable in terms of the same mechanisms underlying celebrity endorsement. Note, moreover, that there is no suggestion that John Lennon's guitar is, in any material way, superior to, or even different from, any other guitar of the same make, model and year. The same applies to the piano used in Casablanca, Pele's shirt and even William Shatner's kidney stone. Plainly, these individual items are valued and

collected by buyers for the kudos bestowed by their particular history – rather than because of their material characteristics or their purely utilitarian value when used as functional items.

The causal roots of this phenomenon may reflect a universal human social characteristic – a possibility suggested by both experimental studies of young children and anthropological studies of widely separated traditional cultures in Africa, Asia and Australia. Frazier and Gelman (2009) found that 3-4 year old children recognized that objects that belonged to a famous individual have a special nature compared to physically equivalent objects with no famous association. Hood and Bloom (2008) found that children as young as six years old valued a personal possession of Queen Elizabeth II more than an identical copy of the same object with no such history.

A concept identified by anthropological researchers and touted as a mechanism for explaining how objects acquire exceptional value purely as a result of being owned by, or in some way connected with, a noted individual, is belief in "magical contagion" - elaborated by psychologist Paul Rozin and colleagues in a large number of publications (e.g. Nemeroff & Rozin, 1994; Rozin & Fallon, 1987; Rozin, et al., 1986; Rozin, et al., 1989). First described by anthropologists around the turn of the 20th century - initially by Edwin Tylor (1871) and later developed by James Frazer (1890) and Marcel Mauss (1902) - the law of contagion can be summarized as: once in contact, always in contact. Rozin and Nemeroff (1990) cite the Scottish anthropologist James Frazer (Frazer, 1890) who attributed belief in contagion as a world-wide phenomenon to account for a wide variety of magical practices and beliefs in traditional cultures. According to Frazer (1890), "things which have once been in contact with each other continue to act on each other at a distance after the physical contact has been severed" (p. 52) and that: "…things act on each other at a distance through a secret sympathy, the impulse being transmitted from one to the other by means of what we may conceive as a kind of invisible ether" (p. 54).

Consistent with the idea that magical *contagion* – and not just mere association - is responsible for the high prices paid for celebrity artifacts, Newman and Bloom (2014) found that the amount of physical contact between the object and the celebrity positively predicts the final bids for items that belonged to well-liked individuals (e.g., John F. Kennedy) but negatively predicts final bids for items that belonged to disliked individuals (e.g., Bernie Madoff). Moreover, when asked to bid on a sweater owned by a well-liked celebrity, participants report that they would pay substantially less if it was sterilized before they received it; however, sterilization increased the amount they would pay for a sweater owned by a disliked celebrity. Fedotova & Rozin (2018) also report studies showing that, for a range of contagion scenarios, association cannot account for the potency of contagion effects. For example, more individuals are upset about holding in their hands a dictionary owned and used by Hitler than a brand new copy of Mein Kampf, although the association value of Mein Kampf with Hitler is higher.

The personal history of objects, in terms of contact with people with positive or negative relations to an individual can powerfully influence behavior, however most of the examples of contagion cited by Rozin and his colleagues have involved negative effects; for example many people are reluctant to try on a sweater they are told was once worn by Adolf Hitler, even if it has been freshly laundered (Rozin et al., 1989). While positive and negative contagion effects are both measurable, negative effects of contagion appear both more frequent and more potent than positive effects (Rozin et al., 1989). According to Rozin and Royzman (2001) this positive-negative asymmetry reflects a general tendency in humans and other animals to learn more rapidly about, and respond more strongly to, negative events (see also Baumeister, et al., 2001; Tierney & Baumeister, 2019). Rozin et al. (1986) point out that while positive contagion is prevalent in some cultures, such as the Hua of New Guinea where

the value of a food for a particular person is enhanced if it is spat on by someone in a positive relation to that person, negative effects are reportedly more potent even among the Hua.

A vivid illustration - and a clue to the cause - of this asymmetry is offered by Rozin and Fallon (1987) who quoted the words of an evidently sagacious Nebraska car mechanic: "A drop of sewage spoils a barrel of wine, but a drop of wine does nothing for a barrel of sewage." (p. 32). Because there are no “contaminants” on the positive side that can match the potency and rapid action of negative toxins and harmful micro-organisms, negative effects will be stronger. In the same vein Rozin and Royzman (2001) note that brief contact with a cockroach will usually render a delicious meal inedible but that the inverse phenomenon - rendering a pile of cockroaches on a platter edible by contact with one's favorite food - is unheard of. Moreover, and notwithstanding the somewhat extraordinary and culturally specific example of the Hua spitting on food cited above, Rozin and Royzman note that there is no way to render a dish of a disliked food more palatable by merely bringing it into contact with something: “What could you touch to that food to make it desirable to eat - that is, what is the anticockroach? Nothing!” (p. 296). This asymmetry may reflect a primary feature of human emotion: Rozin and Fallon (1987) claim that although disgust is generally considered a basic negative emotion, there is no basic positive emotion as its opposite. More recently Nemeroff & Rozin (2018) have acknowledged that positive contagion is much more substantial and far reaching than had previously been realized and suggest that one reason for the “relative spottiness” of positive contagion effects in early research is that positive effects may have competed with negative ones in many of the examples used; for example, although Mother Teresa’s sweater is positive because of Mother Teresa’s essence, it may also carry some negativity because of the possibility of sweat, dirt, and germs (given the type of work she did, and where). This possibility allows that some cases of positive contagion could be unambivalent and hence stronger.

A further impediment to the manifestation of positive effects of magical contagion on monetary valuation is reported by Rozin, et al. (2007) who found that people are substantially less likely to acknowledge magical effects when the judgments involve money (e.g., amount willing to pay to avoid an "unpleasant" magical contact) than they are when using preference or rating measures. While survey respondents indicated they were less willing to rent a condominium if they discovered it had previously been rented by a murderer for one week, the proportion of respondents *not* demonstrating any "magical effect" was substantially greater when the judgments involved money - when they were asked to indicate the highest rental price they would be willing to pay. Rozin et al. concluded that money makes the mind less magical. They related this to a proposal from Amir and Ariely (2007) that when people make payment decisions they consider not only their preferences for different alternatives but also more general guiding principles and behavioral rules that can override preferences. According to this view: "when money is involved, the rule becomes activated and causes their choices to be based on the rule, not on their preferences" (Amir & Ariely, 2007, p.145).

This proposal in turn developed earlier work by Hsee, et al. (2003) who, while acknowledging evidence that choices are often driven by decision makers' affect toward the choice options (e.g. Hsee & Rottenstreich, 2004; Loewenstein, et al., 2001; Slovic, et al., 2002), also provided evidence that people sometimes overly focus on rationalistic attributes, such as economic values, quantitative specifications and functions and consequently underweight more affective attributes. Hsee et al. (2003) cited an earlier study by Hsee (1999) who asked participants to imagine that, as the prize for winning a lottery, they could choose either a small and inexpensive (0.5 oz/US$0.50) chocolate which was in the shape of a heart, or a larger and more expensive (2 oz/US$2.00) chocolate which was in the shape of a cockroach "that looks extremely real and disgusting". When asked to predict which chocolate

they would enjoy eating more, most respondents favored the heart-shaped one, but when asked which one they would choose, most picked the roach-shaped one.

Hsee et al. (2003) argued that this inconsistency arose because, when making decisions, people assign more weight to the more quantitative attributes central to economic calculus – and less weight to more affective attributes - than they do in their predictions of consumption experience, a phenomenon they labelled 'lay economism'. Lay economism identifies the idea that economic calculus urges decision-makers to choose the option that entails the greatest (perceived) economic gains - even if this flouts their (less economically tangible) preferences. Hsee et al. (2003) acknowledged an irony of 'lay economism' – that, in focusing on more quantitative attributes and discounting more affective attributes, what a lay economist would do may be quite the opposite of what a real economist would recommend: "No right-minded real economist would say that … one should choose the more expensive, roach-shaped chocolate if one would not enjoy it." (Hsee et al., 2003, p.261).

We return to this issue in the "Discussion" section but note for now that the 'lay economism' phenomenon would potentially counter any effects of magical influence on economic valuations.

In this context we investigated the effect of commemorative Blue Plaques on the value of properties in London. The London Blue Plaques scheme was started in 1866 and is thought to be the oldest of its kind in the world. According to English Heritage – the organization which runs the scheme: "Across the capital over 900 plaques, on buildings humble and grand, honour the notable men and women who have lived or worked in them". Given the focal prominence of London in recorded history for the past few hundred years, Blue Plaques record the residence of many globally significant historical, cultural, literary and scientific figures – including Karl Marx, Winston Churchill, Oscar Wilde, Ada Lovelace,

Sigmund Freud and Jimi Hendrix. Blue Plaques are 490 mm in diameter and record, along with the name of the celebrated individual, a brief note of their achievements (see Figure 1).

Figure 1

Examples of Blue Plaques.

As new plaques are installed every year we had the opportunity to measure the influence of plaque installation on property valuations by conducting a before-after study. In what follows we describe our identification of a sample of properties for which we were able to identify a transaction price both before and after a Blue Plaque had been installed. By comparing each sale price with the median sale prices of properties sold at the same time and in the same neighborhood (postcode) we were able to investigate whether there had been any influence of the installation of the plaque on the relative value of the property.

Method and Results

At the time of our study there were 958 Blue Plaques installed by English Heritage in London. From the English Heritage website (English Heritage, 2019) we collated their name, address details and date of installation. We compared them with the database of property sold prices from the UK Land Registry (HM Land Registry, 2020), which records all 25 million property transactions in the UK from 1995 until May 2020, the latest available. This enabled us to identify 79 properties with Blue Plaques with at least one transaction before, and one after, the installation of their respective 47 Blue Plaques providing a total of 229 individual

transactions. Many older properties in London used to be single-family houses which have later been subdivided into flats. In most cases the period when the historical figure honored by the Blue Plaque was resident predated their conversion from house into flats. In fact, only 27 of the 958 Blue Plaques identify a specific flat. Therefore when no specific flat number was identified on the plaque, we assumed that the plaque's effect applied to the entire building so included transactions for any flats within the property which is why some Blue Plaques were associated with more than one individual flat. There was also one property associated with two different Blue Plaques installed in the same year. Only the year (not the exact date) of plaque installation is known, so transactions in the same year as the plaque installation were excluded. Property matching was done using three fields: property (house or building) number, street name and postcode. Postcodes in London comprise two alphanumeric codes, the first having between two and four characters and the second, three characters. (e.g., EC1V 0HB) and typically cover an average of 14 neighboring properties in close proximity, often in the same street, making matching easier.

As a control, we also identified any neighboring properties with the exact same postcode as the 79 identified earlier, which also had a transaction before and after the Blue Plaque installation, but that was not a Blue Plaque property itself. These properties were often adjacent, or in very close proximity, to those in which the Blue Plaque was installed. The control set included 696 individual transactions of 235 properties associated with 35 Blue Plaques. A full list of the 958 Blue Plaques (with a London map showing their locations) and the matched 229 Blue Plaque property transactions and 696 neighboring properties transaction data, as well as all the code used for data collection, preparation, and analysis, are available online at OSF (https://osf.io/4ny75/?view_only=495685b5542a4088a206748f05669782).

As property prices change – and typically increase - over time, a difference in the transaction prices of properties before and after plaque installation would be expected, regardless of any influence of the plaque, so we devised a measure to control for changes in local property market values. For each property transaction, we calculated an index of the property sale price which expressed the sale price in relation to the median property price of other sold properties in the same neighborhood. Neighboring properties were included in this calculation if they were: in the same postcode *sector* (identified by the first digit in the second alphanumeric code, e.g. EC1V 0), which, in London, includes an average of 1,638 properties across an average of 49 streets in close proximity; and sold within six months either side of the transaction date of the matched Blue Plaque property. Changing the base of the index to include a broader set of properties in the much wider postcode *district* (identified by the first alphanumeric code, e.g., EC1V) covering an average of 5,908 properties across an average of 172 streets, instead of sector;[1] using mean of prices instead of median; or using a shorter window of three months instead of six, did not change any of the conclusions (see "sensitivity checks" in Table 1).

We then analyzed the price indices using a linear repeated-measures mixed-effects regression from the package lme4 in R (Bates et al., 2015; R Development Core Team, 2020). Each property had at least two price indices associated with it (one before and one after the installation of a Blue Plaque), but many properties had more than two transactions. The model included two independent variables: Timing (before or after the installation of the Blue Plaque) and Presence of a Blue Plaque on that particular property (Yes or No – with the latter representing the control properties). The model also included a random intercept for each individual property. This approach allowed for individual differences in house prices, by

[1] For a visual representation of the hierarchical relationship between the individual postcode, its postcode district and postcode sector, please see the London map of Blue Plaques we made available online at OSF

effectively creating a unique baseline (the model intercept) for each property. Thus, more expensive properties (perhaps because they are larger or have gardens) get allocated higher baselines, while cheaper neighbouring properties (perhaps because they are smaller apartments) get allocated lower baselines. These baselines will absorb some of the random noise of the data, allowing the model to isolate the desired variance due to price changes in relation to the baseline (within the same property, before and after the installation of a blue plaque) from the undesired variance due to differences in house characteristics (between different properties). The annotated full code used for data manipulation, property matching, index creation, statistical analyses and their outputs is available online at OSF as an R Markdown document. The results of this analysis are displayed in Table 1.

Table 1

Regression Coefficients for Timing (Before/After) and Presence (Yes/No) of Blue Plaques on Indexed Property Prices.

DV=Price index	Main Model	(A) Postcode district	(B) Mean	(C) Three-month window
Predictors	*b* *[95% CI]*	*b* *[95% CI]*	*b* *[95% CI]*	*b* *[95% CI]*
(Intercept)	1.42*** [1.25, 1.59]	1.47*** [1.28, 1.65]	1.05** [0.93, 1.17]	1.42*** [1.25, 1.59]
Timing=After	0.00 [-0.08, 0.08]	0.03 [-0.6, 0.11]	-0.02 [-0.08, 0.04]	-0.01 [-0.09, 0.08]
Presence=Yes	0.11 [-0.23, 0.45]	0.20 [-0.17, 0.57]	0.09 [-0.15, 0.33]	0.09 [-0.25, 0.43]
Timing=After : Presence=Yes	0.27** [0.11, 0.43]	0.18* [0.01, 0.36]	0.17** [0.05, 0.28]	0.24** [0.07, 0.42]
N properties	314	314	314	314
N transactions	925	925	925	925
Marginal R^2	0.008	0.008	0.008	0.006
Conditional R^2	0.857	0.864	0.847	0.833

Note. The price index is calculated as the price of the property divided by the mean of the prices of neighboring properties (within the same postcode sector) which were sold in the six months before or after. Sensitivity checks are variations of this model, by changing: (A) postcode sector to the broader postcode district; (B) median to mean; and (C) six-month to three-month windows. *=p<.05; **=p<.01; ***=p<.001.

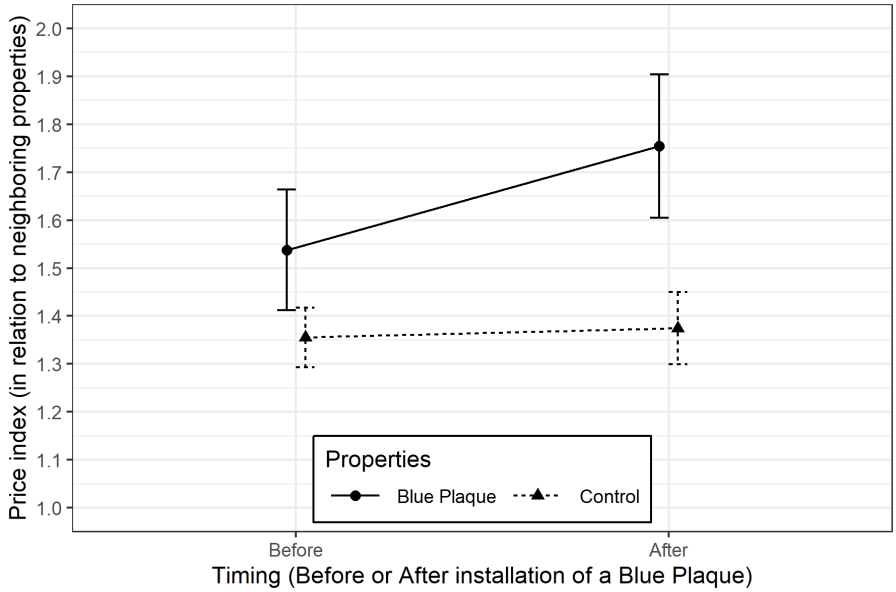
Overall, when averaging across all transactions regardless of timing (both before and after plaque installation), there was no statistically significant difference in the overall price index between the set of Blue Plaque properties and the control set (b=0.11, SE=0.17, 95% CI=[-0.23, 0.45], t(346)=0.65, p=.52); on average Blue Plaque properties and the control set were not priced significantly differently (Blue Plaque: M=1.64, SE=0.10; Control: M=1.36, SE=0.05). Moreover, across all properties, there was no significant change to the overall price index of properties after the installation of a Blue Plaque (b=0.00, SE=0.04, 95% CI=[-

0.08, 0.08], t(613)=0.10, p=.92). On average, properties were priced the same, in relation to their neighbors, before and after Blue Plaque installation (Before: M=1.40, SE=0.06; After: M=1.47, SE=0.07).

However, and critically revealing an influence of Blue Plaque installation on prices, the interaction between Timing and Presence was significant (Figure 2), with a significant increase in price for properties with a Blue Plaque, after the installation of the plaque (b=0.27, SE=0.08, 95% CI=[0.11, 0.43], t(614)=3.26, p=.001). A resampling bootstrapping analysis (n=10,000) confirmed this finding, with an average coefficient of b=0.28 (95% C.I.=[0.12, 0.40]) for the interaction with an observed power of 84%.

Figure 2

Price Index of Blue Plaque and Control Properties Before and After Plaque Installation.



Post-hoc comparisons showed that properties with a Blue Plaque saw a significant increase in price indices after the plaque installation (Before: M=1.54, SE=0.13; After: M=1.75, SE=0.15, 95% CI=[-0.42, -0.13], t(615)=3.82, p<.001, Cohen's d=0.53). In contrast, neighboring control properties without a Blue Plaque saw no significant change to their price indices when a plaque was installed nearby (Before: M=1.36, SE=0.06; After: M=1.37, SE=0.08, 95% CI=[-0.09, 0.08], t(615)=0.10, p=.92, Cohen's d=0.008). Moreover, while the

price of Blue Plaque and control properties was not significantly different before installation of their respective plaques (95% CI=[-0.46, 0.23], t(348)=0.65, p=.52, Cohen's d=0.22), Blue Plaque properties were significantly more expensive afterwards (95% CI=[-0.73, -0.04], t(353)=2.20, p=.03, Cohen's d=0.74). Given that the median price of a property in London in the first five months of 2020 was £476,250, the increase of 27% in value is equivalent to a Blue Plaque installation premium of £128,500 (approximately US$165,000).

To probe the possibility of a relationship between the *degree* of celebrity and the magnitude of the Blue Plaque effect we tested for the presence of a correlation between the fame of the person honored by the plaque and the magnitude of the relative price increase. Given evidence that human subject judgments of fame correlate well with the number of edits of the individual's Wikipedia page (Ramirez & Hagen, 2018), we introduced Wikipedia page edits as a mean-centered covariate to the main model described above. The total number of Wikipedia page edits, since page creation, for each individual was scraped from the Wikipedia website using Python (our Python code and outputs are available online at OSF). For plaques that honored two individuals at the same time, the number of edits for the two pages were added. As shown in Table 2 there was no change to the significance of the previous independent variables Presence and Timing, nor to their interaction. As before, only the coefficient for the interaction between Plaque (=Yes) and Timing (=After) was significant (p=.001). The new variable, Wikipedia Page Edits, was not significantly associated with the price index by itself (p=.92), nor via the interaction with Timing (p=.80) nor with Presence (p=.97) nor their three-way interaction (p=.89). The change in property prices after the installation of a Blue Plaque was also not significantly associated with the number of Wikipedia Page edits.

Nevertheless Blue Plaques may vary in their appeal; there may be characteristics of Blue Plaque celebrants, other than their fame *per se,* that render the properties they grace

more or less desirable. For example, some categories of celebrity may be more appealing than others; for example, figures from popular culture - literary figures or “stars” from the performing arts - may be more desirable previous inhabitants of a property than less glamorous scientists or politicians. For example, while the writer Graham Greene has substantially fewer page edits (1,669) than General James Wolfe "Victor of Quebec” (2,674) it is not hard to imagine that, in the minds of many, the kudos of their Blue Plaques might well be very different. Moreover, some Blue Plaques commemorate individuals who, while barely known at all nowadays, celebrate accomplishments possessing an irresistible charm. The entertainer Fred Russell is a case in point; while now largely forgotten, the plaque recording him as “the father of modern ventriloquism” might plausibly have an appeal disproportionate to his celebrity. More negatively, buyers of 19 Collingham Gardens in South Kensington, where a Blue Plaque records that a previous occupant was the Egyptologist Howard Carter, discoverer of Tutankhamen’s tomb, might have thought twice about the alleged curse of Tutankhamen which, despite the fact that Carter lived for over 16 years after opening the tomb, remains a popular myth[2].

[2] While it is an “unofficial” Blue Plaque – not one erected by English Heritage - the Blue Plaque commemorating Priss Fotheringham, a 17th century resident of Whitecross street, noting she was known as “the second best whore in the city” might also be less likely to excite demand - at least for some.

Table 2

Regression Coefficients With Covariates for Number of Wikipedia Edits and Blue Plaque Desirability Ratings.

DV=Price index	(A) Wikipedia Edits		(B) Subjective Ratings	
Predictors	b	[95% CI]	b	[95% CI]
(Intercept)	1.42***	[1.24, 1.59]	1.42***	[1.25, 1.59]
Timing=After	0.00	[-0.08, 0.08]	0.00	[-0.07, 0.08]
Presence=Yes	0.12	[-0.23, 0.46]	0.11	[-0.23, 0.45]
Timing=After : Presence=Yes	0.28***	[0.11, 0.44]	0.27**	[0.11, 0.43]
Wikipedia Edits (x 1,000)	-0.01	[-0.13, 0.12]		
Timing=After : Edits	-0.01	[-0.07, 0.05]		
Presence=Yes : Edits	-0.00	[-0.18, 0.17]		
Timing=After : Presence=Yes : Edits	-0.01	[-0.09, 0.08]		
Subjective Ratings			0.00	[-0.02, 0.02]
Timing=After : Ratings			-0.00	[-0.01, 0.01]
Presence=Yes : Ratings			0.01	[-0.03, 0.04]
Timing=After : Presence=Yes : Ratings			0.01	[-0.01, 0.02]
N properties	314		314	
N transactions	925		925	
Marginal R^2	0.009		0.009	
Conditional R^2	0.857		0.857	

Note. (A) number of Wikipedia edits since page was created (divided by 1000); and (B) elicited subjective ratings on a scale 0-100 for the desirability of living in a property with a Blue Plaque. Both new covariates were mean-centered. **=p<.01; ***=p<.001.

To investigate the potential effects of variability in the desirability of Blue Plaques we elicited ratings of the desirability of each of the 47 Blue Plaques in our set of properties. Using Prolific Academic, we recruited 150 individuals, all property owners resident in London, to complete an online survey which elicited ratings of the desirability of the Blue Plaques. Each individual viewed pictures of ten of the plaques, so they could read the name of the individual and why they were commemorated, and rated each plaque on a 1-100 point

scale to indicate "to what extent would any of the following blue plaques affect which home you choose". The task took an average time of 2.8 minutes to complete and participants were paid £1 (Survey HTML and JavaScript code, text file with instructions, and participant dataset are available online at OSF). We introduced the mean-centered participant ratings of the Blue Plaques as a covariate to the main model (see Table 2). Again, the same results from the original variables (Presence and Timing) were replicated, with only their interaction being significant (p=.001). There was no overall main effect of Rating on price index (p=.99) or its interactions with Presence (p=.77) or Timing (p=.72), nor their three-way interaction (p=.50). The change in property prices after the installation of a Blue Plaque was not significantly correlated with their subjective ratings.

While we were unable to attribute any variance in the substantial impact of plaques on property values to either the celebrity of the notable persons or ratings of the plaque's desirability we note that, for our modest sample of properties, correlations will be undermined by the noisiness of the data relative to the variance in the desirability of the plaques: property sales prices will be affected by a large number of factors that will vary across our sample of properties.

Discussion

Our analysis demonstrates a substantial influence of the installation of commemorative plaques on property values; after a plaque was installed the sales prices of London properties increased by 27% more than the sales prices of other neighboring properties lacking the advantage of a plaque over the same period. This represents a very substantial premium; applied to the median price of a property in London in the beginning of 2020, the difference attributable to the presence of the Blue Plaque is £128,500 (around US$165,000 in July 2020 when we conducted the analyses). The magnitude of this effect is all the more remarkable given both the weaker reported potency of positive effects of magical

contagion (Rozin et al., 1989) and the finding that magical contagion is substantially less likely to influence monetary values (Rozin et al., 2007) that we noted earlier.

We have assumed that the observed influence of a Blue Plaque on property value is as a result of magical contagion – in effect the close connection of the property with the commemorated notable individual – because there is no plausible alternative possibility: the installation of a Blue Plaque has, beyond its trivial physical manifestation, no tangible impact on the property. Unlike other value-adding interventions – such as improving (e.g., by adding extensions or amenities such as a modern kitchen) – the addition of the Blue Plaque does not change any palpable aspect of a residence. However, even though the addition of the plaque is a trivial alteration to the physical manifestation of a property it nonetheless plainly confers substantial tangible monetary value, reflecting recognition of a special status conferred on the property via the magical contagion from the identified notable person celebrated as having inhabited the property.

It is easy to envisage that the place where someone lived for an extended period would be considered as among the most potent examples of things that can retain their personal essence. Although Nemeroff & Rozin (2018) have proposed that contagion tends to operate in an all-or-nothing fashion, such that only minimal contact is necessary to accomplish a substantial contagion effect, and that more extended contact produces only small additional effects, they also refer to a study we cited earlier (Newman & Bloom, 2014) showing increased impact of contagion on auction prices for items with increasing amounts of contact from celebrities, acknowledging that this challenges the generality of their dose insensitivity claim. Newman & Bloom's (2014) study also showed an effect of association independent from the effect of the amount of contact such that items with some explicit connection to the celebrity were valued higher. Accordingly we could anticipate that, just as

Pele's guitar and John Lennon's shirt might not command the same prices as Pele's shirt and John Lennon's guitar, a notable person's home would attract a significant valuation.

We should acknowledge that one limitation of our before-after methodology is our unverified assumption that, aside from the installation of the Blue Plaque, there were no other substantive changes to the Blue Plaque properties. Thus, although we have no evidence for it, it is possible that the installation of a Blue Plaque on their property may have prompted owners to make improvements and that it is these improvements, rather than the presence of the plaque per se, that are responsible for the uplift in value. While we are unable to corroborate that the awarding of plaques was not associated with such selective improvements, the enormous magnitude of the effect speaks against it. Accounting for the magnitude of this effect by assuming property improvements were responsible would imply that these properties received quite extraordinary levels of investment - far more than would be attributable to even lavish redecorations. We submit that it strains credulity that such an eventuality occurred to the extent that it added an average of £128,500 in value across all the 79 Blue Plaque properties in our sample.

Perhaps the closest similar findings to ours - despite the fact that they do not involve magical contagion - are from studies showing that superstitions about particular numbers can influence buying decisions and affect market prices. In the Chinese culture vehicle license plates with the lucky number eight are auctioned at relatively high prices and vehicle plates with the unlucky number four are auctioned at relatively low prices (Chong and Du 2008; Ng et al. 2010; Woo et al. 2008; Woo and Kwok 1994). In housing markets, houses with an address number ending in eight are traded at a premium, whereas houses with a number ending in four are traded at a discount (Bourassa & Peng 1999; Chau et al. 2001; Fortin et al. 2014; He et al. 2019; Shum et al. 2014). Similar effects have also been observed outside Chinese culture; Antipov and Pokryshevskaya (2015) find more western numerological

preferences - preference for 7 and aversion to 13 - in the Russian apartment market. Numerical addresses, unlike Blue Plaques, are, with rare exceptions, fixed and inherent features of a property; nevertheless, the higher prices of Blue Plaque properties, like auspiciously numbered properties in Chinese culture, ultimately reflect a magical belief – in this case that the connection to the notable figure in some way confers some benefit via magical contagion on contemporary residents.

That such preferences so significantly perturb market prices for serious transactions may appear surprising and even implausible, yet there is good evidence that magical thinking is far from unusual; it is not restricted to the uneducated, or to people with specific mental deficiencies, but is prevalent among intelligent, emotionally stable adults (Risen, 2016). Legare et al. (2012) have reviewed evidence indicating that the tendency to invoke supernatural explanations is widespread in both industrialized and developing countries such that relatively few adults exhibit an exclusively natural mode of reasoning devoid of all references to the supernatural. Moreover, although traditional accounts of cognitive development have treated invocations of the supernatural in explanatory accounts of events as reflecting immature or primitive modes of thinking that is outgrown in the course of cognitive development, these authors find that natural explanations do not necessarily replace supernatural explanations following gains in knowledge, education, and technology. Indeed Legare et al. (2012) noted evidence that both natural and supernatural explanations can coexist in the same minds to interpret the very same events and that supernatural explanations often increase rather than decrease with age such that supernatural explanations are endorsed more often among adults than younger children.

Nevertheless, in the context of magical contagion research, the fact that magical contagion from former notable residents of a property can produce sizeable effects in the London property market *is* somewhat surprising for two reasons noted earlier: the weaker

reported potency of positive effects of magical contagion (Rozin et al., 1989) and the finding that magical contagion is substantially less likely to influence monetary values (Rozin et al., 2007).

With regard to the reduced potency of positive effects this is a matter of relative degree - the presence of positive effects is not in doubt. Moreover the perceived magical effect of a notable person on a home they lived in might be expected to be strong given the evidence that positive contagion shows dose sensitivity from contact with celebrities (Newman & Bloom, 2014) and the bones and other body parts of saints (Nemeroff & Rozin, 2018). Furthermore a building is unlikely to carry negativity akin to that which may have weakened the positivity of items like Mother Theresa's sweater (Nemeroff & Rozin, 2018).

The notion that magical contagion – positive or negative - is substantially less likely to influence monetary values rests on an empirical observation and an accompanying theoretical account. Recall that, despite Rozin et al.'s (2007) respondents indicating a reduced willingness to rent a condominium previously inhabited for a week by a convicted murderer, this didn't much alter the maximum rent many stated they would be prepared to pay. The account for this is what Hsee et al. (2003) termed lay economism – effectively that, when money is involved, emotive considerations are overruled by 'rules' that favor more rationalistic attributes, such as economic values, quantitative specifications and functions. However Rozin et al.'s (2007) finding, and the findings of both Hsee et al. (2003) and Amir and Ariely (2007) that underpin the lay economism account, were observed in rather different decision contexts than those applying to home buyers in London. Indeed, we wonder whether Rozin et al.'s (2007) finding that money makes the mind less magical, would replicate in a real market context.

In Rozin et al.'s study respondents contemplated simple hypotheticals where they were asked to indicate the highest price they would pay to rent "exactly equivalent"

properties previously rented by either a regular person or a murderer. For this judgment the influence of the previous inhabitant is the *only* distinguishing feature between two identical properties. It might be supposed that such a clear presentation would provide an ideally sensitive test of magical influence; however, that transparency might, as indeed Rozin et al. (2007) proposed, have led to respondents invoking rules to override feelings that they deemed to be irrational. Yet, critically, such rules may not be invoked under less transparent circumstances; indeed, buyers in the London property market will rarely - if ever – simultaneously contemplate two properties that are identical save that one has a Blue Plaque and one does not. Given that our Blue Plaque study finds effects of magical contagion on price so markedly different to those of Rozin et al. (2007) we suspect that, in a market context, where available homes are not identical, but vary in all sorts of subtle but significant ways that are hard to evaluate and trade-off, previous occupancy by a murderer may have bigger effects than buyers would explicitly acknowledge – or, indeed, perhaps even be aware of - resulting in non-negligible effects on market rents[3]. Similarly, in the context of evaluating a multi-attribute residential home the presence of a Blue Plaque might go unfettered by the kind of rules envisaged by Amir and Ariely (2007) and Hsee et al. (2003) – not least because, amidst all the characteristics of all the homes they are contemplating buying, it may not be obvious to the buyer that demand, and hence price, are being much influenced by this feature. As our analysis illustrates, inferring the presence and magnitude of the Blue Plaque premium requires access to, and collation of, voluminous data widely dispersed both geographically and temporally, together with computational analyses that

[3] A similar question arises about the Hsee et al. (2003) studies discussed earlier which all showed a discrepancy between what people say they would choose and what they predicted would be most enjoyable – but which also all involved hypothetical choices. There may well be a further discrepancy between hypothetical and actual decisions: for perhaps more self-conscious hypothetical choices people may say that they would choose A over B because A is superior on "rational" criteria but, for actual choices, be more likely to choose B over A because B is superior on more emotive criteria – particularly when influenced by rapid automatic associations unchecked by slower more deliberative reflection (cf. Devine, 1989; Neely, 1977; Strack et al., 1993).

simply would not be feasible for individuals to undertake. We think it unlikely that buyers will appreciate how much the price they paid was inflated by the influence of the plaque.

Research based on interviews with house buyers suggest that the decision to buy is often affect-based and intuitive (Koklic & Vida, 2009; Levy et al., 2008; Munro & Smith, 2008) and that cognitive and rational factors cannot sufficiently explain consumer behavior when deciding to buy a house. Consistent with the idea that buyers are not fully aware of the influence of Blue Plaques on prices, the evidence cited to show that house buyers' decisions are driven more by emotion than calculation also shows that buyers are not fully cognizant of the factors influencing their buying decisions. For instance, buyer comments such as: "I've got no idea [why this house is better than the others] . . . it just feels right. It really just feels right." (Levy et al., 2008, p.286); "We just liked it. There's no rhyme nor reason . . . you don't really know why you know . . . [it's] just a feeling a house gives you." (Munro & Smith, 2008, p. 362) and "You know, it's such a big purchase. It's almost too big. At some point you just have to close your eyes and go with your gut." (Reid, 2014, p.159) indicate that buyers find their own reasoning somewhat impalpable. It is striking, given the tendency of people to generate reasons to justify even relatively unimportant choices (Johansson et al., 2005; Nisbett & Wilson, 1977), that these quoted home buyers were so bereft of tangible reasons for what, for many, is the most important financial commitment of their lives.

While self-reports of introspections of reasons for choice cannot serve as strong evidence of choice processes, observed characteristics of people's housing choices also indicate that buyers do not behave as economic theory would anticipate. For example, that people with longer commuting times report systematically lower subjective well-being (Stutzer & Frey, 2008) suggests that people's housing choices do not successfully tradeoff costs and benefits and may be subject to a focusing illusion whereby attention and judgment

are disproportionately influenced by distinctive affective attributes (cf. Schkade & Kahneman, 1998).

Trivial attributes can sometimes have significant influence on choice – particularly when they enable the resolution of an otherwise intractable choice problem (Brown & Carpenter, 2000). However, *en masse*, arbitrary but commonly shared preferences can have significant and detrimental collective consequences (Falk et al., 2009). In market contexts, as with the present case, popular choices will increase demand thereby potentially raising prices. Our finding that property prices are significantly altered by the advertised commemoration of notable historical individuals raises questions about the effects of magical thinking in economic contexts that merit further investigation.

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