Retraction Stigma and its Communication via Retraction Notices

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Abstract Retraction of published research is laudable as a post-publication self-correction of science but undesirable as an indicator of grave violations of research and publication ethics. Given its various adverse consequences, retraction has a stigmatizing effect both in and beyond the academic community. However, little theoretical attention has been paid to the stigmatizing nature of retraction. Drawing on stigma theories and informed by research on retraction, we advance a conceptualization of retraction as stigma. We define retraction stigma as a discrediting evaluation of the professional competence and academic ethics of the entities held accountable for retraction. Accordingly, we identify seven core dimensions of retraction stigma, consider its functional justifications at both social and psychological levels, and distinguish its various targets and stakeholders. In view of the central role of retraction notices, we also discuss how retraction stigma is communicated via retraction notices and how authors of retraction notices may exercise their retraction stigma power and manipulate the stigmatizing force of retraction notices. We conclude by recommending retraction stigma as a theoretical framework for future research on retraction and pointing out several directions that this research can take.

Keywords Retraction stigma · Stigma power · Stigmatizing force · Retraction stakeholder · Retraction notice · Stigma communication

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Introduction

According to the Committee on Publication Ethics (COPE Council 2019), retraction is intended to weed out flawed research and problematic publications from the scientific literature. If flawed research and problematic publications are viewed as viruses that “spread and contaminate the knowledge system” (Montgomery and Oliver 2017: 53), retraction is a central part of the academic world’s immune system that fights a pandemic sweeping across the scientific literature. According to the Retraction Watch Database (RWDB, a specialized database on retractions, http://retractiondatabase.org), the annual number of retractions is on the rise (Brainard et al. 2018), and as many as 23,896 publications, involving thousands of researchers from 139 countries and regions, had been retracted by December 31, 2020.

Retracted research incurs a wide range of negative consequences for science and society, such as misleading subsequent research and impeding scientific advancement (Craig et al. 2020), distorting academic metrics (Teixeira da Silva and Dobrânszki 2018), endangering the health of patients enrolled as research subjects (e.g., Steen 2011) and of those who received or declined medical treatment due to invalid research findings (e.g., Godlee 2011), eroding public trust in science (Byrne 2019), discouraging junior researchers from pursuing an academic career (Reich 2009), and causing a massive waste of academic resources (Marcus and Oransky 2017). Consequently, authors of retracted publications, who are accountable for the majority of retractions (Xu and Hu in press-a), are faced with various negative consequences, such as a significant drop in citations of their earlier non-retracted and unproblematic publications (Azoulay et al. 2017), reduced opportunities for post-retraction funding and academic productivity (Stern et al. 2014), publishing bans (Springer n.d.), financial penalties (e.g., White 2015), termination of academic career (e.g., McCook 2016), revocation of academic degrees (e.g., Lieb 2004), litigation and imprisonment (e.g., Coons 2015), and even suicide (e.g., Cyranoski 2014).

Apart from tangible penalties, authors of retracted publications are also subject to intangible punishment, namely stigmatization (Enserink 2017; Vuong 2019). Retraction causes reputational damage to authors of retracted publications and journal authorities (i.e., journal editors and publishers) (Teixeira da Silva and Al-Khatib 2019), as well as home institutions of authors of retracted publications (Foo and Tan 2014). Since reputation as an academic currency (Partha and David 1994) cannot be restored once lost (Bean 2017), “the stigma associated with retraction may make the literature harder to clean up” (Brainard et al. 2018: 393). Thus, some scholars (Enserink 2017; Teixeira da Silva and Al-Khatib 2019; Vuong 2019) call for a shaming-free environment for the effective correction of the literature through self-retraction. However, there are also voices calling for a hard-line approach to curb the rising tide of retractions. For instance, Foo and Tan (2014: 208) advocate publishing “a shame list” of authors of retracted publications and their home institutions to help deter potential misconduct and reduce retractions. Watchdogs of academic integrity (e.g., Retraction Watch and
PubPeer) are also said to “employ a variety of different shaming techniques” in their active participation in the movement of post-publication peer review (Didier and Guaspare-Cartron 2018: 166).

Stigmatization is a universal human phenomenon. Since the publication of Goffman’s (1963/1990) seminal work, research interest in stigma as a sociological construct has seen a dramatic increase (Bresnahan and Zhuang 2016), and stigma research has covered a wide range of social topics (for a review, see Pescosolido and Martin 2015). Despite its application to various social phenomena, stigma has not been adopted as a conceptual lens for understanding the high-stakes phenomenon of retraction. On the one hand, as noted by Hesselmann et al. (2017), retraction has not yet caught the attention of sociologists of science. On the other hand, retraction is widely perceived as stigmatizing in academia (Enserink 2017; Hesselmann et al. 2017; Marcus and Oransky 2017; Vuong 2019). Teixeira da Silva and Al-Khatib (2019) even coined the term retraction stigma to refer to the general perceptions, though they did not go beyond naming the phenomenon. The existence of such perceptions indicates that stigma is a conceptually rich construct for the development of an in-depth understanding of retraction.

Drawing on stigma theories and informed by research on retraction, we seek to theorize retraction through the conceptual lens of stigma and map out the constructs of retraction stigma and its communication via retraction notices. The extant research on retraction is largely descriptive rather than explanatory and is fraught with interpretations of empirical data that are typically “more commonsensical than theoretically and empirically supported” (Hesselmann et al. 2017: 12). We believe that our theorization of retraction stigma and its communication via retraction notices is a crucial step toward addressing the limitations of the extant research on retraction. Our conceptual framework proposed in this article is also expected to introduce fruitful avenues and generate useful hypotheses for future research.

This article consists of two major parts. The first part conceptualizes research retraction as stigma and expounds the core concepts of retraction stigma. Given the pivotal role that retraction notices play in the operation of the retraction mechanism and in retraction stigma communication, the second part of this article focuses on expounding how retraction stigma would be communicated via retraction notices. The article concludes with recommendations for future research on retraction stigma and its communication.

Conceptualizing Research Retraction as Stigma

In this part, we define retraction stigma as a discrediting evaluation of the professional competence and academic ethics of (individual and institutional) entities which are held accountable for retraction. To substantiate this definition, we further conceptualize retraction stigma by identifying its seven core dimensions, considering its functional justifications at both social and psychological levels, and distinguishing its various targets and stakeholders.
Stigma is defined by Goffman (1963/1990) as “an attribute that is deeply discrediting” (13) and “the situation of the individual who is disqualified from full social acceptance” (9). It occurs when an individual’s “actual social identity” (i.e., the attributes manifested by actual behaviors) does not match his/her “virtual social identity” (i.e., the attributes supposed to be demonstrated through behaviors) (12). Similarly, Stafford and Scott (1986) define stigma as a human characteristic (i.e., behavior, belief, and status) that violates a given social norm, leading to social disqualification and discreditation.

Retraction results from a severe violation of research and/or publication norms upheld by the academic community. Research fraud is identified by Ben-Yehuda and Oliver-Lumerman (2017) as deviance in science, that is, violation of scientific norms. As proposed by Resnik (1998/2005), scientists are expected to maintain 12 standards of ethical conduct, namely, honesty, carefulness, openness, freedom, credit, education, social responsibility, legality, opportunity, mutual respect, efficiency, and respect for subjects. Closely related to these standards of ethical conduct in science, 9 standards for scholarly publishing were proposed by Wager and Kleinert (2011): soundness and reliability, honesty, balance, originality, transparency, appropriate authorship and acknowledgment, accountability and responsibility, adherence to peer review and publication conventions, and accountable reporting of research involving humans or animals. Similar standards are also upheld in governmental policies that define research misconduct and scientific integrity (e.g., Office of Science and Technology Policy 2000). Notably, these standards of ethical research and publishing have been incorporated into COPE’s retraction guidelines (COPE Council 2019) and procedure for handling issues regarding publication ethics (COPE Council 2020).

The reasons for retraction identified by numerous retraction studies and listed by the RWDB violate seven of Resnik’s standards of ethical conduct in science (i.e., honesty, carefulness, credit, social responsibility, legality, mutual respect, and respect for subjects) and virtually all of Wager and Kleinert’s standards of scholarly publishing (with the exception of balance). Among the identified reasons for retraction, misconduct (e.g., data fabrication, data falsification, and plagiarism) accounts for most retractions (Brainard et al. 2018; Xu and Hu in press-a). Thus, most retractions have resulted from violations of the norm of honesty. Being dishonest means being a liar, which is one of the “blemishes of individual character” in Goffman’s (1963/1990: 14) classification of stigma. Notably, Cran dall et al.’s (2002) large-scale survey study (N = 1504) on the effects of social norms on the public expression of prejudice (i.e., perceived stigma) against 105

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1 As one reviewer of this article insightfully pointed out, it cannot be taken for granted that these standards are adhered to in actual research or publication. There is the question of “whether these standards guide every-day conduct or emerge only when problems and troubles occur”. As the reviewer noted, “such behaviors as condescendence, insults, contempt, delegitimization, academic power-politics tactics all do happen—sometimes in the ‘invisible college’—outside issues of retractions and are not explicitly or directly forbidden by different ethical standards”.

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social groups revealed that liars ranked 17th, way above obese people (70th) and people with AIDS (71st). Given that obesity and HIV/AIDS have been examined as two types of stigma in numerous studies (Turner et al. 2020), there is good reason to posit the existence of retraction stigma anchored in dishonesty, among violations of other research and publication norms. The postulation of retraction stigma is also based on many scientists’ advocacy of incriminating research fraud (e.g., Hadjiargyrou 2015; Redman and Caplan 2005) and the general public’s perception that “both data fraud and selective reporting are morally wrong” (Pickett and Roche 2018: 162).

**Seven Core Dimensions of Retraction Stigma**

Previous theorizing on stigma has conceptualized the construct in terms of seven core dimensions, namely, concealability, course, disruptiveness, aesthetics, origin, peril, and collectivity. All these seven dimensions, represented in Figure 1, are applicable to retraction stigma, as defined and delineated below.

*Concealability* refers to the extent to which the stigmatized mark is visible and its visibility can be controlled (Jones et al. 1984). The mark of retraction stigma is the retraction status of publications. Unlike “abominations of the body” (e.g., physical abnormalities) and “the tribal stigma” (e.g., membership in racial, ethnic, and religious out-groups) (Goffman 1963/1990: 14), the mark of retraction stigma is not visibly carried by its bearers (i.e., those who committed retraction-engendering acts). Although retracted publications indicate their culpable authors’ “blemishes of individual character” (Goffman 1963/1990: 14), the public connection of these retracted publications to their accountable authors can be manipulated and, consequently, the mark of retraction stigma can be concealed to varying extents.

On a macro level, retraction as a mechanism renders scientific misconduct visible in and beyond the academic community (Hesselmann et al. 2017). In most cases, retractions are publicized through official announcements (i.e., retraction notices) published in academic journals. As a result, the concealability of retraction
has been decreasing as the academic community is paying more and more attention to the phenomenon of retraction. Retracted publications and retraction notices have increasingly been indexed and archived in various databases (e.g., Web of Science, PubMed, and RWDB). The RWDB archived 23,896 retracted publications by December 31, 2020. Retraction-related information made publicly and freely accessible in the RWDB includes titles of retracted publications, names of their authors, their geographic locations and affiliations, journal titles, publisher names, publication dates of retracted publications and retraction notices, and reasons for retraction. Of the retracted publications documented by the RWDB, only 5.8% (n = 1,389) restricted public access through their paywalled retraction notices. More and more behind-the-scenes information on retraction has been disclosed on watchdog platforms (e.g., Retraction Watch and PubPeer), and high-profile retractions have been covered in mass media. Many of the retracted publications are watermarked “RETRACTED” usually in red to indicate their status of retraction. Notably, the reference management software EndNote recently has introduced the function of automatically notifying its users of retracted publications in their EndNote libraries (EndNote 2021). These developments have made it more difficult to conceal the mark of retraction stigma.

On a micro level, however, there is still much room for manipulating the mark of retraction and its visibility. For instance, in contrast to the active promotion of their publications, researchers have rarely revealed their records of retraction in their resumes (Teixeira da Silva et al. 2020), social media, or on academic networking platforms. According to the RWDB, by December 31, 2020, approximately 39% (n = 9,250) of its archived retracted publications were retracted without retraction notices or with retraction notices disclosing no or limited information on the reasons for retraction. Similarly, many studies (e.g., Grieneisen and Zhang 2012; Xu and Hu in press-a) have reported that reasons for retraction are missing from a considerably large number of retraction notices. Furthermore, as frequently reported in the literature (Azoulay et al. 2017; Craiga et al. 2020; Hesselmann et al. 2017; Vuong 2019), retraction notices are characterised by brevity, uninformativeness, vagueness, use of euphemisms, and ambiguous wording. More tellingly, agents of retraction-engendering acts could not be identified in 56% of the 250 retraction notices examined by Hu and Xu (2020), and even entities accountable for retraction could not be determined in some cases (Grieneisen and Zhang 2012; Xu and Hu in press-b).

Course refers to the stigmatized mark’s “pattern of change over time” and its “ultimate outcome” (Jones et al. 1984: 24). As recommended by the COPE’s procedure for retraction (COPE Council 2020) and noted by Xu and Hu (2021), suspected problems with publications may be reported to journal authorities and/or their authors, and the publications should subsequently be retracted once the suspicions are confirmed. Publications corrected for minor errors through errata and corrigenda may end up being retracted when retraction-engendering problems are detected and confirmed later. The RWDB had documented 237 such cases by December 31, 2020. An expression of concern may be issued before an alleged retraction-engendering behavior is confirmed. Once the allegation is verified, the issued expression of concern may be superseded with a retraction notice. According to the RWDB, expressions of concern were issued to 854 publications by December 31, 2020.
Publications with alleged problems may first be withdrawn from publishing platforms and then restored when non-substantial changes are made. In general, retractable publications take a long time to be detected and retracted (Dal-Ré and Ayuso 2019).

Once a publication is retracted, its status of retraction is rarely revoked unless post-retraction evidence proves that the retracted publication is actually valid. However, retraction may not be the death penalty for a problematic publication. For instance, some retracted publications may be republished after their retraction-engendering problems are addressed (Heckers et al. 2015). The RWDB documented 308 cases of “retraction and replacement”. It is not uncommon that one case of retraction triggers a follow-up investigation into other publications by the authors of retracted publications, which results in additional retractions. Actually, repeat offenders (i.e., those with a record of more than one retraction) are found accountable for a majority of retractions (Grieneisen and Zhang 2012). It should also be noted that the course of retraction can be influenced by authors of retracted publications themselves. As reported by Xu and Hu (2021), some authors may proactively request a retraction, when they detect problems with their publications, or act cooperatively in an investigation into their publications. By contrast, other authors may be uncooperative or unreachable in retraction-related investigations and even disagree to the retraction decision made by journal authorities.

Disruptiveness concerns the question of whether the stigmatized mark “blocks or hampers interaction and communication” (Jones et al. 1984: 24). Academic publications are intended for knowledge dissemination and academic communication. Since they are scientifically invalid and/or ethically flawed, retracted publications should not be cited, and subsequent studies should not be based on retracted research data/findings. In other words, retracted publications, together with publications citing them positively (Rapani et al. 2020), may disrupt the normal course of research (Craiga et al. 2020). Moreover, retractions may have undesirable spill-over effects; that is, they can negatively affect citations to valid publications by authors of retracted publications (Azoulay et al. 2017). Retracted publications also distort academic metrics (Teixeira da Silva and Dobránszki 2018) and undermine the reliability of metrics-based evaluation of research outputs. A publishing ban ranging from a few years to a lifetime may also be imposed on authors of retracted publications (Springer n.d.), which disturbs academic communication. Although publishing bans as sanctions on retraction go against the COPE retraction guidelines’ explicit disapproval of punishment for misbehaving researchers (COPE Council 2019), the RWDB had records of 71 publishing bans issued by December 31, 2020. It is not clear to what extent retraction has led to covert publishing bans. Last but not least, retracted publications disrupt academic communication by depriving competing manuscripts of valuable and limited publishing opportunities.

Aesthetics refers to the extent to which “the mark makes the possessor repellent, ugly, or upsetting” (Jones et al. 1984: 24). Although Jones et al. (1984) view the aesthetic dimension as being more applicable to human body-related stigma (e.g., deformity and disfigurement) than to human character-related stigma (e.g., lying and theft), it can be argued that the mark of retraction damages guilty authors’ face (i.e., academic image) and makes them repellent reputationally. Physically, retracted
publications are often watermarked “RETRACTED”, usually in red, across all pages of a retracted publication, explicitly and forcefully staining its author’s image. Furthermore, photos of authors of retracted publications are often displayed in Retraction Watch blog posts (e.g., Marcus 2020) to connect them with grave cases of academic misconduct.

**Origin** answers three questions about stigma: “Under what circumstances did the condition originate? Was anyone responsible for it and what was he or she trying to do?” (Jones et al. 1984: 24). In most cases, authors of retracted publications are agents of retraction-engendering acts (Grieneisen and Zhang 2012), most of which are committed for short-term personal interests, such as increased research output, coping with the publish-or-perish pressure, and attainment of tenure, promotion, and monetary rewards. Retraction-engendering acts are committed either intentionally as misconduct, which is accountable for most retractions, or unknowingly as honest error, which accounts for a much smaller number of retractions (Xu and Hu in press-a). As shown by Xu and Hu (in press-b), entities other than authors of retracted publications (e.g., journal authorities and third parties) are also accountable for a considerable number of retractions, and in some cases either no entities were found at fault or the accountable entities could not be identified.

**Peril** refers to the danger posed by the stigmatized mark as well as its imminence and seriousness (Jones et al. 1984). Retracted publications endanger not only subsequent publications but also the cause of science and public interests. Later publications that are unknowingly based on the findings of retracted publications are in peril of being retracted. Retracted research findings may derail science (Craigia et al. 2020) by eroding public trust in scientific research (Byrne 2019) and demotivating junior researchers from pursuing a career in science (Reich 2009) to the detriment of the sustainable development of science. Furthermore, retracted research may mislead the general public to accept or refuse certain medical treatment and adopt questionable lifestyles (Godlee 2011; Steen 2011). Given such consequences, retractions pose a danger to the functioning and wellbeing of not only the academic community but also society at large.

**Collectivity** refers to “the extent to which a stigmatized mark is shared with other members of a group and is thus a social identity (collective) versus seen (by self or others) as a solely individual mark (personal)” (Major et al. 2018: 5; see also Dovidio et al. 2000). A case in point is the stigma associated with blacklisted artists during the “red scare” in Hollywood between 1945 and 1960 (Pontikes et al. 2010). Since the vast majority of retracted publications were co-authored (Brainard et al. 2018), the huge number of retracted publications archived in the RWDB and other databases would mean that thousands of researchers have a record of retraction. Researchers with a record of retraction tend to be perceived as a deviant group within the academic community and thus bear a collective rather than personal identity. Moreover, because of the prevalence of retractions due to misconduct (Xu and Hu in press-a; Brainard et al. 2018), the accountable author of a retracted publication is often seen as one of those bad guys (or rotten apples) in science. Thus, authors of retracted publications are perceived as sharing something in common (i.e., grave violations of
research and publication ethics) and consequently a collective identity. Notably, although bearers of some stigmas may form a social group to fight against the stigmas (e.g., racialism) imposed on them (Jones et al. 1984), it is unlikely for authors of retracted publications to organize and engage in such self-protective group activities.

**Functional Justifications of Retraction Stigma**

Potential origins of stigma have been identified by scholars (e.g., Cottrell and Neuberg 2005; Kurzban and Leary 2001; Neuberg et al. 2000), taking a social evolutionary approach and following three fundamental propositions formulated by Cottrell and Neuberg (2005: 771):

(a) Humans evolved as highly interdependent social beings; (b) effectively functioning groups tend to possess particular social structures and processes; and (c) individuals possess psychological mechanisms “designed” by biological and cultural evolution to take advantage of the opportunities provided by group living and to protect themselves from threats to group living.

Based on the assumption that effective group living is reciprocity-based (i.e., depending on group members’ sharing of effort, knowledge, and material resources), Neuberg et al. (2000: 34) argue that stigmas follow one fundamental principle: “People will stigmatize those individuals whose characteristics and actions are seen as threatening or hindering the effective functioning of their groups”. Accordingly, they identify three types of stigma targets, namely, non-reciprocators (e.g., thieves and the physically disabled), the treacherous (e.g., cheaters and traitors), and those who counter-socialize (e.g., homosexuals and heretics).

In the context of retraction, retracted publications affect the common good of the academic community and meaningful communication between academics, and authors of retracted publications engaging in misconduct can be justifiably discredited as selfish, treacherous exploiters who game the system of academic publishing for personal interests. Therefore, there is ground for authors of retracted publications to be stigmatized within the academic community. In particular, journal authorities and home institutions of authors of retracted publications, as gatekeepers of academic integrity, would be highly motivated to deter potential retraction-engendering acts through the stigmatization of retraction (Hu and Xu 2020). Furthermore, stigma can arouse shame and guilt in the stigmatized (Ablon 2002), and emotions such as guilt and shame often deter people from violating social norms (Elster 1998). According to reintegrative shaming theory (Braithwaite 1989), deviants tend to change and conform when shamed. As pointed out by Horwitz (1990: 224–225), “informal sanctions are more powerful than formal ones because coercive social control is effective to the extent that it harms reputational status and social attachments”. This observation is supported by an experimental study (Brocas et al. 2021) which showed that individuals were significantly less likely to steal when shaming rather than punishment was introduced, suggesting that social image plays an important role in shaping people’s decision-making and deterring selfish
behaviors. As stigma-generated shame and guilt can function as a powerful deter-
rent, journal authorities may employ retraction stigma as a weapon to fight against
potential retraction-engendering behaviors.

Since stigmatization is “a power-laden process” (Link and Phelan 2001: 371)
and because journal authorities are more powerful than authors, it is within the
former’s purview to exploit retraction stigma when handling retractions. Phelan
et al. (2008) propose that stigmatization can enhance group or personal interest
by serving three social functions, which are collectively conceptualized by Link
and Phelan (2014) as stigma power: (a) keeping people down (i.e., exploitation
and domination through stigmatizing those with less power to maintain inter-
group inequalities through denial of resources), (b) keeping people in (i.e., norm
enforcement through deterring deviants from violating ingroup norms), and (c)
keeping people away (i.e., disease avoidance through alerting group members
to threats to group well-being). The most important goal of stigmatization, as
argued by Dijker (2013: 23), is “for those in power to maintain and legitimize
their position by publicly associating those that threaten their power and values
with a bad reputation and exposing them as ‘bad examples’ and objects of public
punishment and denigration”. To help fulfill their duty as gatekeepers of academic
integrity, journal authorities are in a position to exercise the power of retraction
stigma by keeping authors of retracted publications in. Notably, since published
problematic research is metaphorically viewed as a “virus” which contaminates
the literature when not handled effectively (Montgomery and Oliver 2017: 53),
fellow researchers should be distanced from retracted publications. In this sense,
retraction stigma can also serve the function of keeping fellow researchers away.

Researchers competing with authors of retracted publications and those vic-
timized by retractions can be as motivated as the gatekeepers of academic integ-
rity, if not more so, to stigmatize authors of retracted publications because their
own interests are harmed by the latter in various ways. Such stigmatization can
psychologically and behaviorally exclude authors of retracted publications (espe-
cially repeat offenders) from the academic community. Retraction stigma of this
nature is consistent with Neuberg et al.’s (2000: 51) proposition regarding out-
group stigmatization; that is, the onset of outgroup stigmatization depends on the
need to compete for valuable resources, and when resources become insufficient,
“intergroup competition heats up and stigmatization should follow”. The institu-
tion of science provides fertile ground for such stigmatization because it is a jun-
gle replete with competition and rivalry (Toch 1981). Thus, both individual and
collective interests can be served by exercising retraction stigma power. Psycho-
logically, stigmatizing others can enhance the stigmatizers’ self-esteem (Dovidio
et al. 2000). Self-esteem enhancement can be achieved through both interper-
sonal downward comparison (Wills 1981) and favorable inter-group compar-
ison (Crocker et al. 1998; Dovidio et al. 2000), which can “reward” stigmatizers
with competitive group advantages (Allport 1954/1979; Tajfel and Turner 1979).
Therefore, it would not be surprising that retraction-free researchers may stig-
matize authors of retracted publications, especially when in direct competition
with them for limited academic resources or when victimized by retractions. A
personal experience is a case in point. Learning about the first author’s research
on retraction, a friend of his working at a large reputable hospital approached him for a list of her colleagues with a secret record of retractions so that she could win out a stiff competition for promotion. In such cases, retraction stigma is weaponized to advantage stigmatizers in both psychological and material terms.

Targets and Stakeholders of Retraction Stigma

Retraction has two sides. On the one hand, it is an undesirable phenomenon that reflects the failure of the current quality control mechanism of science, especially the traditional pre-publication peer review system (Hilgard and Jamieson 2017; Marcus and Oransky 2017). On the other hand, retraction also has a positive role to play because it is intended to function as a post-publication self-correcting mechanism to clean up the contaminated literature (Marcus and Oransky 2017). In other words, it is not retraction itself but retraction-engendering misbehaviors and the malfunctioning quality control system of science that are at fault. Accordingly, targets of retraction stigma are entities that have committed retraction-engendering acts and gatekeepers who are entrusted to ensure the quality and integrity of science, that is, authors of retracted publications, their home institutions, and journal authorities, among others.

In the light of attribution theory (Corrigan et al. 2003; Weiner 1995), the more accountable a target is held for the occurrence of retraction, the more stigmatized the target would be by the retraction. Apparently, since they are expected to take responsibility for the validity and ethicality of their published research, authors of retracted publications are the primary targets of retraction stigma, unless other entities, such as journal authorities and peer researchers, are found accountable for the retraction of their publications. Notably, when a retracted publication is co-authored by two or more researchers, the retraction-engendering act may not involve every co-author. However, even when innocent co-authors are distinguished from accountable ones, the former may still be stigmatized due to their close association with the latter. This is a case of courtesy stigma, in which the retraction stigma “spread[s] from the stigmatized individual [guilty co-author] to his close connexion [innocent co-author(s)]” (Goffman 1963/1990: 43).

Journal authorities may become targets of retraction stigma in two situations. First, they made honest errors or were involved in a conflict of interest in handling submissions. The RWDB archived 817 such retractions by December 31, 2020. Second, even when not involved in retraction-engendering acts, journal authorities as gatekeepers for academic integrity may be perceived as partly liable for failure to detect and prevent retractable submissions before they were published. This is another form of courtesy retraction stigma. Similarly, home institutions of authors of retracted publications may also become targets of courtesy retraction stigma because they are expected to oversee their employees’ compliance with academic norms and are consequently likely to be seen as indirectly accountable for their employees’ misconduct.

Courtesy retraction stigma can be justified or even escalated into retraction stigma. The justification or escalation takes place when those victims of courtesy
retraction stigma do not play a positive role in correcting the contaminated literature or making known the reasons for retraction. This is because stigmatized individuals are perceived to be not only accountable for the cause of their stigmatization (Jones et al. 1984) but also responsible for eliminating the threat or damage posed by their stigmatizing conditions (Deaux et al. 1995). However, more often than not, the process of retraction is complicated and difficult due to various stakeholders’ conflicting interests (Marcus and Oransky 2017). For instance, not all co-authors may agree to a decision of retraction (Xu and Hu 2021). Journal authorities may be reluctant to retract publications or may issue retraction notices without specifying reasons for retraction out of certain considerations (Marcus and Oransky 2017). Authors of retracted publications and their home institutions do not always behave proactively or cooperatively during investigations into allegations of retraction-engendering acts (Marcus and Oransky 2017). In all those cases, it is justifiable to subject authors of retracted publications, their home institutions, and journal authorities to retraction stigma.

As a stigmatizing attribute/condition exists in social interactions or relationships (Goffman 1963/1990; Jones et al. 1984) and because stigmatization is intended to ensure effective group functioning and collective survival (Cottrell and Neuberg 2005; Kurzban and Leary 2001; Neuberg et al. 2000), retraction stigma involves a variety of stakeholders that can be categorised into three concentric circles according to their stakes in the retracted research (Fig. 2). The inner circle consists of authors of retracted publications, their home institutions, journal authorities, third-party governing bodies of academic integrity, and research funding agencies, given their greater likelihood of being held responsible for the cause and handling of retraction-engendering acts. The middle circle includes three types of peer researchers whose interests are affected by the retracted research: (a) the victimized, whose published works have been plagiarized, whose unpublished data/manuscripts have been stolen,
or whose publications have to be retracted because they were unknowingly based on the retracted research; (b) the competitors, who rival authors of retracted publications for personal interests (e.g., tenure, promotion, career advancement, academic authority, and monetary rewards); and (c) the interested, who are academics working in areas different from that of the retracted research but having a general interest in the latter. The outer circle includes mistreated research participants, consumers of retracted research findings, and non-academic sponsors of retracted research. Individuals (mostly authors of retracted publications) liable for retraction-engendering acts lie at the centre of the three concentric circles. The inner and middle circles are comprised of only people who work in academia, whereas the outer circle includes the general public.

**Communicating Retraction Stigma via Retraction Notices**

Stigmatization due to retraction is a socially constructed process, and retraction stigma communication takes places in both academic and non-academic domains. Given the central role of retraction notices in the operation of the retraction mechanism and in retraction stigma communication, we discuss in this part: 1) how retraction stigma can be communicated through retraction notices within the scientific community; 2) what factors may influence perceptions of retraction stigma and the stigmatizing force of retraction notices; 3) why two major types of retraction stakeholders (i.e., journal authorities and authors of retracted publications) may handle retraction stigma communication differently.

**Retraction Notices in Retraction Stigma Communication**

Stigma communication involves a process of creating and sharing stigmatizing messages (Smith 2007: 462), which aims to “generate protective action tendencies” by alerting people to a danger or threat posed by a stigmatized character or condition. Retraction stigma communication refers to the dissemination of retraction-related information within and beyond the academic community to correct the literature, prevent potential research and publishing misbehaviors, and raise retraction stakeholders’ awareness of the threats posed by the violations of research and publication ethics. Since the mechanism of retraction operates through retraction notices (COPE Council 2019), the latter are the primary source of retraction-related information for retraction stigma communication.

Retraction notices, occasionally accompanied by supporting or supplementary materials (e.g., institutional investigation reports), are officially published to announce retractions and are expected to be publicly accessible for free (COPE Council 2019). Their chief purpose being the correction of the literature, retraction notices are mainly intended for academics. However, retraction-related information, especially high-profile cases of retraction (e.g., Oransky 2019), may also reach the general public through mass media (for a review, see Hilgard and Jamieson 2017). In other words, retraction stakeholders in the inner and middle circles are more likely
to encounter retraction notices and their supporting or supplementary materials in academia-oriented outlets, whereas retraction stakeholders in the outer circle typically come to know about eye-catching retractions through mass media.

The two systems (i.e., academia-oriented communication channels and mass media) for communicating retraction-related information are involved in two sequential rounds of retraction stigma communication, respectively, as visualised in Figure 3. The first round centers on mostly inner-circle retraction stakeholders’ handling of retraction and ends with the publication of a retraction notice. The second round of retraction stigma communication involves mostly retraction stakeholders in the middle and outer circles, who are rarely engaged in retraction handling, and starts with their exposure to retraction-related information in retraction notices and/or mass media. Retraction stakeholders in the inner and middle circles may experience both rounds of stigma communication regarding specific retractions. For instance, in high-profile cases, retraction stakeholders in the inner and middle circles may come to know about them not only through academia-oriented communication channels but also though mass media (Barbash 2015).

Due to the central role of retraction notices and the focus of this article, our discussion here focuses on the production of retraction notices as stigmatizing messages. On the one hand, the production of retraction notices involves the provision of discrediting messages that can invoke retraction stigma. In the light of the model of stigma communication proposed by Smith (2007), retraction notices as stigmatizing messages may contain content cues regarding marks, labels, responsibility, and peril of retraction. Journal authorities as gatekeepers of academic integrity may deploy multiple types of content cues for the dual purpose of correcting the literature (e.g., through cues of responsibility for retraction) and deterring potential offenders (e.g., through cues of peril). On the other hand, conflicting personal interests of various retraction stigma stakeholders may compromise or even undermine the construction of retraction stigma, depending on which stakeholders produce retraction notices. For instance, when penning retraction notices, authors of retracted publications may tone down their retraction-engendering behaviors to reduce the threat to their image. Thus, various stigma management strategies, such as those identified by Meisenbach’s (2010) theory of stigma management communication (i.e., accepting, avoiding, evading responsibility, reducing offensiveness, denying, and ignoring/displaying), are found in retraction notices to mitigate retraction stigma (Xu and Hu 2018, 2021).
Stigmatizing Force of Retraction Notices and its Influencing Factors

The stigmatizing force of retraction notices refers to the extent to which they stigmatize through the information that they disclose and the way the information is communicated. The stigmatizing force of retraction notices is co-determined by stigma-constructing content cues and stigma-managing content cues, which work as two opposing forces on retraction notices, as illustrated in Figure 4. Specifically, the more stigmatizing content cues are communicated, and the fewer stigma management strategies are employed, the more stigmatizing the retraction notices are. This assumption is supported by empirical data (Hu and Xu 2020; Xu and Hu 2021) which show that retraction-related information tends to be selectively disclosed and strategically presented in retraction notices to help repair the tarnished image of authors of retracted publications. The stigmatizing force of retraction notices is also modulated by the linguistic realisation of stigmatizing content cues and retraction stigma management strategies, as found in a study on the linguistic representation of agency/responsibility for retraction-engendering acts in retraction notices (Hu and Xu 2020) and the pervasive use of euphemisms in them (Marcus and Oransky 2015). Furthermore, the polarity (i.e., positive vs. negative) of evaluative language resources used in retraction notices can also shape their stigmatizing force: the more negative evaluative language resources are used, the stronger the stigmatizing force.

Perceptions of retraction stigma and the stigmatizing force of retraction notices may be influenced by individuals’ proximity to and their attitudes toward retraction. According to Hebl and Dovidio (2005), costs/benefits, motivation, and goals of stigma perceivers may have an impact on stigma communication. Therefore, retraction stakeholders in the inner and middle circles may be more likely than those in the outer circle to stigmatize and do so more vigorously because retraction poses more direct threats to the interests of the former than to those of the latter. Moreover,
retraction stigmatizers’ association with and their reactions to retraction stigma targets may have an influence on their attitude toward retraction stigma. Extending Goffman’s (1963/1990) classification criteria, Smith (2012) classifies individuals into four groups according to their association with and their reactions to the stigmatized, namely the stigmatized, stigmatizers, active supporters (i.e., those who challenge stigmatization), and passive supporters (i.e., those who are sympathetic to the stigmatized but do not challenge the stigmatization). Considering the dynamic nature of stigma in general (Crocker et al. 1998; Jones et al. 1984; Pescosolido and Martin 2015) and assuming the applicability of the classification criteria to retraction stigma, individuals other than those accountable for retraction can be expected to take one of the other three roles in relation to a specific retraction in a particular context and at a particular time.

Another factor that may influence perceptions of retraction stigma would be the severity of reasons for retraction. The severity of reasons for retraction would be positively correlated with perceptions of retraction stigma and the stigmatizing force of retraction notices. There are three grounds for this speculation. First, Franzese’s (2015) model of deviance illustrates both the malleability and the vitality of deviant human behaviors and conditions, which suggests the fluidity of stigma. In other words, retraction stigma would be context-specific and vary by the severity of reasons for retraction. Second, origin/etiology (i.e., responsibility) is one of the essential elements of both stigma (Bresnahan and Zhuang 2010; Jones et al. 1984) and stigma communication (Smith 2007), as attested to by many empirical studies (e.g., Bresnahan et al. 2013; Major et al. 2018). Third, the scientific community has increasingly recognized the need for various forms of academic misconduct to be handled differentially (Hall and Martin 2019; Martin 2016; Yeo-Teh and Tang in press). The call for differential handling of research and publication misbehaviors is compatible with the assumption underlying attribution theory that blame and negative reactions to people are positively correlated with their personal accountability for their own conditions (Weiner 1995; Corrigan et al. 2003). Figure 5 summarizes the relationship between the aforementioned three contextual factors and individuals’ perceptions of retraction stigma and stigmatizing force.
Although a strong argument can be made for the existence of retraction stigma, this theoretical proposal about retraction stigma communication should be tested systematically with empirical data. To this end, empirical testing can take two different approaches, namely, a communication and a perception approach. The communication approach examines to what extent retraction is stigmatized in retraction notices and mass media coverage. The perception approach investigates to what extent retraction is perceived as stigmatizing by people with experience in or knowledge about retraction. No research on retraction has taken the perception approach. Three studies (Hu and Xu 2020; Xu and Hu 2018, 2021) took a linguistic approach to investigating retraction notices as an emerging high-stakes academic genre and identified two apparently contradictory characteristics of retraction notices, namely retraction notices’ image-tarnishing nature and retraction notice authors’ effort to repair image. Although the three studies did not frame retraction as stigma, the existence of perceived retraction stigma can be inferred from the two identified contradictory characteristics of retraction notices. It is possible that retraction is perceived to be stigmatizing but actually not communicated as such in retraction notices or that it appears less stigmatizing in retraction notices than actually perceived by various retraction stakeholders. In other words, the stigmatizing force of retraction notices identified through a communication approach may differ from that perceived by retraction notice readers. Therefore, both communication and perception studies are needed to develop a comprehensive understanding of retraction stigma.

**Use of Retraction Stigma Power via Retraction Notices**

As noted earlier, power relations are implicated in stigmatization (Link and Phelan 2001), and stigma power can enhance group or personal interests (Link and Phelan 2014). Strictly speaking, stigma does not have inherent power; it is those capable of invoking or inflicting a stigma on others that are vested with power. Thus, in this article, stigma power is a convenient shorthand. Retraction stigma power is defined as the capacity possessed and the choice made by producers of retraction-related publications to stigmatize specific cases of, entities liable for, and/or the phenomenon of retraction in general. Possessors and users of retraction stigma power mainly consist of retraction notice authors, retraction researchers as well as various participants (e.g., reporters, commentators and discussants) involved in the coverage of research retractions in non-academic media. Our discussion focuses on the use of retraction stigma power by retraction notice authors, who may be journal authorities, authors of retracted publications, or both parties (Xu and Hu 2018).²

² As the same reviewer noted, “stigma is a socially constructed attribute”, which requires attention to those who try to stigmatize and those who react to the stigmatization. However, because our interest is in how retraction notices, the main retraction mechanism, are deployed strategically for communicating retraction stigma and exercising stigma power, we focus only on retraction notice authors, who may be journal authorities, authors of retracted publications, or both parties. We recognize the need for future theoretical discussions to give attention to those who are in a position to react to the stigmatization through retraction notices.
Theoretically, retraction stigma power is exclusively possessed by retraction notice authors who are not involved in the retraction-engendering acts. In other words, in cases of retraction due to faults committed by authors of retracted publications, only journal authorities and innocent authors of retracted publications, if any, possess stigma power when penning retraction notices independently or jointly. In practice, however, retraction stigma power is also in the hand of individuals liable for retraction when they have the opportunity to produce retraction notices addressing their retraction-engendering acts. Use of stigma power involves motivation/goal and interest/profit (Link and Phelan 2014). Since retraction notices reflect the interests of various retraction stakeholders (Hesselmann et al. 2017), retraction notice authors may wield retraction stigma power selectively and discreetly by issuing retraction notices whose linguistic and rhetorical realisation is a product of choice and design. Table 1 summarizes factors that may influence how retraction stigma power may be exercised by four major types of retraction notice authors: journal authorities (JAs), innocent authors (IAs), guilty authors (GAs) of retracted publications, and joint authors (i.e., JAs and IAs and/or GAs).

By stigmatizing their guilty co-authors, innocent authors can disassociate themselves from the retraction and shield themselves from courtesy retraction stigma. However, innocent authors may choose to stay in solidarity with their guilty co-authors by not using retraction stigma power or indiscriminately stigmatizing themselves and their guilty co-authors when they value in-group solidarity more than their personal need for image repair. Guilty authors may feel too ashamed to issue retraction notices, even when they are asked to do so by journal authorities or their innocent co-authors. In this case, they relinquish their retraction stigma power so as to protect their face. However, guilty authors may choose to exercise retraction stigma power by taking the initiative to issue retraction notices, which can serve their need for image repair in at least two ways. First, when allowed to issue retraction notices, guilty authors have the opportunity to determine to their own advantage what information to disclose in the retraction notices and how to communicate the information. Second, when they choose to stigmatize themselves by unreservedly...
disclosing their retraction-engendering behaviors, guilty authors can repair or maintain the relationship with their innocent co-authors for further research collaboration and project a positive image of voluntarily assuming responsibility for retraction and showcasing their effort to correct the literature. Such remedial actions can be destigmatizing, especially when compared with guilty authors who leave the job of issuing retraction notices to journal authorities and/or their innocent co-authors. In other words, voluntary self-stigmatization can be adopted as a laudable strategy for managing retraction stigma, if not recognized as another type of “heroic act” in Vuong’s (2019: 5) words. Notably, to fulfill the priority to correct the literature, both innocent and guilty authors may erect to disclose information necessary for that purpose, which may increase or decrease the stigmatizing force of their retraction notices.

Different from both guilty and innocent authors, journal authorities possess stigma power in every case of retraction because they almost always have the final say in deciding on what kind of retraction notices can be published. They may exercise their retraction stigma power fully to present themselves as angry and stern gatekeepers of academic integrity who devote themselves to correcting the literature and deterring potential offenders. Alternatively, journal authorities may use their stigma power more prudently and in a more restrained manner. Thus, journal authorities may allow retraction notices to appear neutral, if not lenient or tolerant, in the communication of retraction-engendering acts for at least five reasons. First, journal authorities’ use of retraction stigma power is constrained by the difficulty in confirming allegations of retraction-engendering misconduct and, consequently, the risk of litigation against them by authors of retracted publications. Journal authorities do not have “the legal powers to seize or peruse lab notes or any other raw data that is not voluntarily submitted by the authors” (Williams and Wager 2013: 8) and thus in most cases have to rely on the cooperation of authors of retracted publications and/or their home institutions in verifying retraction-engendering allegations (COPE Council 2019). In the absence of hard evidence, journal authorities’ retraction stigma power is held in check. Consequently, they may have to tone down stigmatizing messages in retraction notices or permit negotiation of the wording of retraction notices, as recommended by the COPE retraction guidelines (COPE Council 2019). Second, journal authorities may allow retraction notices to mitigate retraction stigma to better serve the main purpose of retraction. If retraction is stigmatized too harshly in retraction notices, a shaming environment (Teixeira da Silva and Al-Khatib 2019) would likely be created and consequently deter proactive self-retraction of the problematic literature (Teixeira da Silva and Al-Khatib 2019; Vuong 2019).

Third, a restrained use of retraction stigma power can protect journal authorities’ reputation. Retraction stigma is a double-edged sword that can cut not only authors but also journal authorities themselves because of their role as gatekeepers of academic integrity. To avoid falling victim to courtesy retraction stigma, journal authorities can be expected to wield retraction stigma power with discretion. In this regard, Hu and Xu (2020) found that journal authorities were less likely to identify agents of retraction-engendering acts and assigned less responsibility for retraction than authors of retracted publications were. Research into stigma in other social domains has also shown that stigma concealment (Jones et al. 1984; Goffman 1963/1990) and control of stigma-related information (MacRae 2008) are frequently employed
strategies to pre-empt courtesy stigma. In the context of retraction, “silent or stealth retraction” (Teixeira da Silva 2015: 5) conceals retraction stigma, and opaque and uninformative retraction notices (Marcus and Oransky 2014) allow control of retraction-related information (Oransky 2013).

Fourth, if retraction notices stigmatize retraction too harshly and too often, retraction stigma is very likely to rock the academic community and reach the general public through mass media (Ben-Yehuda and Oliver-Lumerman 2017). Retraction notices’ relentless exposure of the dark side of science (e.g., blatant misconduct) to society can lead to the erosion of public trust in and support for science (Byrne 2019). Furthermore, frequent public exposure of high-profile cases of retraction may cause moral panics (Goode and Ben-Yehuda 2009) and exert pressure on research organisations to “create and impose control mechanisms that may stifle the creativity and initiative of researchers” (Ben-Yehuda and Oliver-Lumerman 2017: 193). Such developments could catch the academic community in a double bind: “a diminishing trust in research and researchers, and … an increasing number of rules, regulations, control mechanisms, and bureaucratic organizations or units whose main function will be to monitor research for potential fraud” (Ben-Yehuda and Oliver-Lumerman 2017: 194). Control of this nature can undermine the academic community’s self-governance over research behaviors, protection of academic freedom, and innovative scientific research (Resnik 2019). Thus, journal authorities’ vehement reactions to retraction may, in the long run, victimize researchers who observe codes of ethics in their research and publishing activities. Such an undesirable spill-over effect of an unrestricted use of retraction stigma power would be the last thing that both journal authorities and researchers in general would like to see.

Last but not least, the sociocultural context of retraction may have an impact on whether and to what extent retraction is stigmatized and retraction stigma power is utilised. According to Dijker and Koomen’s (2007) theory of deviance, there are different response options for a deviant condition, and responses to deviance “may vary from relatively harsh punishment, to ‘softer’ treatment such as forgiveness or nurturance, healing, or therapy, to doing nothing about it or tolerance” (as cited in Dijker 2013: 22). They identify cultural and historical influences on the employment of three types of response (i.e., stigmatization, repair, and tolerance with unintended stigmatization) to control deviance socially. They suggest that stigmatization is more likely to be adopted in hierarchical, collectivistic, moderately complex societies (e.g., European Middle Ages and current developing countries), whereas repair and tolerance are more likely to take place in egalitarian, collectivistic, and simple societies (e.g., small groups of egalitarian hunter-gatherers) and egalitarian, individualistic, and highly complex societies (e.g., modern Western societies), respectively. Whether Dijker and Koomen’s postulation of the relationship between the nature of a society concerned and the preferred response type is applicable to the stigmatization of retraction is a hypothesis that warrants empirical research in the future. It would be interesting to see if journal authorities based and operating in Western societies would respond to retraction-engendering behaviors in research and publication differently from their counterparts in Eastern societies.

When journal authorities and authors of retracted publications co-author retraction notices (Xu and Hu 2018), all the factors discussed above may influence their
use of retraction stigma power. To avoid conflicts and serve common interests, negotiations of the use of their retraction stigma power is highly likely to occur. One consideration in favor of such negotiations is that the main purpose of retraction is to correct the literature rather than punish misbehaving authors of retracted publications (COPE Council 2019). Another enabler of the “cooperation” between authors of retracted publications and journal authorities is the need for the former to reduce their retraction stigma and for the latter to mitigate their courtesy retraction stigma. Such reduction and mitigation can be achieved through the linguistic and rhetorical realisation of retraction notices, such as obscuring the agents of retraction-engendering acts (Hu and Xu 2020) and/or downplaying the negative influence of the retracted research (Xu and Hu 2021).

Conclusion

In this paper, we have theorized retraction as stigma and expounded the conceptual apparatus of retraction stigma, including its seven core dimensions, functions at both behavioral and psychological levels, various targets and stakeholders, the communication of such stigma (mainly through retraction notices), and strategic use of retraction stigma power via retraction notices. We believe that our conceptualization offers a useful theoretical framework for future research on retraction and has good potential to extend our current understanding of the phenomenon of retraction. Accordingly, we propose three directions for further research that can be theoretically motivated by the conceptualization of retraction stigma.

First of all, further scholarly efforts are needed to expand our conceptualization of retraction stigma into a full-fledged theory. To this end, further research is needed on how retraction stigma is communicated via media other than retraction notices (e.g., scholarly publications on retraction research and non-academic coverage of retraction events) and how entities other than retraction notice authors exercise their retraction stigma power via media. Further theorizing of retraction stigma can also be facilitated by empirical research on the psychological and behavioral influences of retraction stigma on its various targets and stakeholders.

A second promising line of future empirical research concerns the stigmatizing force of retraction notices, whose findings can provide confirming (or disconfirming) evidence for the conceptualization of retraction stigma. For instance, future studies can identify what content cues and management strategies are used in retraction notices to influence their stigmatizing force and how those content cues and management strategies are realized linguistically and rhetorically. Researchers can further investigate how the stigmatizing force of retraction notices is perceived by different groups of retraction notice readers. In this regard, one of the hypotheses worth testing is that different stakeholders of retraction stigma will perceive the stigmatizing force of the same retraction notices differently. Also needed are experimental reception studies that examine whether the use of different content cues, management strategies, and linguistic resources has an impact on readers’ perceptions of the stigmatizing force of retraction notices.
A third direction that future research can take is the identification and exploration of contextual factors that may influence the use of retraction stigma power. Research can be conducted to verify whether the contextual factors we have discussed in this paper can indeed mediate retraction notice authors’ use of retraction stigma power and to identify potential influencing factors that are not discussed in this paper. It is also of theoretical interest to map out contextual factors that can influence the use of retraction stigma power by entities other than retraction notice authors. To conclude, the conceptual framework we advance in this paper provides fertile ground for the generation of research hypotheses that are well positioned to substantiate a principled explanation of the sociology and psychology of retraction.

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