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Reputation laundering and museum collections: patterns, priorities, provenance, and hidden crime

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ABSTRACT

Provenance research in museums has traditionally been reactive and focused on singular objects with dubious histories, such as colonial-era acquisitions, Nazi-looted art, and objects with active ownership claims; the 'crimes' we expect to see. But what if what we think we know prevents us from seeing the bigger picture within and across museum collections? We argue that a machine-learning approach to provenance could allow the detection of broader patterns of unethical or even criminal behaviour that are embedded in the relationships underpinning museum collections. To demonstrate the potential of a machine-learning approach, we present a computer-assisted model that predicts plausible patterns and connections, 'leads' or 'hot tips', derived from a dataset of unstructured texts concerning the antiquities trade. Preliminary results have revealed what may have been a multi-decade scheme involving the donation of low-value Latin American antiquities to museums as a form of 'reputation laundering' potentially in advance of criminal fraud. We believe that such patterns could not be identified by an approach to museum provenance that is restricted to known problems within individual institution, demonstrating the need for innovative provenance tools and approaches that consider the complex networks within which museum objects exist.

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Introduction

Provenance research in museums has focused on '*reacting* . . . to guidelines and accusations' (Fuhrmeister and Hopp 2019, emphasis in the original). Typically, it is conducted in response to identified issues with individual objects or distinct collections. Objects with suspected collecting histories that involve colonial domination, looting, Nazi confiscation, or forced sales, particularly those objects that are the subject of active external ownership claims, naturally rise to the top of museums' provenance priority lists. Indeed, there are compelling arguments that these objects should be prioritised (Reed 2023).

Conducting provenance research on objects before a claim is made is often labelled as 'proactive', representing an ideal to which museums should aspire. However, we argue that there are risks in centring provenance efforts on objects that are likely to 'cause trouble'. Although it is clear that museum collections contain evidence of crimes, these crimes may not always align with our expectations. To only seek out evidence of known issues within museum collections, even when done proactively, could potentially slow or even impede the detection of problems within our collections that we are not yet aware of.

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The adoption of a more networked approach to provenance, which sees individual objects as well as people, institutions, etc. forming a complex social world of interactions, has been proposed (e.g. by Berger, n.d., and we are particularly excited by the proposed 'Art Worlds' approach of his upcoming Between Canon and Coincidence (BECACO) project) but never effectively implemented within a museum on a large scale. Many efforts of this type are based on the work of scholars who consider cultural artefacts, currently housed in diverse museums and away from their original locations, as parts of a connected, global network, using the metaphor of a diaspora. (e.g. The Follow the Pots Project, followthepotsproject.org; The Persepolis Diaspora Project, (Allen 2013a, 2013b). These trans-collection approaches are inspired and important, but they are largely external to museum-based approaches to provenance research. We find much existing museum practice around provenance research to be insular and often limited.

We believe the failure to implement a truly networked approach to museum provenance research stems from practical barriers: the difficulties in sharing data across institutions, the paucity of approachable tools available for provenance researchers interested in networks, and, to return to our initial observation, a feeling that a networked approach will not address the existing known/immediate provenance priorities of institutions. In other words, a networked approach to provenance runs counter to the prevailing object-centred approach; is seen as difficult and expensive to accomplish; and it is unclear how it will advance a response to the known priority issues related to the collection histories of singular objects that museums have to deal with.

Yet we must belabour our point. We know that a painting with a cloudy European art market history during the 1930s or 1940s is potentially problematic. We know that Greek-style pottery purchased from a handful of dealers in the 1970s, 1980s, and 1990s will likely result in a call from the Italian Carabinieri sooner rather than later. We know that collections amassed during periods of domination and control will eventually be challenged. These are important problems which the field's linear, singular object provenance approach can address in many circumstances. They are museum priorities, but these priorities and the issues that museums recognise within their collections are set by what we already know and by what we expect to see. There is circularity at play. We don't know what we don't know, and important patterns may be lurking below the surface within the complicated, transnational human/object/institution networks that created these collections in the first place. We believe these patterns are important to understanding the myriad meanings of museum objects. We also believe that some of the patterns are sinister and problematic, reflecting forms of unethical or even criminal behaviour that museum and academic communities have not effectively observed, documented, or addressed.

How can we break free? In this paper we discuss the results of a method that helps us reframe our perspective on what we already know (Lincoln 2015), and to begin to explore important provenance issues that we do not expect. This enables us to argue, first, that the knowledge that is hidden within the provenance histories of multiple museum objects across multiple institutions can provide us with information about forms of crime that we do not expect and are not actively looking for. In particular this includes crimes where object-museum interactions were, themselves, not criminal, but the interactions were crucial to the modus operandi of a criminal towards committing fraud, tax evasion, etc. We assert that an object in a museum's collection may not, itself, be illegal, at least not in any provable way,[1] but could be a key element in the committing of other crimes. Second, we argue that if we focus our provenance efforts only on singular objects with expected problems, we will overlook important patterns of crime that are invisible to a non-networked approach where particular assumptions have already been made. Finally, we argue that provenance researchers and museums need to find effective ways to reset focus and challenge priorities to move beyond locating what we expect to see in our collections.

To support these arguments, we present a computer-assisted model for suggesting plausible patterns and connections within the network of relationships that make up, in this case, the past and present transnational trade in antiquities. This model is able to take unstructured and narrative text (like the text that might exist within a collections database or in provenance records) and predict

probable relationships between people, institutions, and other entities named in the text. These relationships are not explicitly present within the source texts, but they represent likely connections based on the patterns present within the dataset as a whole (Graham et al. 2023; Graham, Yates, and El-Roby 2023).

We then present preliminary results stemming from our research into one of the possible connections that our model suggested. This research has produced evidence of what we believe may be a multi-decade reputation laundering scheme that involved the donation of otherwise nondescript low-value Latin American antiquities to major museums in at least three countries seemingly in advance of criminal fraud. With minimal time, person power, or financial commitment on our part, and with a surprisingly small experimental data set, our model was able to extrapolate from patterns within the data we already had (our own Trafficking Culture encyclopaedia articles), to suggest patterns that we should look for in other data sources (provenance records).

We believe that the possible crime pattern we present here would not have come to light through the object-focused, reactive approach to provenance that museums currently employ. Indeed, that this particular set of behaviours appears to have not been previously detected rather proves our point. The objects in our case are in six museums (so far) on three continents and have been in their respective collections for between 39 and 55 years at the time of writing. Yet they have, to our knowledge, never been considered together as a whole despite at times being individually questioned within their respective institutions. Our model encourages a holistic view of emergent patterns that might not otherwise be recognised as significant.

The apparent success of our model in suggesting interesting provenance research lines is important because it suggests that reliance on our existing priorities may result in missed opportunities to detect and halt crime. Provenance research focused on individual objects histories from the perspective of individual institutions and institutionally bounded collections will inherently miss the wider networks, broader contexts, and the meanings of those networks/contexts that these objects exist within. We must explore the rich worlds these objects are embedded within. Only then can we begin to approach the complexity of human-object relationships and the complexity of our museum collections.

Our problem, our approach

Problem

We study crime related to cultural objects employing, respectively, criminological (Brodie and Yates 2022; Brodie et al. 2022; Mackenzie and Yates 2016a; Mackenzie and Yates 2016b; Mackenzie, Brodie, and Yates 2019; Palombo and Yates 2023; Yates 2014; Yates and Bērziņa 2023; Yates and Brodie 2023; Yates, Bērziņa, and Wright 2022) and digital humanities (Davidson, Shawn, and Damien 2021; Graham and Huffer 2020; Graham et al. 2020; Graham, Huffer, and Blackadar 2020; Graham, Huffer, and Simons 2022; Huffer and Graham 2017, 2018, 2023; Huffer, Guerreiro, and Graham 2021; Huffer, Wood, and Graham 2019) toolkits. Over our respective decades of work in this field, we have noticed that both our own research and the research of others tends to focus on particular forms of criminality or illicit behaviour, usually related to the looting, trafficking, and purchasing of objects of illegal, murky, or otherwise questionable provenance. This is an object-focused idea of crime trajectory that is concerned primarily on what could be broadly considered crimes related to property and to the repatriation or restitution of that property to its rightful owners.

Research in this vein has produced a wealth of knowledge about the types of crime we expect, the connections we expect, and the people and institutions that we expect within what are the traditionally constructed linear histories of the objects in question. This approach dovetails with

the prevailing museum approach to provenance research that we discussed in our introduction: object focused, reactive, and focused on addressing known issues concerning important pieces. In a museum reality characterised by endemic underfunding, perhaps this seems logical.

Yet researchers in this field have only a limited view of the structure and nature of historic or recent crime related to museum collections. This is particularly the case when museum objects have been used as means to commit a crime rather than as the target of crime. Little is known about how museums, objects, and collections have contributed to such important and disturbing activities as fraud schemes, tax evasion and manipulation, money laundering, etc, but there is strong evidence that these contributions do exist (e.g. see Yates 2015).

We believe that the collections data housed in museums may provide important clues about the nature of this type of criminality. However, we do not think such clues will be detected within a provenance approach based on current priorities. We, the authors, have come to believe that we are stuck investigating familiar patterns, familiar relationships, and familiar object pathways, towards detecting familiar crimes. We wanted to develop a way to transcend what we already know (and what we think we know), so that we can consider other possibilities.

To put this in popular law enforcement terms straight from television, we sought to develop a way to generate good 'tips' or 'leads' about crime possibilities in museum collections that we can follow up on via specialist investigative skills. We wanted these leads to be the data equivalent of an unexpected but trustworthy informant coming through the door of a police station and saying 'Psst, check out this person's relationship with that museum'. The nature of the relationship is unknown to the police and the possibility of crime may not be something the police ever considered, however its worth following up.

Such a method for generating fresh research possibilities would require certain features to be useful. First, *the method must rely on what we already know and understand*. The collection of new data is expensive and time consuming, and there is little utility in trying to predict what data would best display relationships that we do not know about. A wealth of data about the art and antiquities market, collecting, and museums is publicly available and ready for use.

Second, *the method must produce better than random results*. If wacky scenarios were useful, pulling names out of a hat to produce random research leads would suffice, but these would not provide good leads. The method must make predictions based on existing knowledge so we can concentrate our limited time and resources on investigating relationships that are possible and probable.

Third, *the method must not be limited to or by existing provenance research priorities*. Such a limitation defeats the purpose of the tool.

Finally, *the method must lead to lines of research that have not been previously explored*, including research lines that we could have but never would have generated ourselves without assistance.

The following section outlines what we came up with. We are about to get technical for a moment so please do bear with us, the results are coming.

Method: the new organigram project

The 'New Organigram Project' takes its name from the famous 'organigram' depicted the various connections in Italian 'cordata' tying the antiquities trade in that country into an international network of dealers, intermediaries, collectors, and museums (Watson and Todeschini 2007, 16–18). The idea behind our approach is that we can take statements of what we know to be true about the antiquities trade and knit these together into a network (also known as a 'knowledge graph'). Then, we can use a technique from machine learning and data science to create a 'knowledge graph embedding model'. This means that the machine takes the statements of knowledge and their interconnections and turns these statements into numerical arrays or vectors. These vectors represent different locations and directions in a multi-dimensional space.[2] Once this is done, we can then ask the computer to create *new* statements using the people, places, organisations, objects,

and relationships that it knows. It then takes the vectors for these new statements and locates them against those for true statements, where proximity in the multidimensional vector space gives an indication of the likelihood that the new statement is true. We then examine the new statements that carry the highest probability from our perspective as domain experts. We find it helpful to think of these new statements as 'leads' or 'tips' that help us redirect our attention. Our method is published in full technical detail in Graham et al. (2023) and Graham, Yates, and El-Roby (2023).

The quality of the original 'knowledge' is a key element of this process. To produce the lead that we discuss in this article, we used 129 of the 'encyclopedia' articles from the Trafficking Culture project website: a collection of academically researched case studies related to antiquities trafficking.[3] Many of the encyclopaedia entries were authored by and all were edited by Yates, so the data set certainly represents *our* (the authors') existing knowledge. Our students manually annotated each article for person, place, organisation, objects, and relationships. These statements constitute the 'knowledge graph' for the articles: a network representing a kind of super-condensed distillation of what we know to be true. This knowledge graph is turned into an embedding model using the Ampligraph Python library, a body of algorithms for this kind of research.[4] Since carrying out our initial experiments we have developed a method for using so-called 'large language models', a form of artificial intelligence, to automate the manual first step in our process. This represents an enormous acceleration of both the scope and quantity of information we can work with (see Graham, Yates, and El-Roby 2023).

Once the embedding model is created, we use the Ampligraph algorithms to visualise the locations of entities in this space (reducing the complexity to two or three dimensions) to start generating 'hypothesis' by recombining the various entities and relationships. By measuring where these new statements fall in the multidimensional space of the model compared to the known 'true' statements we initially fed it, the model can return likely true statements for a given probability. We do not treat the results as *actually* being true until we can confirm them. Some of the statements are so obviously true that they are of no use to us. Some statements are so unlikely that anyone with knowledge of this domain can discard them. What is left are the interesting possible relationships that we did not previously know about but cannot immediately rule out. We look at those statements and use our expert judgement to decide which ones to investigate further.

Our method is an excellent tool for what in the digital humanities is sometimes called 'deformation': taking what we know (or think we know) and providing a new way of looking at the issue that strips away the familiar landmarks and, perhaps, familiar assumptions (see Ramsay 2011; Sample 2012; Samuels and McGann 1999). But did it generate good leads to follow? We believe so.

As we report in Graham et al (2023), our model accurately suggested connections that we knew about but that were not directly reflected in the source material. For example, it suggested that two dealers had a business relationship that we knew about from prior research, but that relationship was not mentioned in the Trafficking Culture encyclopaedia. We consider these to be indicators that the model's results are better than random.[5] Satisfied that it was producing good results, we asked the model to suggest a connection to investigate that we had no prior knowledge about. We then used traditional open source and provenance research methods to investigate the possibility. The following is the preliminary results of an intriguing research line that stemmed from asking a model trained on what we know to suggest a connection, a reasonable lead, that we did not know about beforehand.

The lead: a dodgy dealer

The model suggested we look at a possible connection between the Brooklyn Museum and Latin American antiquities dealer Leonardo Patterson. This was the first 'good lead' that we investigated, a lead which turned our research agenda upside down because of the rich and interesting information that flowed from just this one tip. We have been fully occupied with this tip for the past few months, so we have not yet begun to investigate *all the others*. The research in this section remains

a work in progress, however we are far enough along to report our initial findings, particularly within the context of displaying the utility of our method and the need to rethink provenance research priorities.

Leonardo Patterson, a likely suspect

Leonardo Patterson is a Costa Rican-born dealer in Latin American antiquities who was approximately 80 years old at the time of writing. From the 1960s into the 1980s, Patterson was based in New York and Mexico City, with a stint in Australia and perhaps other countries. By the 1990s and beyond Patterson was mostly based in Europe, particularly in Munich with some presence in Spain. He is now infamous for his decade-long career selling real antiquities from Central and South America, as well as offering some audacious fakes (Kelker and Olsen Bruhns 2009; Mashberg 2015). This has led to multiple criminal convictions in several countries, criminal charges in other countries, and civil judgements in still more countries.

Until his most recent conviction in Germany in 2015 Patterson had a unique ability to weather any setback and continue dealing antiquities and fakes around the world. Over the span of five decades an unknown number of suspicious objects linked to Patterson have entered private and public collections. Numerous legal actions over the same period failed to stop his criminal enterprises, not all of which were focused on antiquities trafficking or faking. Patterson often seemed to have more money than he should, coupled with periods of financial distress that are visible within the now-public records of other antiquities dealerships.[6] Taking this all into account, Leonardo Patterson seems like the type of person who might engage in forms of crime beyond antiquities trafficking, and, indeed, we know that he did. More information about the forms and patterns of that crime could help us to understand Patterson's modus operandi and could reveal points of weakness within our museums that could be manipulated by criminals.

The Brooklyn Museum, also a likely subject

In this case, the model suggested that we consider a relationships Leonardo Patterson and the Brooklyn Museum. Despite our long-standing research interest in Patterson, this is not a connection that we had ever considered. Recall that out method does not replace expertise. Some of the possible leads generated by our model were so unlikely that they did not warrant further consideration[7]; following up on them would be a waste of time. Significant specialist knowledge from a human researcher is needed to tell if a lead generated by the model is worth investigating. Based on our specialist knowledge in the area, this lead seemed reasonable.

The Brooklyn Museum is located in New York, and we knew that Leonardo Patterson operated out of New York at various points in his career, a geographic congruence that makes a connection more plausible. We knew that the Brooklyn Museum has a complicated history with looted and trafficked antiquities from Latin America: exactly the sort of material that Patterson traded in. This is epitomised by their 1964 purchase and 1972 return of looted and trafficked portions of a Maya stela from the Guatemalan site of Piedras Negras (Coggins 1969; Knox 1972). Even though Patterson was not the source of the stela, the museum's purchase indicated its lack of concern for the origin and legitimacy of such objects at the time. Given those facts we decided this was a worthwhile tip to investigate.

After spending less than four minutes searching on the Brooklyn Museum's collections database, we found a connection. A keyword search for 'Leonardo Patterson' showed that the Brooklyn Museum houses two low-value[8] Mexican-style[9] objects with a Patterson provenance: a ceramic whistle shaped like a dog (69.170.1) and a small figurine (69.170.2) (see Figure 1a and b). A review of the Brooklyn Museum's published records confirm that the two objects were accessioned in 1969 (The Brooklyn Museum 1969, 82–83).

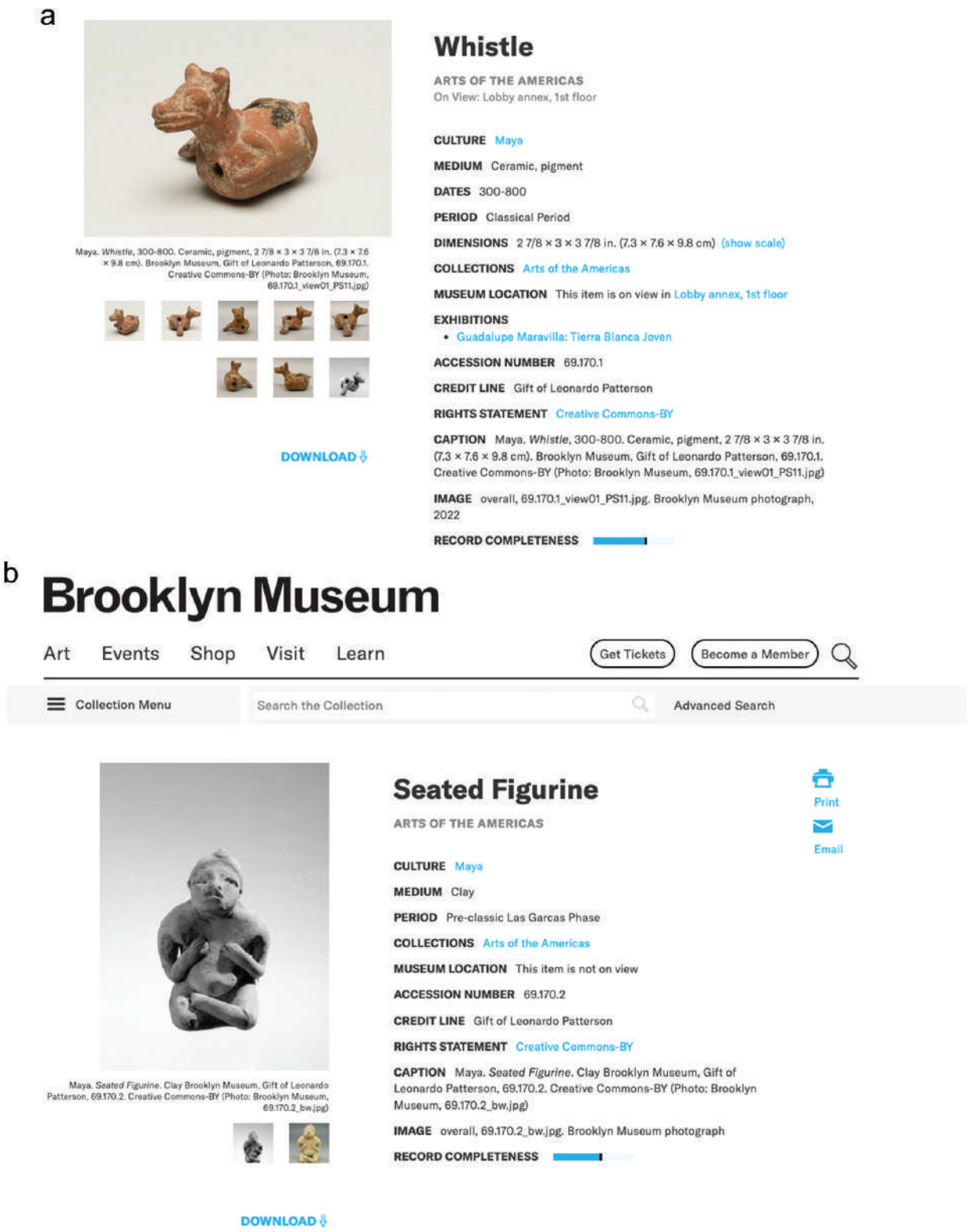

Figure 1. a and b: Patterson's donations to the Brooklyn Museum. Screenshot of the museum's digital catalogue taken by Yates, 7 July 2022.

In the summer of 2022, we contacted the Brooklyn Museum about these objects, asking if they happened to have any further information about their past dealings with Patterson. Representatives replied to say that by coincidence they had recently flagged the two objects as worthy of more scrutiny due to their Patterson connection as one of the pieces had recently appeared in a special exhibition.[10] They said that investigating the pieces further was a low priority for the museum but

suggested that our email may be enough impetus to move the objects up the list. At the time we contacted them they did not have any information about the Museum's relationship with Patterson.

It appears as if the model's link prediction worked: it suggested a hypothesis about the existence of a connection, and we used that hypothesis to guide further research. Our query may have prompted the Brooklyn Museum to conduct provenance research within the museum's existing priority structures; our email converted two objects with a known problem into a priority case. However, to end our investigation and discussion here would mean, once again, potentially missing our chance to uncover the hidden evidence of crime within a networked concept of provenance across museum collections.

In the next section we present where our lead took us when we followed it beyond the walls of one museum.

A pattern within a network of museum donations

We believe that we now have strong evidence that certain dealers in Latin American antiquities were engaging in 'reputation laundering' by strategically donating minor objects to major museums. They would then borrow on the museums' legitimacy to increase their own reputations in advance of private sales and, in some cases, as a foundation for transnational crime. By engaging in reputation laundering, these dealers manipulated the public perception of their credibility and integrity. This, at times, facilitated criminal activities and involved the museums in their schemes without the museums' knowledge or consent.

A pattern of small objects and small donations

Once we followed the model's lead to the two Patterson objects in the Brooklyn Museum we noticed something interesting. Patterson did not *sell* the museum these two low-value, relatively insignificant objects. They are listed in the museum catalogue and records as 'Gift of Leonardo Patterson'. The pieces were *donations*. This is important.

Patterson as a donor rather than a dealer raised suspicion for us because, at the time, the only other Patterson donation that we knew about was a tax manipulation scheme that abused a loophole in Australia's Cultural Gifts programme (see Yates 2015 for a full discussion of the scheme). Following a change in the law in 1978, Patterson arranged a 1979 donation to the National Gallery of Victoria (NGV) that took advantage of holes in Australia's tax relief policy for gifts to museums. He imported over 200 Mexican-style antiquities into Australia and sold them to a group of investors for $AUS 1.2 million (see Figures 2a and 2b). The investors then had the pieces valued at $AUS 3.7 million via a valuer supplied by Patterson, and immediately donated the pieces to the NGV for inflated tax relief.

This scheme did not break the law, which at the time did not require independent and certified valuations, but certainly contravened the law's intent. Australia gave out much more tax relief than it received in donated object value, and a group of wealthy individuals were able to use a trusted institution to avoid their tax obligations. This activity is inherently subversive: it undermines public trust in public institutions, in this case both the tax authority and the museum. The only thing that Australia could do at the time was close the loophole that Patterson had exploited as soon as it was exposed.

Moving back to our case, we considered the idea of Patterson donating anything to any museum as worthy of investigation. The oblique glimpse into Patterson's complicated finances and legal trouble through another dealer's records only piqued our curiosity further. We began to wonder if Patterson's donations of low-value Latin American-style antiquities to museums might represent a more complicated pattern of potential manipulation or crime that is not visible from the vantage point of a single object or museum.

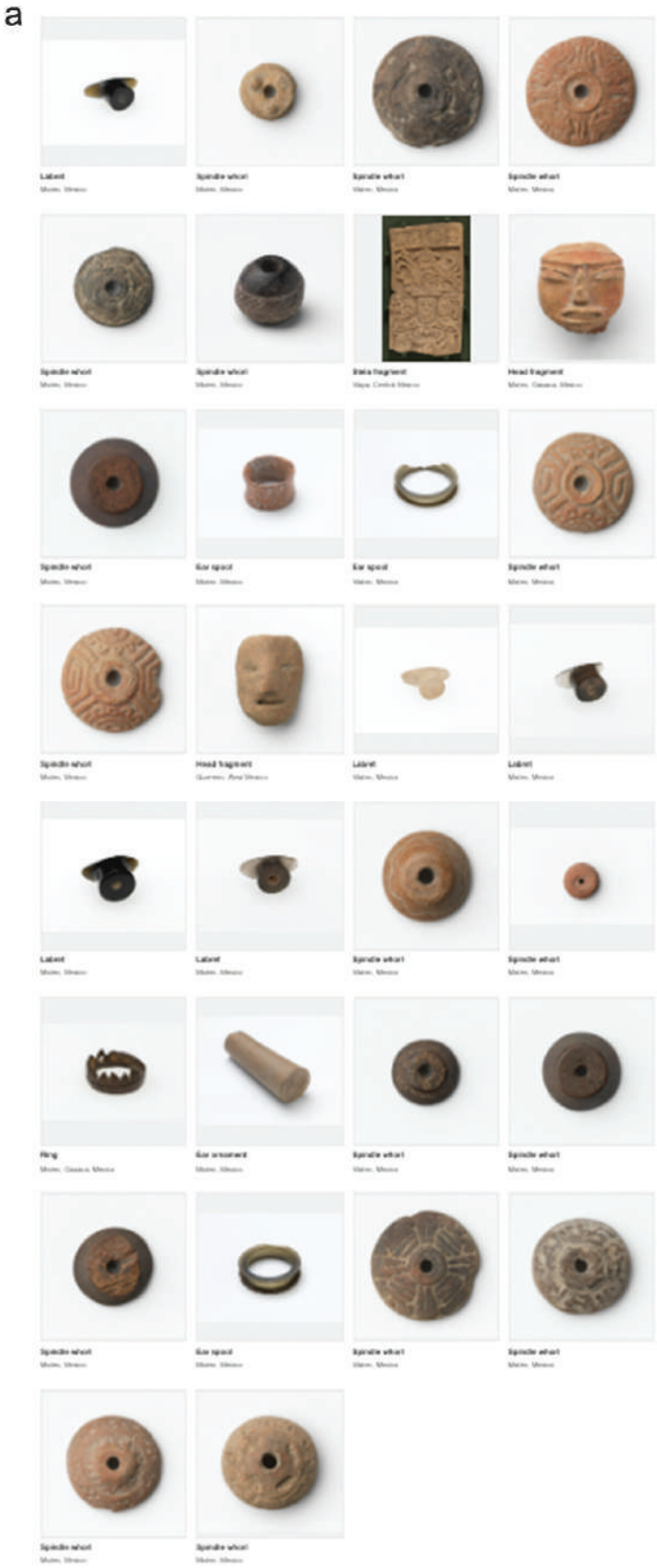

Figure 2a. a and b: some of the low-value items that were part Patterson's NGV donation scheme. Screen shot taken of the NGV collections database by Yates, 21 July 2023.

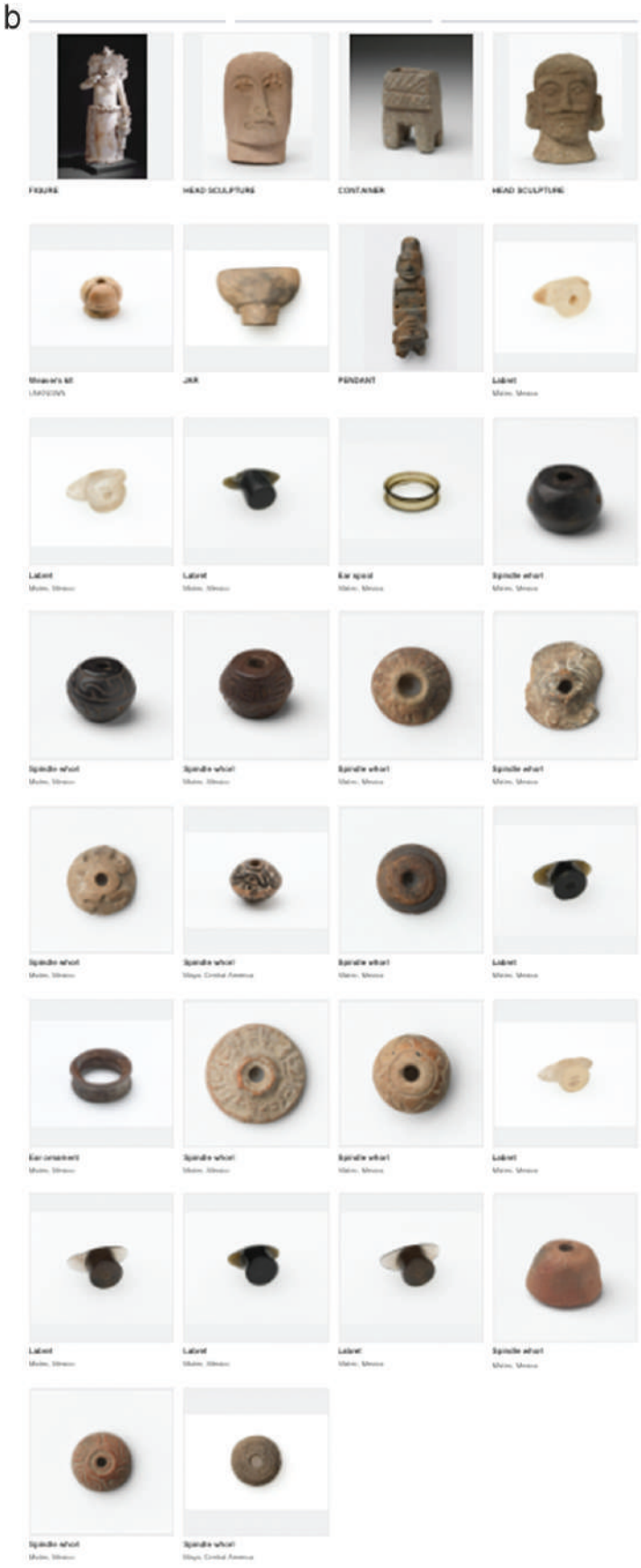

Figure 2b. (Continued)

Table 1. Objects donated to museums by Leonardo Patterson; our list as of mid 2023.

Donation Year	Museum	Accession/ Catalogue Number	Description	URL
1968	National Museum of the American Indian	Unknown	"one fragmentary item from El Salvador"	This item is not currently on the museum's online database but was confirmed in response to our query.
1968	American Museum of Natural History	30.3/1098 A and B	Fragmentary earspools listed as Costa Rican	Unavailable at the time of writing, collections database undergoing extended systems maintenance.
1969	American Museum of Natural History	30.2/1256	Vase listed as from El Salvador	Unavailable at the time of writing, collections database undergoing extended systems maintenance.
1969	Brooklyn Museum	69.17.01	Ceramic whistle shaped like a dog	https://www.brooklynmuseum.org/opencollection/objects/95988
1969	Brooklyn Museum	69.17.02	Seated figure listed as Pre-classic	https://www.brooklynmuseum.org/opencollection/objects/95989
1978	Minneapolis Institute of Art	78.32	Figurine head listed as Olmec	https://collections.artsmia.org/art/21958/head-olmec
1978	Minneapolis Institute of Art	78.86	Seated figurine listed as Olmec	https://collections.artsmia.org/art/21918/seated-figure-with-flaming-eyebrows-olmec
1979	National Gallery of Australia	79.794	Whistle/ocarina in the shape of a human head	Although recorded in the museum's annual for 1979 (National Gallery of Australia 1979), the museum says the object has been unlocated since 1980/81 and may have never been received
1980	National Gallery of Australia[12]	80.4322	A vase with flying fox feet	Not on the museum's online database, presence confirmed by representatives of the museum
1980	National Gallery of Australia	80.875.A–D	A group of pendants	Not on the museum's online database, presence confirmed by representatives of the museum
1981	Minneapolis Institute of Art[13]	81.62	Small figurine listed as Jalisco	https://collections.artsmia.org/art/22948/figure-jalisco
1984	British Museum	Am1984,06.1	Inlaid human teeth listed as from Chiapas	https://www.britishmuseum.org/collection/object/E_Am1984-06-1

To explore this suspicion, our next step was to see if we could locate Patterson donations within other museums. That proved to be easy once we knew that we should be looking. To date we have located Patterson donations in six museums in three countries and spanning three decades (see Table 1).[11]

Our search for Patterson donations is limited to museums with easily navigable, fairly complete, and publicly available collections databases, particularly those that are indexed by Google. Our list excludes any object that was donated by Patterson in the past 60 years but has since been deaccessioned by the recipient museum, a likely scenario given Patterson's reputation for flogging fakes. Patterson also moved to Europe several decades ago and continued his dodgy dealings there, as evidenced by his prosecution in Spain and criminal conviction in Germany. We have not yet searched continental European collections for Patterson donations. We suspect our list is incomplete and that there are other Patterson donations out there.

The break in the case: human teeth

What was going on with these donations? The response we got when we queried the human teeth in the British Museum (BM) provided us with a break in the case that we needed to begin answering that question.

The BM's collections database records that in 1984 Patterson donated six 'Inlaid [human] teeth made of teeth, jade, plaster' said to be from the Mexican state of Chiapas.

In response to our query, the museum told us that they have minimal documentation related to the teeth, but what they did have was intriguing. They informed us that the teeth were reported as a donation to the May 1984 meeting of the Museum trustees and that a pro forma 'letter of thanks' was sent by the museum to Patterson to acknowledge his donation. This letter was returned unopened to the museum a few weeks after it was sent with a red cross through Patterson's name and a stamp indicating he was not residing at the address he provided. Several museum employees then wrote notes on the returned envelope expressing doubt about the credibility of a donor who supplied a false address.

Although the BM did not know where Patterson was in the spring and summer of 1984, we do. On 21 May 1984, the same month that his donation was presented to the museum's trustees, Patterson was arrested in the United States on federal wire fraud charges (Elias 1984; United Press International 1984). These charges related to Patterson's attempts to sell fake ancient Maya murals in the United States, and he was found guilty and sentenced to probation. Presumably, the letter thanking him for his donation to the British Museum arrived while he was a guest of the American penal system.

We believe that Patterson may have donated the human teeth to the British Museum to gain that letter. Had Patterson not been picked up by United States authorities, the letter would have served as a tangible token of his legitimacy to potential buyers of the fake Maya murals; it would have increased his apparent bona fides. If a top-tier museum was willing (even thankful) to accept a piece from Patterson, it might have quieted the concerns of a doubtful buyer to seal the deal. That would mean the UK-based British Museum donation was one element in a transnational scheme to defraud in the US and possibly Switzerland.[14]

We do not believe that the British Museum donation is unique. We believe that Patterson would have received similar pro-forma acknowledgements or receipts for his small gifts to other museums and we know that these gifts were publicly acknowledged in the museums' annuals (e.g. in The Brooklyn Museum 1969; National Gallery of Australia 1979), which Patterson had access to copies of. What we do not know (yet) is what other legitimate and illegitimate activities those donations correspond to. It is tempting to, for example, see Patterson's 1978 donation to the Minneapolis Institute of Art as a move to increase his legitimacy in advance of the very profitable donation scheme in Australia a year later, but we cannot yet confirm this. Much more highly networked, transnational provenance research is needed. What we can say is that a pattern is emerging of a criminal antiquities dealer engaging in reputation laundering on a global scale via museums.

Reputation laundering through museums

As Becker notes, 'museums provide the highest form of validation for an artwork [. . .]. Nothing makes it more important' (Becker 1982, 117). Museums also provide the highest form of validation for dealers, affirming their position of suppliers of the best of the best objects (museum quality objects) to the most discerning of collectors (museums themselves). Having 'placed' objects, even low-value items, in important museums would make Patterson appear legitimate in the broader marketplace.

In 1996 Williams and Savona (1996, 166) briefly defined reputation laundering as 'the process of acquiring respectability in a new environment', portraying it as an as an aspect of transnational crime, money laundering, and the use of the proceeds of crime. Recently the term has entered broader use to mean the deliberate manipulation of public perception by individuals or organisations, often through strategic philanthropy, with the aim to improve their societal standing following misconduct or scandal. We see Patterson's donations as sitting between these two ideas, with museum donations helping him to both gain respectability as he moved to new sites and victims, and to distract from his prior misdeeds. Reputation laundering specifically via museum donations is not a surprise. It is something that we believe dealers have done in the past and present, and numerous art market actors have casually confirmed to us that this practice exists.

We present here a relatively unique situation where we have strong evidence that seems to connect a reputation laundering museum donation (the teeth) to the crime that the donation was meant to facilitate (the fraudulent sale of fake murals). This represents the first time to our knowledge that likely reputation laundering via museums in advance of crime has been detected from the object network up. By using the knowledge graph embedding model, we may be able to predict and identify other cases of reputation laundering within a networked view of collections. We also may be able to connect them to the crimes they facilitated.

We are not asserting that all or even most dealers who donate to museums are involved in any illegal or unethical activities. It makes good business sense to engage in actions that bolster one's reputation as part of legitimate business. Dealer donations only become suspicious when connected to a larger network of suspicious objects, activities, institutions, and transactions.

More leads, a complicated network, and implications

In early 2023, while we were seeking to speed up the method discussed above, we built a second model where the knowledge graph was made by automated means based on the same source texts, rather than by manually annotation (see Graham, Yates, and El-Roby 2023). This second model was significantly faster to produce and predicted the same major findings as the first, along with some new leads to follow. One of the new leads was a suggested link between Leonardo Patterson and the American Museum of Natural History (AMNH). Compared to the Patterson/Brooklyn Museum connection, this seemed less likely as the we could not immediately think of a direct AMNH connection to illicit antiquities from Latin America. However, due to the prior successes of our method we decided to check it out. Again, it took one simple search of the AMNH online collection database to find two small objects donated by Patterson in 1968 and in 1969,[15] the same year he donated to the Brooklyn Museum (Figure 3).

We had previously noticed that antiquities dealer Edward H. Merrin made a small donation of two low-value Latin American antiquities to the Brooklyn Museum in the same year as Patterson.[16] We knew that Merrin, who died in 2020, did not have a clean reputation, particularly related to his sales of Mediterranean antiquities: Italian prosecutors even alleged in court that Merrin was part of the Becchina smuggling ring (Gattinara 2006; Watson and Todeschini 2007). Also, Merrin was convicted in 2007 of fraudulently inflating the commissions he received for Latin American antiquities by overstating his acquisition costs. He was sentenced to a year of probation, eight months of home confinement, was ordered to pay a $20,000 fine, and to pay $44,455 to the victim (Grant 2005; Kaufmann 2008; Lufkin 2005). From the point of view of our model, Merrin's name came up in association with Patterson and the Brooklyn Museum in close proximity in the knowledge graph embedding space, increasing our feeling that a pattern was emerging.

Out of curiosity we searched the AMNH collections database for Merrin's name and, sure enough, Merrin made donations to that museum too during the same years as Patterson, 1968 and 1969.[17] We immediately noticed that many of the objects that Merrin donated to the AMNH are strikingly similar in subject and quality to the pieces that Patterson eventually donated to the National Gallery of Victoria in the tax avoidance scheme. (Figure 4a and b).

Following this find, we searched for Merrin's name in all of the museum collection databases where we found Patterson donations. Besides the Brooklyn Museum and the AMNH, we found Merrin donations in the National Museum of the American Indian[18] and the National Gallery of Australia.[19] We do not yet know why there are similarities in the donation habits of these two dealers. We have not yet found any direct correction between Merrin and Patterson although we feel a connection is likely.[20] Still we have the intriguing pattern of two New York-based dealers of Latin American antiquities, both with criminal

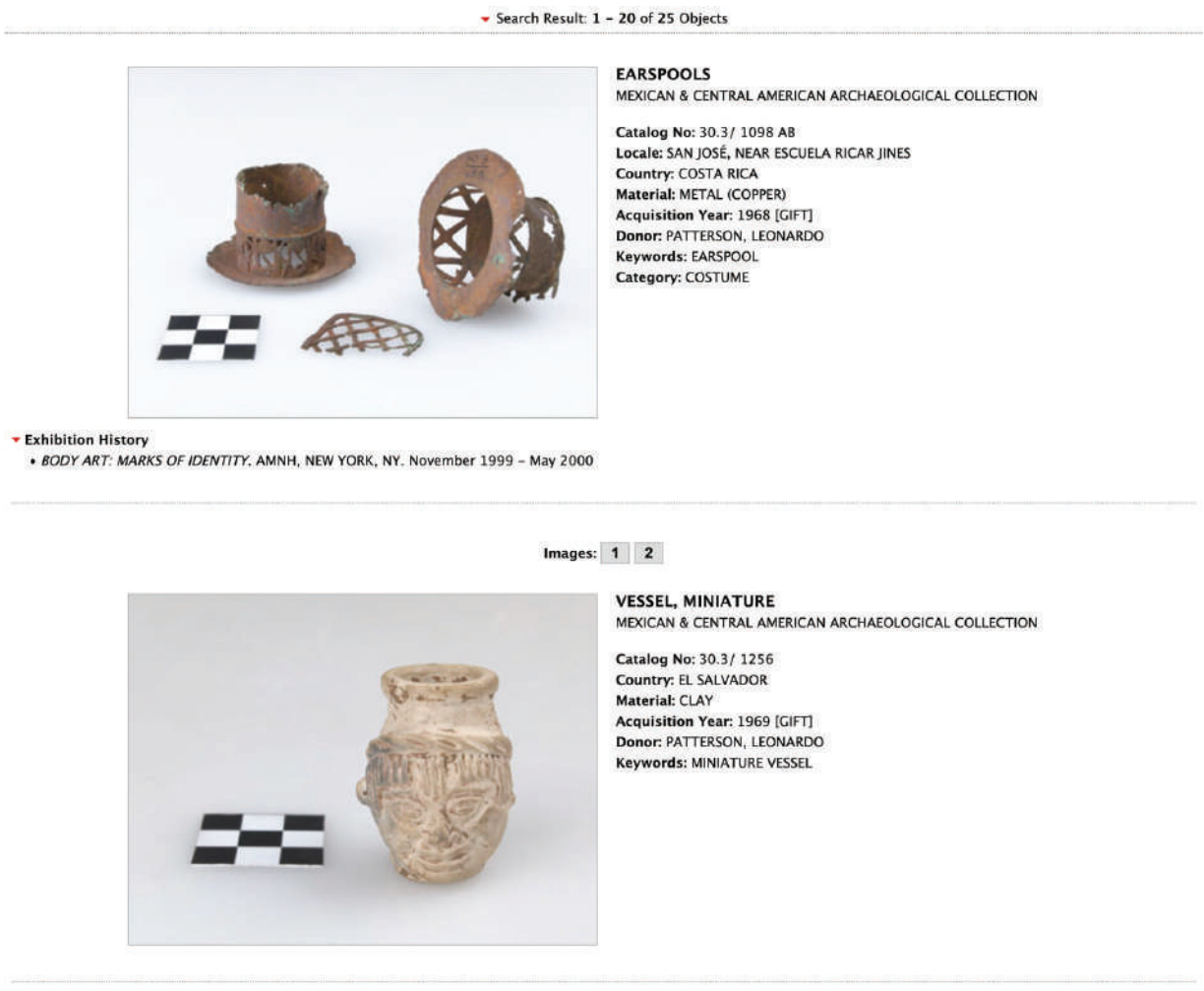

Figure 3. Patterson's donations to the AMNH. Screen shot taken of the AMNH online collections database by Yates on 23 February 2023.

fraud convictions, donating low-value objects to some of the same museums at the same time. The plot thickens. We have a lot of work to do to investigate this further.

Closing thoughts

To close this paper, we would like to address three questions that arise from this work.

Could we have come up with the same pattern of unexplained museum donations without the aid of the model?

Yes. All the information needed to detect the patterns we present here would have been easily findable by an interested specialist scholar. The key point is that it *wasn't*. In the over five decades since Patterson made the first donation that we have found so far, and despite the considerable spotlight on him, no one has noticed this. It was a matter of asking the right question, and a computer model inspired us to do so.

Provenance experts hold a vast and varied amount of qualitative knowledge about thousands of individual objects, actors, and cases. How we approach researching these cases is based on prior experience, with researchers looking 'for continuations of patterns they have already detected or expect, follow[ing] established pathways for question posing and evidence

Figure 4. a and b: above, three of the obsidian "labrets" from the Patterson objects in the NGV; below, two strikingly similar obsidian "ear plugs" among the Merrin donations to the AMNH. Screen shot taken of the NGV online collections database and of a pdf supplied by AMNH by Yates on 21 July 2023.

gathering, and ultimately creat[ing] a locally effective but limiting box for themselves' (Graham, Yates, and El-Roby 2023). Lincoln, 2015; 2017) calls this problem 'confabulation': 'differentiating what, in retrospect, sounds *reasonable*, from what we actually *already knew*'. We need to set aside what a researcher already knows, to step outside that box, and to develop new and meaningful leads to follow. The method we present, then, offers confabulating suggestions. As we noted previously, 'we do not claim that these suggestions *could not* have been noticed via other means available to researchers, but we argue that they probably *would not* have been noticed. This approach allows the researcher to look at existing knowledge in a different way, prompting the investigation of alternatives' (Graham, Yates, and El-Roby 2023).

Have we really learned anything actionable about Patterson's criminal activities?

Not in a legal sense. To borrow from another overused TV investigation trope: our tips have led to circumstantial evidence. By placing the fact that Patterson made multiple low value museum donations to prominent museums over the span of several decades within the context of both known criminal activities, the personalities involved, and our extensive knowledge of the reputational aspects of the art market, we end up with informed speculation. A careful review of existing court documents, accessible dealership records in archives, and existing correspondence within museum files may turn up irrefutable evidence that the donation of these items were used to enhance Patterson's credibility prior to criminal acts. We could also ask Patterson about this directly,[21] although prior experience indicates he is unlikely to give an answer. To use one last TV term, there is no smoking gun here, and further work is needed to link Patterson to new crimes or new forms of crime via these donations. Prior to this research, though, that such work was needed was unknown.

That said, our goal was not to find *actionable* data about crime, it was to find *meaningful* data about criminality within museum collections. We see meaning in the identification of a clear pathway to museum-supported criminality, evidenced by the currently circumstantial evidence but high likelihood that a convicted criminal has used that pathway. It opens the door for researchers and museums to take a more critical look at past patterns of donations across multiple institutions, for authorities and art market actors to consider the use of evidence of prior sale towards reputation building within this market, and more generally for us all to revisit the wider stories of seemingly minor objects within museum collections.

What does this mean for provenance research?

Our computational approach represents one way to partially set aside our existing expectations and priorities towards detecting new and important patterns within provenance data. It does not represent a sea change or a transformation of provenance research in and of itself. Rather it is one possible new approach to proactive provenance that serves the authors' interest in studying museum-related crime. There are certainly other approaches that serve to build a philosophy of provenance that considers patterns beyond objects, and possibilities beyond priorities. The transformation of provenance research comes when these approaches are developed, tested, implemented, evaluated, and shared. Clearly, we are not there yet, but even early forays into this field, as presented in this paper, provide fascinating enrichments of the social stories behind the objects in our museum collections.

In this paper we offered an interesting method for generating provenance research leads within and across museum collections. We also provided an initial report on what is shaping up to be a fascinating addition to our understanding of transnational crime related to cultural objects. We believe that the Patterson case demonstrates that there is evidence for a wider variety of crimes hiding within our museum collections than is usually recognised. Those crimes remain invisible if we imagine provenance to be formed of linear pathways, and single object biographies that end at the museum's doorstep. They also remain invisible when our concept of crime related to these objects is limited by what we expect to see.

Notes

1. We *do* believe that the objects we discuss here, at least the authentically ancient ones, were likely illegally looted and trafficked, yet for many reasons these crimes are unprovable within our current system.
2. As an example of 'vectors', consider the two-number vector [40.65, −73.95] which represents a location and direction in *physical* space, the latitude and longitude for Brooklyn, bearing north and west of the Equator and the Prime Meridian, a two-dimensional vector
3. https://traffickingculture.org/encyclopedia/

4. where it sometimes goes by the name 'link prediction'; we do not use that phrase here because it suggests formal network analysis, which this method is not.
5. The interested reader may consult or re-run our original code and data at https://doi.org/10.5281/zenodo.7506971
6. e.g., in the André Emmerich Gallery Records and André Emmerich Papers held in the Smithsonian Archives of American Art.
7. Only a small number of the leads were like this. These 'false leads' stem from the fact that the knowledge graph is not a complete representation of the world, and that proximity in the multidimensional space is necessary, but not sufficient.
8. In this article, 'low value' refers only to monetary value within the art market, it is not as a statement about cultural meaning.
9. We append '–style' onto the descriptors of these objects because we suspect some to be fakes and, as unprovenanced pieces, we do not believe listed places or cultures of origin should be treated as accurate.
10. Guadalupe Maravilla: Tierra Blanca Joven, 8 April–18 September 2022, https://www.brooklynmuseum.org/exhibitions/guadalupe_maravilla
11. We have not included the 1979 donation to the National Gallery of Victoria on this list because the objects were not donated in Patterson's name, and we know the end-goal of the donation was inflated tax relief. That does not mean the NGV donation is unconnected to the others. Prior Patterson donations may have made the Australia scheme possible by allowing Patterson to project himself as a reputable dealer with objects in reputable museums.
12. The National Gallery of Australia informed us that Patterson offered the museum several other items in 1979/1980 but the museum did not consider them to be of suitable quality for the collection.
13. The Minneapolis Institute of Art is the only institution that has not aided in our queries about Patterson donations, having not responded to our multiple emails.
14. Patterson was reportedly also trying to sell fake Maya murals in Switzerland at the time.
15. These are the earspools and vase presented in 1 previously.
16. We saw his donation of an Olmec-style bowl (69.169.1) and a Maya-style bowl (69.169.2) in the museum's 1970 annual (The Brooklyn Museum 1969) and then online (https://www.brooklynmuseum.org/opencollection/objects/95986 and https://www.brooklynmuseum.org/opencollection/objects/95987). Merrin appears to have made three other donations of low-value Latin American antiquities to the museum prior to that donation: 63.237, 67.208, 68.219.
17. In 1968: catalogue numbers 30.3/1146, 30.3/1147, 30.3/1148, 30.3/1149, 30.3/1150, 30.3/1151, 30.3/1152, 30.3/1153, 30.3/1154, 30.3/1155, 30.3/1215, 30.3/1216, 30.3/1217, 30.3/1218, 30.3/1219, 30.3/1220, 30.3/1223; in 1969: 30.3/1247, 330.3/1248, 330.3/1249, 330.3/1250, 330.3/1251, 330.3/1252. We note that 30.3/1154 and 30.3/1155, fresco fragments that we believe were looted from Teotihuacan, and 330.3/1252, a mutilated Maya stela, are significantly more valuable than the other items. Merrin also made donations in 1965: 30.3/1000, 30.3/1001, 30.3/1002, 30.3/1003; in 1966 30.2/1054, 30.2/1055, 30.2/1056, 30.2/1057; and in 1992: 30.3/2578, 30.3/2579, 30.3/2580.
18. 24/3347 and 24/3352 donated in 1970; the museum purchased a higher quality antiquity from Merrin that same year 24/3351. Perhaps the donations sweetened that deal.
19. A Peruvian textile donated in 1981, 81.1093; the museum purchased several other antiquities from Merrin in the years before and after this donation so, again, perhaps the donation was a deal sweetener.
20. Anyone who has information about a connection between the two: please get in contact with us.
21. In summer 2023 this research was presented at a conference of The German Association of Social and Cultural Anthropology held in Munich. Patterson was thought to be a Munich resident at that time, and the authors somewhat fancifully hoped that he might come to our keynote, part of a session on Mesoamerican cultural objects, so that we could discuss our findings with him. Sadly, he was not in attendance.

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Data availability statement

Our computational notebooks and our original knowledge graph CSV file are available at https://doi.org/10.5281/zenodo.7506971 and may be run using Jupyter on a personal computer, or online via Google's Colab service; for use on a personal computer, a GPU is recommended. Source code for our use of the OpenAI large language model to create a knowledge graph is available from: https://github.com/XLabCU/gpt3-relationship-extraction-to-kg; Archived source code at time of publication: https://doi.org/10.5281/zenodo.7860733 (Graham, Yates, and El-Roby 2023). In that latter repository, the original code for 'python_api.py' is copyright Sixing Huang released under the MIT License. Our additional code ('split_resize.sh') is released under the MIT No Attribution License.

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