Indigenous adornment in the circum-Caribbean: The production, use, and exchange of bodily ornaments through the lenses of the microscope

Falci, C.G.

1

Introduction

Bodily adornment was extremely varied and ubiquitous among the indigenous communities of the pre-colonial Caribbean, as noted in both ethnohistoric sources and archaeological collections (*e.g.*, Alegría 1995; Fewkes 1903; Las Casas 1992; Lóven 1935; Petitjean Roget 1963). Body modifications, body paint, hairstyles, tattooing, and the addition of objects to the surface of the body can be encompassed under this general category. However, when it comes to most Caribbean archaeological contexts, only a portion of this last group is commonly recovered. A range of non-perishable artefacts that would have been attached to bodies, such as beads, pendants, plaques, ear spools, and plugs, have been recovered from contexts associated to the Ceramic Age (400 BC – ca. AD 1500). At certain moments during this long time period, such artefacts have not only been produced and used in large numbers, but, most notably, have also been circulated across large distances (Boomert 1987; 2000; 2001a; 2001b; 2007; Cody 1993; Hofman et al. 2007; 2014; Laffoon et al. 2014; Martinón-Torres et al. 2012; Mol 2007; 2014; Narganes Storde 2005; Rodríguez 1993; Rodríguez Ramos 2010a; 2010b; 2011; 2013; Serrand and Cummings 2014; Watters 1997; Watters and Scaglion 1994). Ornaments exhumed from Caribbean archaeological sites are now incorporated in many collections and museum displays across the globe. In these new settings, individual beads are often assembled together with strings or glue in aesthetically pleasing compositions that are at least partially based on analogies with indigenous material culture from the lowlands of South America. While engaging, such reconstructions run the risk of constraining the potential of these artefacts to provide us with insights on the Caribbean past.

The importance of researching collections that have been previously excavated and are now housed in institutional repositories is being increasingly stressed worldwide. A plea for the generation of new data from "old" materials has surfaced around discussions of the "curation crisis" and "legacy collections" (Frieman and Janz 2018; King 2016; Merriman and Swain 1999). Repositories

worldwide harbour understudied collections, excavated at different points in time by both archaeologists and amateurs. Many of these have not been (extensively) described and investigated, lack (substantial) documentation, include potential forgeries or mislabelled items, and/or would profit from new theoretical and methodological developments in archaeology (Brody 2009; Frieman and Janz 2018; Gamble 2002; Guerra 2008; King 2016; Rodet et al. 2013; Woodward and Hunter 2015). Furthermore, even recently excavated collections become, to a certain degree, legacy collections when they enter a repository, as they no longer are under the custody of the investigator who exhumed them (King 2016, 7). The circum-Caribbean is no exception in this regard, with collections of diverse materials housed locally, in Europe, and in the United States (*e.g.*, Antczak et al. 2019; Díaz Peña 2004; Françozo and Strecker 2017; Françozo and Ordoñez 2019; Hardy 2009; Hicks and Cooper 2013; Siegel 2009; Watters and Brown 2001; Watters and Scaglion 1994). Furthermore, Caribbean archaeological material culture is not only housed in institutional repositories, such as museums, but is also in the possession of individuals as private collections.

Despite the regional abundance of ornaments and the interest they have raised, analytical approaches have not been given priority in ornament research in the Caribbean (see section 1.1). As a result, ornaments remain a poorly understood artefact category. The goal of this dissertation is, therefore, to provide new insights concerning the circulation, production, and use of bodily ornaments in the Caribbean. This will be done through the detailed study of assemblages of ornaments from key time periods in the archipelago. Three main research questions will be posed to ornament assemblages from the region:

1. What are the patterns in the ways ornaments were dealt with in each time period?
2. How do such patterns relate to the social roles these objects had?
3. What are the new insights given by a focus on technology and use to our understanding of exchange patterns and the social mechanisms responsible for them?

In order to accomplish this, it is necessary to set out another goal: to devise a strategy for the study of collections of ornaments from diverse origins. One is required to acknowledge the diverse ways in which collections have been and are being formed in the region. Collections have been and are still formed through both systematic archaeological research and unsystematic collecting.

More than requiring a single and specific protocol of actions, such collections demand flexibility and clarity regarding their potentials and limitations. One can identify a number of methodological and interpretative limitations that need to be taken into account during their study. Here we can include 1) extensive raw material and typological variability, 2) low numbers of production debris and associated tools, and 3) challenges with extrapolating from a single artefact (such as a bead) to an object that performed in a certain way in the past (for instance, a whole necklace). Other limitations are related to the lack of sufficient contextual information and to the complex trajectories artefacts undergo after they leave the ground. Devising a strategy to deal with such issues is not only relevant for the Caribbean region, as many limitations permeate the study of collections everywhere.

This chapter introduces the main themes and issues that will serve as threads connecting the individual components of this dissertation. We start with an overview of previous research on bodily adornment from the Ceramic Age Caribbean. The goal of this section is to highlight how ornaments have been integral elements in narratives about socio-cultural interaction and socio-political organization. In particular, focus is given to two time periods in which ornaments were produced in large numbers and exchanged between different islands. Such review will allow us to single out gaps in knowledge that will be addressed by the present research. In order to create a framework for this investigation, we delve into what ornaments are and what kinds of social roles they could have held in the following section. The concept of artefact biographies is introduced as an approach for making sense of the multiple life stages ornaments are engaged in both as individual artefacts and composite constructions. Microwear analysis is then proposed as a method for investigating ornaments, having as basis previous research carried out worldwide. Finally, the outline of the dissertation is explained and the goals of each chapter are made clear.

1.1. Bodily ornaments in Caribbean archaeology

The exchange patterns, sociopolitical organization, and worldview of past Antillean societies have often been interpreted by analogy with indigenous communities from lowland South America (*e.g.*, Boomert 1987; 2001a; 2001b; Rodríguez 1997; Roe 1989; 1997; Siegel 1997; 2010). The location of the Antillean archipelago in relation to surrounding continental masses is shown

in Figure 1. These researchers have favoured such connections on the basis of the purported Orinocan origin of Saladoid communities that occupied the islands, as proposed on the traditional culture-historical schemes put forward by Irving Rouse (1986; 1992). It was posited that, from 500 BC, migration waves of Saladoid peoples would have replaced the Archaic Age populations that occupied the islands. This would mark the beginning of the Ceramic Age period, as these new people would bring with them ceramic making traditions and a horticultural lifestyle, accompanied by the settlement of semi-permanent villages (Rouse 1986; 1992). Over the centuries and through local developments, they would become the bearers of Ostionoid ceramics from the Greater Antilles, which would eventually develop incipient chiefdoms and would give origin to the so-called Taíno peoples met by the first Europeans to arrive to the Americas. As new research has been carried out, different aspects of this culture-historical trajectory have been debated and criticized from a number of standpoints (*e.g.*, Chanlatte-Baik 1983; 1987; Chanlatte-Baik and Narganes 1980; Keegan 2000; Rodríguez Ramos et al. 2008; Veloz Maggiolo et al. 1981). Researchers have challenged the cultural and stylistic boundaries traditionally defined in the discipline and the considerable focus previously given to migration and colonization as monotonic events (Curet 2005; Hauser and Curet 2011). The

Figure 1: Geographical location of the circum-Caribbean in relation to South, Central, and North America.

Caribbean region is now seen as highly interconnected and ethnically diverse throughout its pre-colonial history (Hofman et al. 2007; 2010; 2011; Keegan and Hofman 2017; Mol 2014; Oliver 2009; Rodríguez Ramos 2010b; Rodríguez Ramos and Pagán Jiménez 2006; Wilson 1993; 2007; see also contributions in Curet and Hauser, eds. 2011 and in Hofman and Van Duijvenbode, eds. 2011). In this panorama, ornaments have often served as proxies for reconstructions of past Caribbean connectivity. Island-island and island-continent interactions have been suggested on the basis of the differential distribution of (exotic) goods and on the predominance of similar material culture over large areas. However, the specific social mechanisms responsible for the observed patterns of material translocation are still not fully understood (Curet and Hauser 2011, 7; Hofman et al. 2011).

1.1.1. Some thoughts on material exchange and social organization

More than half a century ago, it was argued that human economy is embedded in socio-political institutions (Polanyi 1957, 250). According to its supporting social structure, the circulation of materials in a given society can take place through different mechanisms or forms of integration, namely reciprocity, redistribution, and market exchange. Reciprocity would be characteristic of symmetrically organized groups, such as kinship groups. The exchange of social valuables or prestige goods has been argued to play an important role in small-scale stateless societies (Dalton 1977). It would be crucial in alliance building between corporate descent groups, having political, economic, and social functions concurrently. Notable among such social transactions are delayed-reciprocal ceremonial exchanges held in the context of feast celebrations and exclusively between group leaders. Amassing and distributing goods would be key factors in crafting a big man's personal success and in outranking potential competitors (Sahlins 1963). Success in ceremonial exchanges would play a role in the attaining and maintaining of political power in one's corporate group, at the same time as providing a big man with fame and renown to outsiders (Dalton 1977, 196; see also Boomert 2001b). In contrast, redistribution would involve movement of goods toward and from a (*e.g.*, political or religious) centre. One should note that Polanyi (1957, 256) stressed that such forms of integration are not stages of development, as no progression in time is implied and as certain societies are known to practice, to varying degrees, both reciprocity and redistribution (see also Ibáñez et al. 2016). Nevertheless, non-reciprocal

modalities of material distribution have generally been connected to systems with institutionalized social hierarchies (Service 1971[1962]).

Abundant archaeological research has focused on evidencing the social patterns producing the translocation of materials in past societies, particularly in connection with the advance of scientific and statistical approaches afforded by processual archaeology (see contributions in Earle and Ericson 1977 and Ericson and Baugh 1993; also Hirth 1978; Hodder 1974; Ibáñez et al. 2016; Kirch 1988). Such efforts have replaced concerns with issues of migration and cultural diffusion that had previously occupied a prominent role in archaeological endeavours. Efforts have been made to explain patterns in artefact distribution across a given region according to specific models of exchange. For instance, reciprocal/symmetrical exchange would produce a down-the-line model, a pattern resulting from materials being passed down from hand to hand in transactions between neighbouring villages (Renfrew 1977, 77-79). As a result of this process, material distribution would follow the "law of monotonic decrement", according to which materials become rarer with increased distance from the supply zone. In contrast, when a certain location is supplied preferentially, a pattern of directional trade has been referred to (Renfrew 1977, 85). From such a location, i.e. a central place, goods would then be redistributed to neighbouring areas (see also Hirth 1978). This hierarchy of exchange would be reflective of a hierarchy between settlements or individuals. However, limitations have been pointed out in such models, particularly concerning the issue of equifinality (Hodder 1974; Renfrew 1977, 82-83). Furthermore, the presence or absence of a given raw material should not be considered in isolation from data concerning the technical states materials may be in and the different spheres of production they may belong to (Perlès 2007).

Craft specialization and the roles of material culture in legitimizing social hierarchies hold a persistent place in ornament research, due to the exoticness of raw materials used and to the high skill often involved in their production (Arnold and Munns 1994; Baysal 2013; Bellina 2014; Brumfiel and Earle 1987; Carter 2015; Kenoyer and Vidale 1992; Kenoyer et al. 1991; Miller 1996; Trubitt 2003; Watson et al. 2015; Zerboni et al. 2018). However, the large-scale production of lapidary materials and ceremonial artefacts need not to be connected to the presence of an emerging elite social stratum. As Spielmann (2002) highlights, communal rituals and feasts, which are intrinsic part of social life in small-scale and uncentralized societies, create considerable demand for food and for

objects to be used in ritual performance and social transactions. Household-level production, in a context of community-wide specialization, can support large-scale demand for social valuables to be used in display and exchange. In this sense, Spielmann (2002) proposes the "ritual mode of production" as an alternative to the common explanations for production intensification and specialization: economic efficiency in face of uneven resource distribution or demand from aspiring and competitive elites.

In the following, previous efforts to understand the roles of Caribbean bodily adornment and to model its exchange are reviewed. It is not my goal to provide an exhaustive overview of such literature, but instead to provide context to the issues and case-studies that will later on occupy us in the present dissertation.

1.1.2. Profusely adorned: Lapidary materials in the early part of the Early Ceramic Age

Large-scale production of ornaments took place in workshops found throughout the Lesser Antilles and Puerto Rico during the earlier part of the Ceramic Age (400 BC – AD 400) (Figure 2; Bartone and Crock 1991; Boomert 2000; Cody 1991a; Chanlatte-Baik and Narganes 1980; Crock and Bartone 1998; Faber Morse 1989; Hofman et al. 2007; 2014; Murphy et al. 2000; Narganes Storde

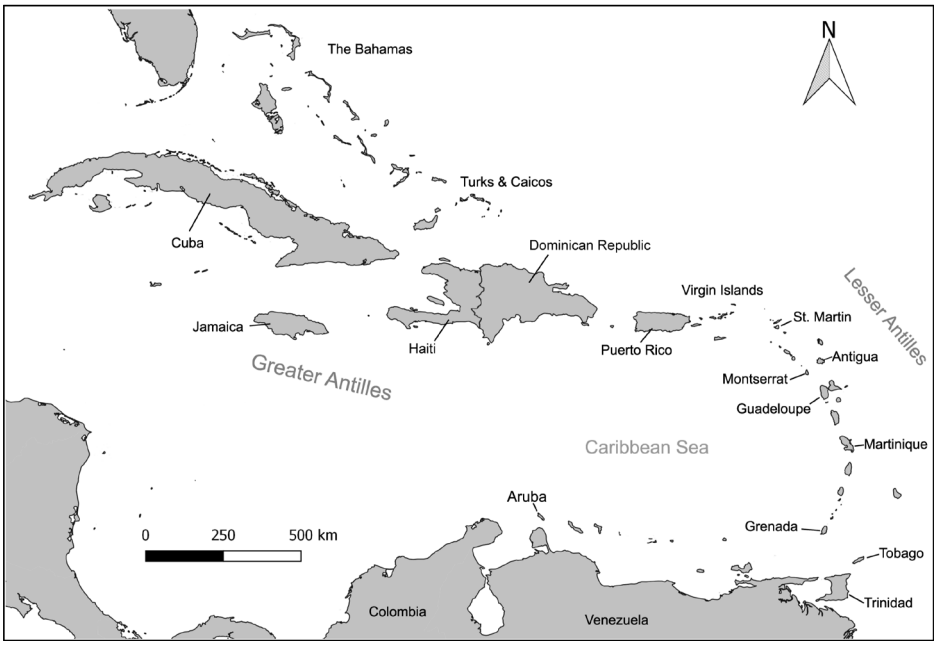

Figure 2: Map of the Caribbean.

1999; Rodríguez 1991; Vescelius and Robinson 1979; Watters 1997; Watters and Scaglion 1994). Workshop sites have been identified by the abundance of lapidary remains, in particular unfinished ornaments, flaking debris, and raw materials. Beads and pendants made of a range of raw materials were produced, especially of hard and semi-precious minerals and rocks (see Chapter 4 for an overview of previous studies and the potential geological sources). Further evidence for the circulation of ornaments comes from freshwater mussel shells (Unionoida) and perforated mammal teeth, whose origins have been traced to northern South America and/or lower Central America (Laffoon et al. 2014; Narganes Storde 2005; Serrand and Cummings 2014; Vescelius and Robinson 1979). Raw materials and finished products were exchanged between different islands, probably as high prestige valuables (Boomert 2000; 2001b). For instance, carnelian from Antigua, together with other lithic resources (Long Island flint, St. Martin mudstone, and Puerto Rican serpentinite), was entangled in exchange networks connecting the northeastern Caribbean (Hofman et al. 2007; 2014; Knippenberg 2007; Mol 2014). These carnelian beads were also exchanged for amethyst specimens produced in the southern island of Grenada (Cody 1991a; 1991b; Watters 1997). Connections of even greater distances have been suggested: similarities were noted between pendants from Puerto Rico and the Isthmo-Colombian region in terms of iconography and raw material (Rodríguez Ramos 2010a; 2010b; 2011; 2013). However, the jadeitite used for the Antillean artefacts has not been definitely linked to the Guatemalan sources used for Costa Rican specimens (Garcia-Casco et al. 2013; Harlow et al. 2006; Schertl et al. 2019).

The most systematic investigation of exchange patterns in the region through material and technological variability has been carried out by Knippenberg (2007), who examined the mechanisms behind the circulation of lithic materials in the northeastern Caribbean (from Puerto Rico to Martinique). His work focused on how the distribution of three materials, namely Long Island flint, St. Martin mudstone, and calci-rudite, evolved from the beginning of the Early Ceramic Age to the end of the Late Ceramic Age. Based on the study of the assemblages from several sites, Knippenberg (2007) created fall-off graphs illustrating the percentage of materials in the studied region in relation to their geological source, and distribution maps, which show the extent of the interaction networks across the region. Materials used in ornament production were also taken into account. Particularly, it was argued that lapidary materials

were distributed within the same exchange networks as flint and mudstone during the Early Ceramic A (400 BC – AD 400). This would have involved the long distance distribution of rocks, alongside other items, through down-the-line exchange between communities in a context in which the islands were still limitedly occupied.

The long distance connections between the Early Ceramic Age communities with those on the surrounding continental masses (in particular, South America) has been explained through a "lifeline" or "homeland" model (Hofman et al. 2007; 2011; Keegan 2004; Watters 1997). This model, originally proposed for the Lapita cultural complex of the Pacific, sees long-distance exchange of prestige items as a formal mechanism for the maintenance of ties with homeland communities (Kirch 1988). The continuation of regular contacts with parent communities would provide demographic, ecological, and economic safety to colonizing groups faced with uncertainties associated with the occupation of previously unknown and still-sparsely occupied islands. At the same time, we should not overlook the presence of Archaic Age occupations on many islands during the first centuries of this period (until ca. AD 100). Huecoid/Saladoid communities exploited the same flint sources as the Archaic Age populations and are very likely to have interacted on different levels (Hofman et al. 2011; 2014; 2019; Rodríguez Ramos 2010a).

Material specialization and control over the sources of certain lithic materials would have supported the competitive exchange and display of valuables by big men in ceremonial intercommunity feasting (Boomert 2000; 2001b; Hofman et al. 2014; 2019; Mol 2014). In this sense, large settlements were located next to key geological sources, such as those of Antiguan carnelian and Puerto Rican serpentinite. These sites, operating as regional social hubs, also functioned as lapidary producing communities. However, such reconstructions have focused primarily on the northeastern Caribbean islands. On the southern Caribbean, the site of Pearls on the island of Grenada was a large settlement that functioned as lapidary workshop. In contrast to the aforementioned researchers, Cody (1991a; 1993), who investigated the site, has supported a more hierarchical view of Early Ceramic Age communities. Pearls would represent a gateway community, as it was situated in a key locale for controlling the movement of goods (notably amethyst) between South America and the islands (Cody 1991a; 1993, 210). The strategic location of gateway communities would allow for a reduction in transportation costs related to the acquisition of exotic resources to be

redistributed to "hinterland" (consuming) communities (Hirth 1978). This would guarantee a secure supply of goods and would allow the gateway community to assume a hierarchical place in a long distance exchange network. Cody (1991a; 1993) further connected this to the centralization of power by elite groups, who controlled the manufacture of prestige goods; the exchange of such goods would reinforce their status and serve for the formation of alliances. Evidence for this would be found in the intra-site differential distribution of valuables (i.e. ceremonial ceramics and lapidary materials), the investment in the production of such items, and the symbolism of the zoomorphic beings depicted on them; such elements would be supportive of elite ideology. However, one may wonder if it makes sense to import such a hierarchical model from Mesoamerica to the Early Ceramic Age Caribbean, especially as the assemblages of the Pearls site remain understudied. Previous studies of collections of lapidary materials from this site have focused on typological classification and geological identification (Boomert 2007; Cody 1991a). Technological studies, which would be crucial for assessing many of such issues, are still missing.

1.1.3. Beads of the cacique? Ornaments in the later part of the Late Ceramic Age

In the subsequent periods (AD 400 – ca. 1500), beads and pendants still circulated across the Caribbean Sea, but the spheres of interaction were reduced in extent and widely available local raw materials were predominant (Hofman et al. 2007; 2011; Knippenberg 2007; Rodríguez Ramos 2010a, 175-176). Exchange networks involving rock materials become more localized, which is hypothesised to correspond to changes in socio-political organization and in orientation of the social relationships established between different communities (Knippenberg 2007). In contrast to the Early Ceramic Age, in which many exchanged lapidary materials are unequally distributed across the region, the ornament materials used in later periods are often available across the archipelago, thus rendering it more difficult to reconstruct potential networks of ornament circulation (see Chapter 5; Boomert and Rogers 2007; Hofman et al. 2007; 2011, 82; Knippenberg 2007). Marine shells, calcite, and diorite are commonly recovered from archaeological sites across the archipelago (Berman 2011; Blick et al. 2010; Boomert and Rogers 2007; Lammers-Keijsers 2007; Serrand 1997; 2007).

It has been argued that the Late Ceramic Age period (AD 600/800 – ca.

1500) sees the development of greater social complexity in the form of incipient chiefdoms (*cacicazgos*) in the Greater Antilles (Curet 1996; 2014; Keegan 2013; Keegan and Hofman 2017, 11-14; Rouse 1992; Siegel 2010; Wilson 2007). This is particularly expressed in Chican Ostionoid ceramics and other representational material culture (from AD 1200), often connected to the "Classic Taíno" peoples met by the Spaniards (Rouse 1992, 33-34; also Arrom 1975; Bercht et al., eds. 1997; Keegan 2013). The exchange of "Taíno"-like ritual paraphernalia would have taken place in connection with the regional formalization of a ritual grammar across the Greater Antilles and northern Lesser Antilles (Hofman 2013; Hofman et al. 2008; 2011, 82-82; Hofman and Hoogland 2011; Hoogland and Hofman 1999; Rodríguez Ramos 2010a, 197-198). The increase in the numbers of conspicuous ritual artefacts and spaces, as opposed to that of more personal items like bodily ornaments, has been argued to be connected to the greater importance of the public display of power in ceremonial events (Curet 1996; Helms 1987; Rodríguez Ramos 2010a, 198; Roe 1989). This includes intricately carved items such as stone collars, elbow stones, stone three-pointers, and shell ornaments depicting faces (*guaízas*). Whereas the evidence for three-pointer exchange is based on the occurrence of specimens in raw materials exotic to the region/island where they were found (Breukel 2013; Knippenberg 2007; Rodríguez Ramos 2010a, 198), *guaízas* are believed to have been exchanged due to their iconographic distinctiveness and rarity (Mol 2007; 2011; 2014).

At the same time, bodily adornment has been argued to be a crucial aspect of the display and enactment of the supernatural and political power of the *cacique* (Oliver 2000; see complete review in Chapter 5). Ornaments are also thought to have been produced in large numbers as products of specialized workshops and exchanged as part of social transactions between elite groups (Las Casas 1992, 611, 1288; Lóven 1935). However, the archaeological evidence for their specialized production and exchange is not easily traceable. An exception is found in the Turks and Caicos islands, where marine shell beads, notably small beads used for embroidery ("seed beads"), were produced in large numbers in specialized workshops; they would have arguably been commissioned by an elite from the Greater Antilles (Carlson 1995; Littman and Keegan 1991). It has further been argued that, as products of elite wealth, they would be kept in cacical storehouses, where they could be integrated into valuable composite artefacts or be redistributed as gifts (Ostapkowicz 2018; see also Mol 2007, 86-87). In turn, lithic ornaments recovered from sites in the Bahamas archipelago are

hypothesised to be trade items, as diorite and quartz sources cannot be locally found (Berman 2011). Beads and pendants made of lithic materials are indeed known to occur widely across the Greater Antilles, as abundantly illustrated in a number of publications (Arrom 1975; Fewkes 1903; 1922; Knight 2017). Bodily ornaments have also been recovered in caches in Puerto Rico and the Dominican Republic. From the former, a ceramic bowl with hundreds of beads has been recovered from a burial plaza in Utuado (Fewkes 2009 [1907]) and a wooden bowl containing a necklace with indigenous ornaments and European glass beads has been found in Quebradillas (Ostapkowicz 2018; Ostapkowicz et al. 2012). A similar find was made from a rock shelter in El Variar, southern Dominican Republic (Ortega 2005; Ortega and Fondeour 1976; also Keehnen 2019). It included two ceramic bowls with 262 stone beads, 89 shell beads, two anthropomorphic pendants, and four metal beads and pendants. Another find from a rock shelter comes from Sabana Yegua in San Juan de Maguana, on the centre-west of the Dominican Republic (Vega 1979, 11-13). It consisted of abundant European material alongside three stone necklaces, three pendants, and two amber earplugs. In Manantial El Cabo San Rafael, a rock shelter on the eastern tip of the island, another cache has been found with approximately 4000 perforated dog and seal teeth, some of which with decorative carvings (Ortega 2005, 115-116; Samson 2010, 103-104). Based on this combined evidence, it can be hypothesized that there was an increase in the production and circulation of ornaments made of different raw materials in this period. However, apart from the aforementioned studies of shell beads and others focused on gold and *guanín* (Cooper et al. 2008; Martinón-Torres et al. 2012; Valcárcel Rojas et al. 2007), little research has focused on ornaments from the period.

1.1.4. Research gap and case-studies

The present dissertation will be conducted against this background of research regarding periods of increase in production and exchange of bodily adornment in the Caribbean archipelago. The two main case-studies that will concern us are the early part of the Early Ceramic Age in the eastern Caribbean and the later part of the Late Ceramic Age in the Greater Antilles. The two periods highlighted here have been previously regarded as two "climaxes" in the culture-historical development of the pre-colonial Caribbean separated by a "dark age", in particular in what concerns ceramic styles and so-called ceremonial art (Rouse 1982, 52; for critiques, see Curet 1996 and Oliver 2009). However, this is not

the intention or the approach advocated here. As mentioned previously, this view of Caribbean pre-colonial history is an outdated one.[1] At the same time, the overview presented above shows that there is an overlap in the ways the ornaments from both periods have been interpreted: even though the models of socio-political organization differ, ornaments tend to be unanimously seen as social valuables produced by craft specialists and exchanged between competitive high-status individuals. In this sense, it remains unclear how the social mechanisms and corresponding archaeological patterns differ from one period to the other—even though the material remains themselves (raw materials and types) are notably different. While considerable archaeological attention has been placed on bodily adornment, research that systematically addresses material acquisition, production, use, and deposition of ornaments are scarce or more generally missing (for a more thorough review of this issue, see Falci 2015 and chapters 4 and 5). As the two case-studies selected refer to different regions and time periods, they will be addressed independently from each other in the next chapters. This independent attention will allow us to characterize in detail ornament-related practices that are specific to each context. Nevertheless, we should keep in mind that both case-studies are relatable as evolving patterns in long-term interaction networks that stretched across multiple islands of the archipelago.

1.2. What is in a bead? Theoretical approaches

The previous section has provided a review of hypotheses concerning the abundant presence of bodily adornment in the Ceramic Age Caribbean. We learned from previous research that ornaments functioned both as markers of political and supernatural power and as trade items—and that both functions cannot be entirely disassociated from each other. In other words, ornaments had at least two different roles over their lifetime. It is, therefore, our goal to assess the specific ways in which these roles were performed and how they differed between the Early and the Late Ceramic Age. For this purpose, it is necessary to build a framework through which these artefacts can be investigated.

Beads, pendants, and other artefacts interpreted to be ornaments have been intensively studied by archaeologists worldwide. Since the development

1 Furthermore, bodily ornaments from other time periods should be researched, such as Archaic-Age and early Ostionoid ornaments (for examples, see Rodríguez Ramos 2010a, 65-68, 175-176).

of archaeology as a discipline in the 19th century, the role of bodily adornment in past human societies has been regarded in different ways in connection with trends in the social sciences (notably, anthropology) and art history (Moro Abadía and Nowell 2015). Among others, they have been labelled minor art, decorative items, cosmetics, primitive money, amulets and talismans, identity and status markers, symbolic and communicative items. Perhaps as a result of the challenges in defining the cross-cultural "function" or "role" of ornaments (and, in a sense, justifying their research as a collective), finding an appropriate terminology to refer to this somewhat loosely defined group of "small finds" has also been a concern. Scholars discussing artefacts recovered from archaeological sites have focused on the terms such as personal adornment, ornament, and dress. Both *ornament* and *adornment* have been noted to be problematic terms, in that they imply a lack of practical function, a purely aesthetic role, and a positive value judgement (Moro Abadía and Nowell 2015; Roach-Higgins and Eicher 1992). *Dress* has been proposed as a less ethnocentric, value-charged, or ambiguous term; it conceptually groups under the same rubric direct modifications of and supplements added to the body (Eicher and Roach-Higgins 1992; Roach-Higgins and Eicher 1992). Without overlooking such concerns, I have opted for the words adornment and ornament as the most adequate way to collectively refer to the set of portable artefacts that will be studied here. The use of these terms strengthens the dialogue between the research being conducted here and other analytical archaeological research carried out on ornaments worldwide.

Following a structuralist tradition to the study of art (Lévi-Strauss 1963; Panofsky 1955), bodily adornment has been regarded as part of complex symbolic systems of meanings that have a communicative role in society (Wobst 1977). In this sense, crucial information concerning an individual's identity and group belonging would be broadcast to those around them through socially-regulated properties of adornment, such as raw material, design, colour, shape, volume, size, and the arrangement and position of components (Lévi-Strauss 1936; Loren 2009; 2010; Newell et al. 1990; Ribeiro 1988; Roach-Higgins and Eicher 1992; Seeger 1975; Turner 2012[1980]; Vidal, ed. 1992; White 1992; White and Beaudry 2008; Wobst 1977; Wright and Garrard 2003). The formal study of such strictly regulated patterns could thus provide insights into a society's underlying ideas and principles concerning personhood, social norms, and cosmology. As items attached to the bodies of people, ornaments are both personal and social, allowing for the active construction, performance, control,

and manipulation of personal identity *vis-à-vis* the social groups one belongs to. A notable avenue in past bodily adornment research has focused on prehistoric archaeology of Eurasia and Oceania, particularly of the Paleolithic period (see, for instance, recent contributions in Bar-Yosef Mayer and Bosch 2019). In early human contexts, forms of dress are regarded as invaluable proxies to the study of: 1) the emergence of behavioural complexity connected to cognitive or environmental changes (Brumm et al. 2017; d'Errico et al. 2005; Gilligan 2010; Kuhn and Stiner 2007; Rifkin et al. 2015) and 2) prehistoric ethno-linguistic boundaries and identities (Newell et al. 1990; Rigaud et al. 2015; Vanhaeren and d'Errico 2006). The importance of investigating ornaments often made of hard animal materials (i.e. bones, teeth, ivory, claws, and shells) has thus been stressed on account of their symbolic function. It is within this research context that the use of wear-trace analysis of ornaments has developed and expanded, providing a new means of assessing how people from the past produced and used such items (d'Errico 1993a; 1993b; d'Errico et al. 1993; Taborin 1991; 1993; White 1992; 2002; 2007; see section 1.3). Researchers have thus used diverse analytical techniques to address issues such the anthropic and intentional nature of artefacts and the aesthetic, symbolic, or pragmatic function of certain practices. However, one must wonder whether this latter question retains its relevance outside of the field of human evolution and whether the dichotomy between the aesthetic, the symbolic, and the pragmatic (or, more generally, art and artefact) is relevant outside of modern Western society (a.o., Ingold 2001; 2013; Conneller 2004; Dobres 2001; 2010).

Representational and visual characteristics of ornaments have gained great scholarly attention. However, one should not overlook the fact that dress is more than *appearance*, as it has other properties through which it can be experienced, such as texture (touch), odour, and sound (Eicher and Roach-Higgins 1992, 14; Roach-Higgins and Eicher 1992). Furthermore, material culture does not just passively reflect meanings bestowed onto it by a thinking mind (Gosden 2005; Hodder 2011; Ingold 2001; 2013; Jones 2004; Knappett 2012; Olsen 2012; Pfaffenberger 2001). As Malafouris (2008, 408) argues: "instead of seeing early ornaments as existing for the self we should be seeing the self as emerging through the ornament". The human brain should be understood as intrinsically plastic, being moulded through its interaction with material culture. The body itself is not a purely biological entity to which cultural meanings and materials are added: it cannot be fully disassociated from the experiences, treatments, rituals,

and practices that it has engaged in (Alberti 2012; Conklin 1996; Hamilakis et al. 2002; Joyce 2005; Rival 2005; Thomas 2002; Vilaça 2005; Warnier 2009). This becomes more evident when more permanent forms of body modification are considered. While somewhat elusive in the archaeological record, a number of studies have pursued evidence for such practices, for instance, studies on cranial modification (*e.g.*, Van Duijvenbode 2012), on the impact of the use of lip plugs on an individual's teeth (Cybulski 2001; Torres-Rouf 2012), or on proxies for past tattooing (Deter-Wolf and Peres 2013; Gates St-Pierre 2018). Mauss (1973[1935]), in his essay on the techniques of the body, argues that the habits of the body are transmitted from one generation to the next, being simultaneously mechanical, psychological, and sociological, regardless of how ordinary and innate they may seem (Mauss 1973[1935]). While bodily adornment is not considered a technique of the body, he does refer to "techniques of care for the body" (Mauss 1973[1935], 84) and to walking in particular types of shoes as a learned disposition (Mauss 1973[1935], 83).[2] In light of more recent theories of the body cited above, this brings an interesting thought to mind: ornament making certainly involves the use of multiple techniques and tools emerging from socially-mediated bodily dispositions (see next section); but one should not overlook the fact that forms of adornment are themselves makers of bodily habits (see Naji and Douny 2009; Warnier 2009). Therefore, bodily ornaments, hygiene, and other forms of bodily care and performance are inseparable as constitutive elements in the creation and maintenance of personhood and, more broadly, social life (Brück and Davies 2018; Choyke 2006; Loren 2010; Miller 2009; Santos-Granero 2012; Turner 2012[1980]; Walker 2009; Warnier 2009). This implies a shift in focus from the potential messages carried by inert ornaments to how artefacts were capable of action: they affected, mediated, and transformed past bodies and minds. Whereas this realization frees us from the conundrum of not being able to assess the meaning of bodily adornment in the past, it does leave us with many unanswered questions. In particular, our main questions remain: how to approach bodily ornaments recovered from archaeological sites? How can we assess the ways in which *specific* ornaments

2 Elsewhere, Mauss (1993[1947]) discusses body arts (cosmetics and ornaments) as forms of plastic arts, i.e. *techniques* marked by a pursuit for the aesthetic. Mauss (1973[1935]) defines a technique as traditional and efficacious action. Warnier (2009) notes that, even though scholars in the anthropology of techniques have taken this to exclusively mean action *on matter*, one should also consider action *on subjects*. As examples, he argues that ritual performance and skin care are technologies of the subject mediated by bodies, material culture, and words.

performed in *specific* past societies?

1.2.1. Status, career, and expectations: objects lead interesting lives

Despite their apparent lack of a pragmatic function, the diverse items that find themselves gathered in the adornment category may have performed multiple tasks: they may have created, unified, protected, reminded, empowered, or even subjugated people. More than labelling and "trapping" certain finds in a self-evident and somewhat static "personal adornment" category, it is important to acknowledge that their function, meaning, or agency are dependent on the archaeological contexts in which such artefacts have been produced, used, assembled, and, ultimately, found (Loren 2010, 10). For this reason, these attributions can also oscillate over the lifetime of such items. It is therefore our goal to inquire into these social lives led by objects (Appadurai 1986; Kopytoff 1986). Objects are expected to follow ideal "careers" in accordance with the social contexts they are part of, involving stages analogue to birth, life, and death (Kopytoff 1986). These pathways are intrinsically connected to their expected performance and perceived value or status.

Building onto the foundations first set out by Mauss (2003[1925]) in his *Essay on the Gift*, Kopytoff (1986) proposes that an object's status can be seen in a continuum that stretches from gift (sacred/inalienable) to commodity (profane/fully alienable). Through processes of singularization or commoditization, objects can undergo changes in status during their *biographies* as they oscillate between different spheres of circulation. These shifts are particularly striking in cases of culture contact, as materials leave their original social context and enter a new one where they are expected to perform in rather different ways. Examples can be found in mass produced European glass beads received in exchange by indigenous peoples of the Americas, who perceived them to be valuable and powerful items (*e.g.*, Keehnen 2012; 2019); and in indigenous material culture taken from source communities to be stored, catalogued, studied, and exhibited in Western museums (*e.g.*, Françozo 2012; Gosden and Marshall 1999; Grognet 2005). In both cases, items used as bodily adornment have been notable (albeit not sole) "currency" of exchange. Contemporary processes, such as the cultural appropriation of forms of traditional dress by the fashion industry, can likewise serve to illustrate the idea of commoditization as a process: "as one makes [things] worthy of being collected, one makes them valuable; and if they are valuable, they acquire a price and become a commodity and their

singularity is to that extent undermined" (Kopytoff 1986, 81). In modern and contemporary case-studies, historical sources and ethnographic insights play an important role in tracking the regional or global circulation of object types and the corresponding changes in expectations surrounding them.

By reconstructing object biographies, we can assess how objects were entangled in the biographies of people (Gosden and Marshall 1999; Hoskins 1998; 2006). In other words, a biographical approach offers a framework to understand the ways in which objects were appropriated by social actors, who interacted with them and who attributed sets of meanings to them. However, no specific research method is implied by a biographical approach; this has led to varied applications across and within each discipline concerned with the study of material culture. When studying archaeological artefacts, any biographical pursuit must inquire into the properties of materials and into the stages that predate those in which the artefacts are found—since the archaeological context is only their final repository.[3] This is done by examining the qualities of objects and materials that demand and encourage action from humans (Gosden 2005; Hodder 2011; Jones 2004). Pursuing *artefact* biographies (Van Gijn 2010; 2012; Van Gijn and Wentink 2013) involves a focus on the materials themselves as means to seek answers. Archaeologists are well equipped to assess the changes artefacts undergo as a result of their successive life stages, as "[b]iographical information resides in the artefact, in the patina of age, wear and repair it acquires through its life" (Joy 2009, 545).

Archaeologists have indeed paid considerable attention to the life stages of artefacts, in particular by using an approach often referred to as the *chaîne opératoire*. This concept was originally proposed in francophone ethnology and archaeology and has since become an analytical tool for the understanding of technical processes (Balfet 1991; Cresswell 1983; Desrosiers 1991; Leroi-Gourhan 1993[1964]). This interest in technical sequences, gestures, and in bodily habits at large can be traced back to, among others, Mauss's (1973[1935]) essay on techniques of the body. The use of the *chaîne opératoire* in archaeology has involved the detailed study of entire assemblages of, *e.g.*, lithic remains recovered from archaeological sites (Bodu 1999; Cahen et al. 1980; Cahen and Karlin 1980; Inizan et al. 1999; Pelegrin 2000; 2005). Focus is not placed exclusively on (formal) tools to be classified into static typologies based on

3 That is, before they start their new careers as archaeological artefacts, museum objects, and their representations (Joyce and Gillespie 2015; Gosden and Marshall 1999).

their morphological or stylistic attributes. Instead, all remains are hierarchically organized according to their raw material and position in idealized operational sequences. These sequences of technical gestures and procedures would have had specific end-products, set as templates in the mind of the craftsperson (Pelegrin 1991). The recovered remains are thus understood as products of (technical) processes, rather than as fixed categories. The typical life stages of artefacts assessed in such manner can include raw material acquisition, production (itself divided in many successive stages: blank production, roughing-out, shaping, retouching, etc.), hafting, use, recycling, reuse, and discard (Cahen et al. 1980; Inizan et al. 1999; Wright 1992). The performance of technical operations, notably artefact production, is at the same time conservative and flexible: it involves individual skill and knowledge of materials, but follows socially-constrained procedures according to which materials can be successfully worked. In combination with experimental replications and contextual studies, such an approach has allowed researchers 1) to investigate processes of decision-making, knowledge transmission, and innovation (Cresswell 1983; Lemonnier 1993; Pelegrin 1991; 2005; Roux and Brill, eds. 2005; Tixier 1980) and 2) to understand how materials and resources were managed by prehistoric communities (Geneste 1992; Perlès 1980; 2007).

This understanding of the performance of techniques follows a social constructionist view of technology (*sensu* Killick 2004; Martinón-Torres and Killick 2015), according to which technological choices are not exclusively guided by material constraints, environmental conditions, pragmatism, or efficiency. Instead, the choices made from a pool of available alternatives are influenced by the socio-cultural context an individual was raised in and by what this person has been taught as the correct way of performing a given task (Cresswell 1983; Dobres 2010; Killick 2004; Lemonnier 1993; Pfaffenberger 1988; 1992; Sillar and Tite 2000). For this reason, a *chaîne opératoire* approach has also been regarded as providing an avenue into the social relationships and symbolism that shape and are shaped by craft practice (Dobres 2001; 2010; Farbstein 2011; Knappett 2012; Lemonnier 1993; Pfaffenberger 2001). Here I will use the *chaîne opératoire* approach to organize and make sense of the technological data gathered from the studied ornaments, such as techniques, tools, gestures, and sequences of production, alongside technical performance and technological choices. This data will constitute a key component of the ornament biographies that will be discussed in chapters 2, 4, and 5.

However, one must be aware of the limitations of the chosen approaches. In particular, pleas for a less mechanistic understanding of the life of objects have been made as a reaction to common assumptions in applications of the *chaîne opératoire* approach. The description and classification of material remains is arguably over-formalized and imposes an artificial linearity to the engagement of humans with materials, through the definition of discrete stages with clearly defined goals (Bar-Yosef and Van Peer 2009; Conneller 2006; Ingold 2013). Reconstructions have focused on an image of craft practice as the task of a single problem-solving individual. However, as Conneller (2006, 47) argues: "in practice *chaînes opératoires* are never individual, but always multiple, interconnected networks of action". A compartmentalized treatment of past activities often fails to grasp how certain artefacts were integrated in composite objects or in complex (inter-, multi-, or cross-)craft systems (Brysbaert 2007; 2011; Miller 2007; Shimada 1996; Tsoraki 2011; Van Gijn 2012; Van Gijn et al. 2008). Furthermore, an economic perspective is often prioritized when building the life of an artefact as a linear construct that follows a strict sequence of stages towards a single end-product with a specific function. Objects have *use* lives that extend beyond any purely utilitarian expectations; for instance, they can also be handled, passed down from hand to hand, wrapped and unwrapped, hidden away, displayed, cleaned, or be treated with a variety of substances (Breukel 2013; Choyke 2006; 2010; d'Errico 1993b; Van Gijn 2014b; 2017; Van Gijn and Wentink 2013; Wentink 2006; see also Chapter 3). We should not regard these processes as mere aesthetic or curious additions to an artefact's "real function". By recording the trajectories undergone by artefacts, we are equipped to highlight departures from our expected "utilitarian" biographies. Likewise, assuming that all object lives have a birth/beginning and a death/end, as understood in analogy with human lives, is rather limiting (Hahn and Weiss 2013; Joyce and Gillespie 2015). This had led researchers to propose *itineraries* as a more dynamic way to frame the lives of objects and their "extraordinary changeability" (Hahn and Weiss 2013, 9; also Fontijn 2013). This can be also linked to a concern with acknowledging that matter is in a perpetual state of becoming (Joyce and Gillespie 2015; also Ingold 2007; 2013). Here I opted for retaining the term biography, but keeping in mind that it does not need to be a coherent narrative with a beginning and an end. An object biography narrative is often incomplete due to limitations intrinsic to archaeological data (Joy 2009, 544). Despite the perpetual continuity of the lives of matter and the intrinsic

incompleteness of our reconstructions, a biographical approach can still be used to pursue a more holistic and relational view of how, throughout its life, an object is entangled in social interactions with other objects and humans. The biography metaphor will thus be used to provide a structuring framework with which we can make sense of the complex, dynamic, cyclical, and perhaps chaotic lives of objects.

1.2.2. No strings attached: pursuing the biographies of ornaments

Even if often found separated from each other in archaeological sites, beads and pendants were likely once connected to other components through string materials. The resulting objects (necklaces, belts, arm bands, and the like) are here collectively referred to as "composite ornaments"[4]. This often overlooked, but intrinsic characteristic of ornaments makes them particularly prone for having unexpected biographies, as aptly put in the following: "The integrity of a beaded dress ornament is as fragile as the material that holds it together […]. Anyone who wears beaded jewellery or clothing is aware of its precarious nature, and has left at one time or another a trail of sequins or beads that if sufficiently valued are gathered up and refabricated" (Cifarelli 2018, 53; see also Bigi and Vidale 2009). Fragmentation and transformations are thus recurrent in the lives of composite ornaments. This may not be exclusively the product of accidental breakages, but also may be connected to a deliberate desire 1) to refashion a piece once it has served its purpose, 2) to add a personal touch to an object prior to further exchange, or 3) to gather pieces with different biographies in a single (powerful or memory-laden) object (*e.g.*, Campbell 1983; Ewart 2012; Gaydarska et al. 2004; Van Gijn 2017; Wiessner 1982, 72; Walker 2009). This is because composite ornaments are assemblages of components, which are at a given point in time linked to each other. Despite the recurrent reassembly and reconstruction of archaeological necklaces as complete, symmetrical, and harmonious from a Western point of view, the individual components need not to have the same materials, colours, shapes, or even biographies (Frieman 2012; Woodward and Hunter 2015). Studying the biographies of individual components has allowed researchers to identify processes of fragmentation, singularization, and curation. For instance, objects may be removed from their typical life cycles, in order to be made into (parts of) something else. Through such processes, they can become "mnemonic devices" or "ancestor materials":

4 Examples of such objects are illustrated and discussed in Chapter 3.

new artefacts with a new role, but which are still reminiscent of their prior lives and their prior sets of meaning (Caple 2010; Cifarelli 2018; Jennings 2014; Loren 2009; Skeates 1995). The intergenerational circulation of ornaments as heirlooms has also been put forward on the basis of detailed artefact analysis (Choyke 2010; Van Gijn 2017; Woodward 2002; Woodward and Hunter 2015; see also Lillios 1999).

A biographical approach has often been used in the study of material exchange, particularly across different cultures. The capacities of a given object can be linked to its raw material and to its known or imagined origins. This can be illustrated by several case-studies from across the globe, such as ornaments made of skeletal materials (Chaumeil 2004; Choyke 2010), 18th-19th century remembrance hair jewellery (Holm 2004), and, more generally, exotic materials from faraway (Helms 1988). At the same time, the status of an object at any given time is a "state of being" (Lillios 1999, 243) dependent on the way it is regarded and dealt with by people (Fontijn 2013, 190-191; Stockhammer 2015). Nevertheless, the topic of exchange in archaeology has more often than not been addressed through studies that focus exclusively on the *transfer* of material. As Pollard and colleagues (2014) argue, a "simplistic view of provenance, with 'instantaneous' lines drawn from source to the final object, though objectively true, fails to engage with the rich life of the material beyond its first and last points" (Pollard et al. 2014, 627; see also Breukel 2019; Van Gijn and Wentink 2013). As argued above, this "rich life" can be assessed through the identification of processes such as technological modifications, fragmentation, curation, assemblage, and use (Brück and Davies 2018; Choyke 2006; Gaydarska et al. 2004; Perlès 2007; Sheridan and Davies 2012; Van Gijn 2017; Walker 2009; Woodward 2002; Woodward and Hunter 2015). For instance, we know from ethnographic accounts that composite ornaments acquired greater value depending on their specific histories of exchange and ownership, as visible on the surface of the objects themselves (Gosden and Marshall 1999; see references in Pollard et al. 2014, 628, and Spielmann 2002, 201). Practices of repolishing ornaments and groundstone celts upon receipt are also known archaeologically and ethnographically (Breukel 2019; Campbell 1983; Pétrequin and Pétrequin 2016). Researchers, therefore, need to also focus on elucidating what happens to a material after arrival and prior to (further) exchange. A purely quantitative assessment of the occurrence of exotic or presumably valuable materials cannot be sufficient for generating a

comprehensive understanding of how materials were circulated and made active in the past. Artefacts must also be investigated from a qualitative perspective that can further elucidate human action leading to observed patterns in material distribution (Lillios 1999, 238; Perlès 2007). This type of investigation is crucial in making the study of past exchange relevant from a social and technical point of view (Pollard et al. 2014). Furthermore, as discussed in section 1.1.3, certain materials may have been exchanged in the past, but present limited potential for provenance studies due to their wide regional availability. For instance, Kirch (1988) contrasts the exclusive focus archaeologists had placed on the exchange of mineral resources across the Pacific islands to the abundant and well-known ethnographic evidence for the long-distance exchange of shell ornaments. In order to demonstrate the exchange of shell valuables and explore its patterns, Kirch (1988) maps the occurrence of these items, taking into account not only raw material and typological variability, but also evidence for local production. In fact, the operations that compose a *chaîne opératoire* are organized in time and across geographical space (Perlès 1980; Geneste 1992). The hierarchical organization of an archaeological assemblage in technical stages can highlight the presence or absence of certain products, thus pointing to the states in which materials were brought into a given site (Perlès 2007). The percentage of each raw material and the corresponding states of importation can provide insight into the mechanisms of material acquisition and circulation. When seen as a group, these studies stress the need for pursuing the roles of ornaments in the past not only in connection with their types and raw materials, but also through careful examinations of their biographies.

1.3. Methodology

The previous section demonstrated that we cannot successfully inquire into the roles of ornaments by limiting ourselves to a typo-morphological approach. Furthermore, the identification of raw materials and their geological sources also present us with only part of the story. I argued that we should pursue the biographies of ornaments as a means of generating a more holistic understanding of the ways materials were dealt with by people in the past. This pursuit for a less static approach to the study of ornaments forms a key component of this dissertation. In the following, the method used here to operationalize artefact biographies is presented.

1.3.1. Through the jeweller's loupe: microwear analysis of ornaments

Biographies can be reconstructed by investigating the artefacts themselves. The direct observation of the surface of artefacts can provide information on the processes they have endured. Technological and functional approaches to artefact analysis have developed on the basis of this general idea, although not specifically visualizing these processes as part of a biography. While microscopic studies of wear traces have originally developed to study the function of isotropic lithic resources (Keeley 1974; 1980; Keeley and Newcomer 1977; Mansur 1990; Odell 2001; Plisson and Van Gijn 1989; Semenov 1973[1964]; Van Gijn 1990), they have been increasingly applied to other raw materials. In particular, microwear analysis[5] has now been carried out on a much broader range of materials, focusing on traces connected to both technological and use activities (*e.g.*, Adams 2004; Adams et al. 2009; Bradfield 2015; Breukel 2019; Buc 2011; Cuenca Solana et al. 2017; d'Errico 1993a; 1993b; De Angelis and Mansur 2010; Dubreuil and Savage 2014; Hamon 2008; Kelly 2003; Kononenko et al. 2010; Lammers-Keijsers 2007; Little et al. 2016; Maigrot 2005; Sidéra and Legrand 2006; Van Gijn et al. 2008; Van Gijn and Hofman 2008). The most common instruments of analysis are based on optical light microscopy (i.e. a stereomicroscope and a reflected or incident light metallographic microscope). At the same time, explorations of new instruments are ongoing, in particular of those providing quantitative measurements of wear (*e.g.*, Borel et al. 2014; d'Errico et al. 2000; Evans and Donahue 2008; Ollé et al. 2016; Procopiou et al. 2013; Stemp et al. 2016). The identification of specific techniques, tools, and, more generally, contact materials is dependent on reproducing observed archaeological traces through controlled experiments (Bamforth 2010; Hurcombe 2008; Keeley 1980; Keeley and Newcomer 1977). Experiments may focus on reproducing specific tasks with controlled conditions (*e.g.*, cleanness, time, number, type and strength of gesture), only changing one variable at a time. This type of clinical experiment allows for the characterization and identification of material interaction. Actualistic experiments can also be conducted, focusing instead on complex activities or production sequences that incorporate multiple gestures and variables. This has proven to be of importance, as real life conditions tend to be markedly different from laboratory settings (Van Gijn 2014a). Furthermore,

5 In order to highlight this focus on the study of traces from multiple origins, I opted for using the term microwear analysis throughout this dissertation, instead of other common terms, but of narrower scope, such as use-wear or functional analysis.

traces form on an artefact from multiple interactions over its biography, creating a micro-stratigraphy or even complex palimpsests on its surface (Akoshima and Kanomata 2015). Researchers have also investigated how natural or post-excavation processes affect studied materials and the preservation of wear, for instance by characterizing the damage caused by predators, taphonomic agents, and cleaning or curating practices on shell and bone (*e.g.*, d'Errico 1993a; Cuenca-Solana 2013; Graziano 2015; Orłowska 2018). It is in this context of an ever-growing and increasingly more diversified field of microwear studies that the present research is situated.

Here we consider primarily the study of ornaments produced through extractive-reductive crafts (*sensu* Miller 2007), such as the working of lithics and hard animal materials.[6] This is because these are the most commonly recovered ornament raw materials from pre-colonial Caribbean contexts (section 1.1). Ornaments have received considerable attention from an artefact analysis perspective, in particular by researchers using some degree of magnification in search of greater insight on production, use, and taphonomy. The success and popularity of the use of magnification for ornament studies can be at least partially explained by: 1) the small sizes of ornaments, which limit the usefulness of direct observation with the naked eye, and 2) to the recurrent use of abrasive technologies in their production, which not only do not produce abundant remains such as debitage, but also tend to superpose and erase traces left by previous life stages. Many studies have used low power microscopy (magnifications of less than 100×), using a stereomicroscope or a DinoLite. Such instruments allow for the identification of manufacture traces, generally to the level of technique (i.e. percussion, pressure, drilling, and grinding), and their sequence of application. They also provide an understanding of use-wear presence, types, distribution, and degree of development. Archaeologists have focused especially on automorphic artefacts (in which the natural shape of the material has not been changed significantly), such as perforated whole shells or teeth (Alarashi 2010; Álvarez Fernández 2006; Bonnardin 2008; 2012; Cristiani and Borić 2012; Cristiani et al. 2014; d'Errico et al. 2005; Gutiérrez Zugasti and Cuenca Solana 2015; Langley and O'Connor 2016; Mărgărit et al. 2018; Sidéra and Giacobini 2002; Sidéra and Legrand 2006; Tatá et al. 2014). Low magnification microscopes have also been used for the study of lithic materials,

6 To the exclusion of ornament materials produced by transformative crafts, such as ceramic, porcelain, glass, and metals.

such as amber, jet, calcite, diorite, carnelian, and steatite (Alarashi 2016; Falci 2015; Sebire 2016; Van Gijn 2006; 2008; 2014b; 2017; Verschoof 2008).

Low magnification instruments are often used in combination with at least another microscope providing high magnifications (from 50x up to 1000x). A metallographic microscope can offer insight into contact materials, directionality, and superposition of traces. The analysis works through the same principles as more traditional use-wear studies, entailing the study of the surface micro-topography of an artefact. Observed features include polish, rounding, micro-removals, striations, pits, directionality, the micro-stratigraphy of traces, and potential residues (Adams et al. 2009; Keeley 1980; Mansur 1990; Van Gijn 1990). It has been used to identify both technological and use-related features, such as successive surface treatments, production toolkits, residues associated to attachment systems, and contact with other beads, skin, or fabrics (Brasser 2015; Breukel 2019; Cristiani and Borić 2012; Cristiani et al. 2014; Falci 2015; Groman-Yarolavski and Bar-Yosef Mayer 2015; Martí et al. 2017; Milner et al. 2016; Van Gijn 2006; 2008; 2014b; 2017; Verschoof 2008). The use of this type of microscope has been somewhat limited in ornament studies. This may be connected to the need for a 90° angle between the light source and the surface of the artefact, which can pose a challenge for the rounded surfaces common in ornaments. In addition, the bright, white, and/or reflective surfaces of certain materials, such as shell, teeth, and some lithics, may render observation of diagnostic features difficult. Furthermore, poor surface preservation affects this type of analysis to a greater degree than analyses with low magnification. Detailed examination of the inside of deep and steep features, such as perforations and incised grooves, requires the production of negative silicone impressions (casts) of the surface.

A Scanning Electron Microscope (SEM) has been used for a long time in bead studies, particularly for assessing the raw material of drill bits and the drilling mechanisms used (*e.g.*, twisting motion, palm drill, bow drill, etc.) (*e.g.*, Bains 2012; Gwinnett and Gorelick 1979; Gorelick and Gwinnett 1989; 1990; Kenoyer 1997; Kenoyer and Vidale 1992; Vidale 1995). This microscope allows good visibility of curvilinear surfaces, wider depth of field, a longer working distance, higher resolutions, and higher magnifications (Borel et al. 2014; Ollé et al. 2016). The SEM is also being used for the identification of carving techniques and toolkits, through the examination of the morphology and sequence of carved grooves and of the width of bands of striations under high

magnification (d'Errico 1993a; 1993b; d'Errico et al. 2005; Melgar Tísoc and Andrieu 2016; Milner et al. 2016; Sax et al. 2004; Sax and Ji 2013; Velázquez Castro 2012). Multiple raw materials have been studied with the use of a SEM, both lapidary materials (agate, carnelian, nephrite, and jadeitite) and hard animal materials (shell, bone, and teeth). Limitations involved with the use of this microscope are higher costs, time-consuming analysis protocol, and the need for sample preparation (i.e. producing silicone casts of artefact surfaces and gold- or carbon-coating them for placement in a high vacuum chamber) (Borel et al. 2014). Furthermore, it does not permit direct observation and instant manipulation of samples.

More recently, X-ray micro-Computed Tomography (μ-CT scanning) has also been used for the study of (non-metallic) ornaments. It creates a 3D virtual model of the scanned object at high resolution (5 – 10 μ), including not only its surface, but also its inner structure. The model can be sectioned in multiple planes and observed features can be measured, isolated, or removed. In this way, it is possible to visualize both technological traces, such as the shape of the perforation and drilling marks, and structural features, such as different layers, inclusions, or air bubbles in a material (Huisman et al. 2012; Ngan-Tillard et al. 2014; 2018; Winnicka 2017; Yang et al. 2009; 2011; 2016). Thus far, it has been used for the study of beads made of glass, amber, steatite, jadeite, ostrich eggshell, and bone. It is a non-destructive technique and no sample preparation is required, as most beads are sufficiently small to be scanned in their entirety. Other analytical techniques have also been experimented with to assess their potential for the study of ornament making, such as microscopes for measuring surface roughness (*e.g.*, Confocal Microscopy; Astruc et al. 2011; d'Errico et al. 2000; Wei et al. 2017) and Reflectance Transformation Imaging for examining incised carvings (Lauffenburger et al. 2015; Milner et al. 2016).

1.3.2. Adjusting the focus: studying ornaments from the Caribbean

The application of technological and, especially, microwear analyses to ornaments has been sparse in the Caribbean. Shell ornaments from sites in the French West Indies and Aruba have been studied, with emphasis on production sequences and toolkits (Lammers-Keijsers 2007; Serrand 1997; 2007). An experimental programme has been conducted alongside the study of shell bead-making remains from the workshop site at Grand Turk (Carlson 1993; 1995). In fact, experiments aiming to replicate the sequence of production and the use

of marine shell tools have been relatively more common in the region (Antczak 1999; Dacal Moure 1997; Lammers-Keijsers 2007; Lundberg 1987; O'Day and Keegan 2001). Despite the abundance of ornaments in lithic materials found throughout the Caribbean, there have not been many studies focused on their technology or use. Ornaments in lapidary materials from Saladoid and Huecoid contexts have received more attention from a technological point of view than later varieties (see Chapter 4 for a complete review). For instance, a study has been carried out on the reduction sequences involved in bead manufacture in lapidary materials, notably carnelian, from Montserrat (Bartone and Crock 1991; Crock and Bartone 1998). Four stages of ornament making were defined, involving hard hammer percussion and pressure flaking in the first two stages, respectively. The authors also recorded remnant drilled cones inside unfinished holes that suggest the use of hollow drill bits for perforating (Crock and Bartone 1998, 213). Other studies have been performed on assemblages recovered from sites in Martinique and St. Martin (Bérard 2004; Haviser 1999). Only a pilot experimental study focused on drilling technologies has been conducted, using SEM to examine traces produced on calcite (De Mille and Varney 2003; De Mille et al. 2008). In summary, despite the abundance of ornaments recovered from archaeological sites across the Caribbean, not many studies have focused on understanding crucial stages in their biographies. Chapters 4 and 5 provide more detailed reviews of previous studies focused on Caribbean ornaments, also including those primarily concerned with typology, iconography, raw material identification, and sourcing.

Microwear analysis of individual ornaments recovered from archaeological sites in the Caribbean will provide first-hand and fine-scale data that can be contrasted to the models reviewed in section 1.1. In order to create a dialogue and challenge previous ideas, we will investigate not only artefacts retrieved during recent systematic excavations, but also specimens from previously excavated and/or looted sites without good provenience data. Sites and collections that have for a long time served as basis for building the regional culture history need to be redressed by new approaches and methods, as noted at the onset of this chapter. Microwear analysis can be used to study artefacts with such different post-excavation biographies, provided that their limitations are acknowledged. Different collections require different approaches to their successful study. In each of the following chapters, collections of different composition and history of formation are researched. As a result, they have

experienced different degrees of modification after removal from archaeological sites or source communities. Furthermore, a great variety of ornament types and raw materials are encompassed in this selection. Different materials have different physico-chemical properties, which affect not only their workability, but also the formation of use-wear and their taphonomic preservation. Ornament types also varied considerably, encompassing minute "seed beads", 10cm-thick tubular beads, exquisitely carved anthropomorphic pendants, and a broad range of morphologies in between. The setting where the research was conducted oscillated between the Laboratory for Artefact Studies of Leiden University (Chapters 2 and 5), the Atelier de Conservation et Restauration of the Musée du quai Branly (Chapter 3), and field-based improvised laboratories in Grenada and the Dominican Republic (Chapters 4 and 5). This entailed the use of different microscope models for the studies: relatively portable equipment had to be transported to the Caribbean, while microscopes were available in the museum facilities in Paris. The Laboratory in Leiden is especially designed for microwear research; it thus provided ideal conditions for analysis. However, in many instances, it was decided not to take archaeological material from the Caribbean out of its country of origin. In each of the following chapters, the microscopic equipment used and the research protocol are specified. As a general rule, both low and high magnification microscopes were used. In spite of the differences in collections and research setting, the analysis form and registered features remained the same across all case-studies (form in Appendix 1). An image of the Access database used for registering each artefact can be found in Appendix 2. A supplementary analysis form was used for the ethnographic objects studied in Chapter 3 for general description (form in Appendix 3), alongside multiple forms for the individual ornaments that are part of each object. The cleaning protocol for ethnographic objects took into consideration their composite nature and fragility; it is described in detail in Chapter 3. For archaeological artefacts (Chapters 2, 4, and 5), the cleaning protocol involved carefully washing each artefact by hand in water with soap. When it was not possible to remove dirt by hand, artefacts were placed in an ultrasonic tank for a few minutes; this was only done in Leiden, as we did not have an ultrasound in the Caribbean. During analysis, the surfaces of artefacts were often cleaned with cotton soaked in alcohol or lighter fluid in order to remove grease produced by handling.

1.3.3. Reference collections

Bead research has a long tradition of experimental programmes, many of which concerned with technical performance, time expenditure, and craft specialization (*e.g.*, Francis 1982; Carlson 1993; Miller 1996; Yerkes 1993). Only a portion of these experiments have been carried out with the goal of reproducing manufacture traces for comparison to microwear data (*e.g.*, d'Errico et al. 1993; 2000; Groman-Yarolasvski and Bar-Yosef Mayer 2015; Gurova et al. 2013; Mărgărit et al. 2018; Tatá et al. 2014). In the present research, experiments related to ornament production were carried out to support interpretation. They have been performed in different occasions on the years of 2014, 2015, and 2016; experiments from the first two years have been previously reported elsewhere (Breukel 2019; Breukel and Falci 2017; Falci 2015). While the experiments of 2014 were exploratory, the experiments carried out in 2015 and 2016 were focused on addressing specific questions raised by the analysis of archaeological materials. Rather than replicating entire production sequences, I opted for reproducing individual techniques with use of different tools and additives. The techniques were intended to represent the main ornament making operations identified on the studied assemblages, namely blank acquisition (sawing), surface treatments (grinding and polishing), perforating (drilling and sawing), and carving for shaping or decorative purposes (incising and notching). In some cases, more than one technique was applied to a same bead blank; for instance, a surface was ground prior to polishing, while surfaces obtained through sawing were sometimes ground over. This provided insights on the micro-stratigraphy of traces, i.e. how traces belonging to earlier operations in the manufacture sequence would appear on (nearly) finished ornaments. Time was recorded for most experiments and photographic registration was made of all activities and products. The grinding and polishing experiments from 2016 were sequential experiments; in other words, casts were made of the worked surfaces at selected time intervals (for instance, 0', 15', 30', 60'). Moreover, the effects of the addition of abrasives (sand) and lubricants (water) were tested both individually and in combination.

Preference was given to working with only certain raw materials as ornament blanks, in particular those most common in the archaeological case-studies. This led to the choice of three marine shell species (*Lobatus gigas*, *Spondylus americanus*, and *Oliva reticularis*), one stony coral species (*Acropora cervicornis*), and the following lithic materials: calcite, diorite, amethyst, and, to

a lesser degree, nephrite and serpentinite. The contact materials (i.e. tools) used for each experiment were chosen on the basis of a range of factors: preliminary hypotheses concerning the origin of observed traces on archaeological specimens, regional availability of raw materials, hypotheses previously advanced (Clerc 1974; Rostain 2006; Rodríguez Ramos 2010b), experiments by other researchers (Carlson 1993; Kelly 2003; Lammers-Keijsers 2007; Melgar Tísoc and Andrieu 2016), ethnohistoric sources (Las Casas 1992, 587), and ethnographic sources from lowland South America (Koch-Grünberg 2005; Ribeiro 1988; Roth 1924). The complete list of experiments conducted for this research can be found in Appendix 4, while the standard form used for recording the experiments can be found in Appendix 5. The relevant experiments are described and illustrated in Chapters 2 and 5, where they serve as basis for interpretation. Chapter 4 refers to the preliminary results of the sequential grinding and polishing experiments.

For the interpretation of ornament use-wear, we referred to published experiments that describe its location, characteristics, and formation rates (Álvarez Fernández 2006; Brasser 2015; d'Errico 1993a; d'Errico et al. 1993; Langley and O'Connor 2016; Mărgărit 2016; Minotti 2014; Vanhaeren et al. 2013; Verschoof 2008). The contributions and limitations of use-wear experiments for the study of ornaments are discussed in-depth in Chapter 3. Replicating the use of ornaments was not part of the experimental programme carried out here; this was due to the large number of studied raw materials and of artefacts that have undergone multiple stages of production. Their replication for use experiments would require more time and resources than at disposal. Here I investigate use-wear formation on ornaments through the systematic analysis of ethnographic composite ornaments. The studied objects belong to the lowland South American collections of the Musée du quai Branly. The choice for objects from this region is related to the traditionally advanced connections between this region and the Caribbean, as referred to in section 1.1. The studied objects include components made of mollusc shell, animal bone, quartz, among others. Even though we cannot control for variables such as use duration and contact materials when looking at such objects as a reference collection, they do provide a valuable window into attachment systems and the ways that individual components would have undergone processes of wear in real life. The variety of processes an ornament undergoes in its lifetime is very difficult to replicate in experimental programmes. A thorough overview of this study and its results can be found in Chapter 3.

1.4. Thesis outline

The remainder of this dissertation is composed of four chapters and a concluding chapter. The four main chapters have been published in peer-reviewed journals, as independent contributions to ornament studies and circum-Caribbean archaeology. The order of the chapters should not be regarded as a strict and predetermined sequence. Instead, it should be conceived as a beadwork: individual chapters are connected to each other at multiple levels and rely on each other for interpretation, but do not need to be read in the presented order. Nonetheless, they are separated in two consecutive parts, each dealing with one of the two main goals of this dissertation as proposed earlier in this introduction (Figure 3). The aim of Part 1 (Chapters 2 and 3) is to develop an approach for researching the biographies of bodily ornaments, taking into account challenges that are particularly common in circum-Caribbean archaeology—but, certainly not exclusive to it. In this sense, they provide the basis for the interpretations that will be made in the second part of the dissertation.

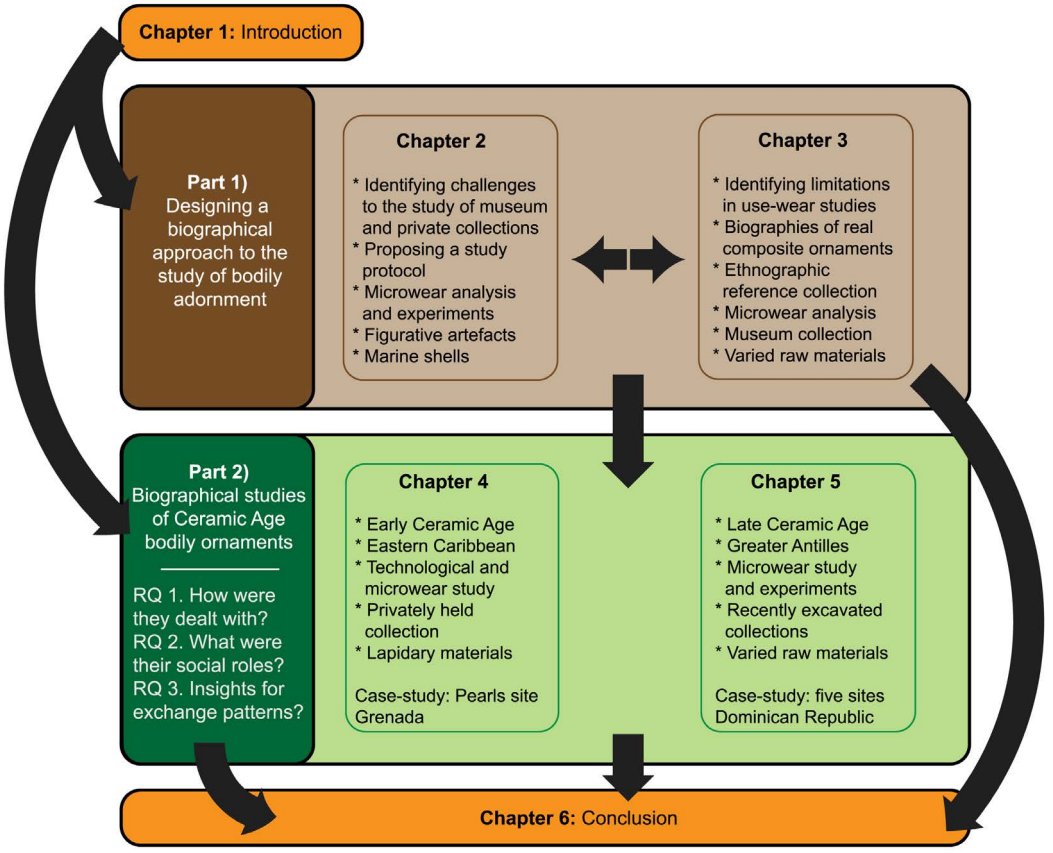

Figure 3: Graphical representation of the outline of this dissertation.

Part 2 (Chapters 4 and 5) focuses on applying the biographical approach developed in the previous chapters to the study of assemblages of ornaments from the two case-studies selected here. Each chapter primarily deals with the first research question posed above, i.e. how people dealt with ornaments in each of the studied contexts. The two case-studies give us the opportunity to delve into the biographies of ornaments not only from two different time periods, but also from different types of sites and assemblages: 1) a large assemblage of ornaments in different stages of production from a workshop site and 2) smaller assemblages of finished ornaments from settlement sites. In this sense, they illustrate the wide applicability of the approach proposed here. Both chapters include a review of archaeological debates surrounding ornaments and their raw materials for the relevant time period. The newly generated microwear data is interpreted in the form of ornament biographies, which are then contrasted to previous narratives about the socio-political roles of bodily adornment and its exchange.

Part 1: Designing a biographical approach to the study of bodily adornment

Chapter 2: Identifying challenges and proposing solutions

In this chapter, a case-study from north-central Venezuela is used as basis for developing a protocol for approaching ornaments from circum-Caribbean collections. We carried out a microwear study of 15 archaeological marine shell figurative ornaments from an early 20th century collection of the Ethnologisches Museum Berlin.[7] This study deals with specific challenges faced during the analysis of collections that do not have (abundant) associated data concerning their provenience or specific archaeological context. This chapter, therefore, proposes an avenue for studying ornaments such as those found in many museum and private collections around the world. As (mostly) finished artefacts with no associated tools, production remains, or clear context of usage or deposition, the detailed analysis of their surfaces through microwear analysis offers one of the few avenues into their biographies. With this in mind, we propose a protocol for dealing with the micro-stratigraphy of traces observed on the surfaces

7 This research has been presented in its entirety in the author's Research Master thesis (Falci 2015). The processes of recontextualizing this collection in relation to, first, its particular history and, second, to trends in research and collecting in the Valencia Lake Basin are discussed in another two published journal articles (Antczak et al. 2019; Falci et al. 2017).

of such artefacts, involving technological stigma from multiple stages of production, use-wear and rejuvenation, post-depositional surface modifications, and curatorial interventions. The paper contextualizes the studied material in relation to other figurative ornaments, notably pendants, recovered across the Caribbean and northern South America. Similarly figurative artefacts in lithic materials and marine shells from the Antilles will be discussed in Chapters 4 and 5, so Chapter 2 also sets a protocol for investigating such complex items. The contents of this chapter have been published as the following:

Falci, C.G., Van Gijn, A.L, Antczak, M.M., Antczak, A.T., Hofman, C.L., 2017. Challenges for microwear analysis of figurative shell ornaments from pre-Colonial Venezuela. *Journal of Archaeological Science Reports* 11, 115-130. http://dx.doi.org/10.1016/j.jasrep.2016.11.029

Chapter 3: Ornament biographies and use-wear studies

Following one of the research avenues in need of further study suggested in the previous chapter, this chapter looks at ethnographic collections of ornaments from lowland South America. The 38 objects studied here belong to multiple 19th-20th century collections housed at the Musée du quai Branly (Paris). Many specimens are composite objects, incorporating components made of organic, inorganic, and biomineral materials. The chapter reviews studies of ornament use-wear and notes some of their limitations. It critically discusses how the biographies of composite ornaments contrast to common archaeological interpretations, in particular regarding use-wear types and distribution. In other words, composite ornaments from real-world contexts are complex constructions whose biographies do not necessarily proceed in a linear manner. Many of the studied raw materials (*e.g.*, shell, bone, quartz) feature in the case-studies that follow; the ethnographic collection will thus be used as reference for the interpretation of use-wear. The contents of this chapter have been published as the following:

Falci, C.G., Cuisin, J., Delpuech, A., Van Gijn, A.L., Hofman, C.L., 2019. New insights into use-wear development in bodily ornaments through the study of ethnographic collections. *Journal of Archaeological Method and Theory* 26(2), 755-805. http://dx.doi.org/10.1007/s10816-018-9389-8

Part 2: Biographical studies of Ceramic Age bodily ornaments

Chapter 4: A clash between production and exchange: lapidary biographies

The first case-study concerns the circulation of lapidary materials during the early part of the Early Ceramic Age in the eastern Caribbean. We focus on the study of a large private collection of ornaments retrieved from the site of Pearls on the island of Grenada. The site has been regarded as an important node in exchange networks of the period for its size, abundance of recovered materials, and proximity to South America (as discussed in section 1.1.2). This chapter presents the results of a combined study, involving identification of lithologies and technological analysis of 1273 ornaments in varied lithic raw materials and in different production stages. Of this total, a sample set of 100 ornaments was analysed for microwear. The studied collection is recontextualized through comparison with data stemming from previous research on the Pearls site and on other lapidary workshops from across the Caribbean. The combined use of these research methods provides insights on production logics and management strategies specific to each lapidary raw material. While the research carried out in this chapter is guided by a *chaîne opératoire* approach, the distribution of lapidary production sequences not only across time, but also across space highlights the importance of a biographical perspective. Only by tracing networks of action as expressed through the "fragmented" production sequences of many ornament materials, can we reconstruct past networks of interaction taking place across the Caribbean Sea. The contents of this chapter have been published as the following:

Falci, C.G., Knaf, A.C.S., Van Gijn, A.L., Davies, G.R., Hofman, C.L., 2020. Lapidary production in the eastern Caribbean: a typo-technological and microwear study of ornaments from the site of Pearls, Grenada. *Archaeological and Anthropological Sciences* 12:53. https://doi.org/10.1007/s12520-019-01001-4.

Chapter 5: Recollecting lost beads: the biographies of ornaments from settlement sites

The second case-study concerns bodily adornment in the later part of the Late Ceramic Age in the Greater Antilles. As reviewed in section 1.1.2 and further argued in the chapter itself, ornaments are assumed to have a role in reinforcing inherited social hierarchies. However, few studies have been concerned with material-based research of ornaments from the period, despite

the great interest they have generally sparked. In this chapter, assemblages from five recently excavated settlement sites in the Dominican Republic are studied: the neighbouring sites of El Flaco, El Carril, and La Luperona in the northwestern region[8], the site of Playa Grande on the northern coast, and the site of El Cabo on the eastern coast. The 312 recovered ornaments are made of a broad range of raw materials, but with clear predominance of calcite, plutonic rocks, and marine shells. The ornaments have been exhumed through modern and systematic excavation techniques, in contrast to materials in the previous chapters. Nevertheless, we are faced with challenges when making sense of such artefacts, albeit different ones: most of them are finished specimens, have been recovered either in isolation or in small groups from across the sites and in non-structured deposits, are not associated to identified ornament production tools or remains, and are not placed in burials that could offer insight on mode of wear and composite ornament type. A microwear study of these assemblages can provide a new perspective on their biographies and on the regional variability in ornament types, technologies, and raw materials. All artefacts were thus studied through microwear analysis and 10 specimens underwent μ-CT scanning to provide better visualization of their perforations. While researchers have stressed the role of bodily adornment in exchange, the widespread regional occurrence of the raw materials from which the studied ornaments are made prevents sourcing efforts. We circumvent this limitation by identifying ornament morpho-technical groups and their occurrence patterns across the five studied sites. The identification of such groupings provided insights into possible regional connections. The contents of this chapter have been published as the following:

Falci, C.G., Ngan-Tillard, D., Hofman, C.L., Van Gijn, A.L., 2020. The biographies of bodily ornaments from indigenous settlements of the Dominican Republic (AD 800–1600). *Latin American Antiquity* 0, 1-22. https://dx.doi.org/10.1017/laq.2019.101

In the concluding chapter, the main findings of each study are revisited. In particular, the biographical patterns for ornaments in each time period are

8 Part of the research on the ornaments from the northwest of the Dominican Republic has been presented in the author's Research Master thesis (Falci 2015). It included materials from the 2013 and 2014 excavations of El Flaco and La Luperona, in addition to specimens recovered during surveys in the region.

summarized. The second and third research questions are addressed in this chapter: the contributions of our study to the understanding of exchange are discussed, at the same time as providing insights on the social roles held by bodily ornaments in the Caribbean. Furthermore, the contributions and limitations of the chosen approach and methods are evaluated. The implications of the results obtained here in regards to the (microwear) study of ornament collections are also stressed. Finally, avenues for future research are proposed.

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