Peirce's Semeiotics: A Methodology for Bridging the Material-Ideational Divide in IR Scholarship

1 Introduction

Within the interpretive turn in IR scholarship an understanding emerged that material objects are in-and-of-themselves meaningless, and acquire meaning only as a result of the intersubjective processes of meaning making that humans impose upon things. Yet, things can at times impose their meanings upon us. They are not purely passive, and can acquire agentic dimensions of their own. Take the example of a drone (Holmqvist, 2013). It video streams real-time images of distant places into the control room of the drone operator. As it does so, it provides the technical means to kill from a distance (or to survey wildlife in a national park), while the images it conveys to the drone operator leave an irreducible impression upon her/him. Many drone operators suffer from Post Traumatic Stress Disorder, which the American Army certainly would like to avoid, if only it knew how. The images transmitted by drones contain a certain materiality, a factuality, which reaches beyond interpretations and reinterpretations. These images are thus at least partly located outside of the hermeneutic circle. They differ from a movie in that they indexically transmit real life events that are happening in that very moment elsewhere, and which are tied to the actions of the drone operator. They provide the technical means to perform certain acts, and they provoke certain kinds of emotions. The purpose of the present paper is to develop a systematic methodology that allows us to study how material signs can at least partly create meaning without that we would have to rely on entirely ideational arguments about the social world.

A rising number of scholars in international relations have reintroduced materiality into their accounts of socially meaningful action. Practice scholars highlight how embodied practices are simultaneously material and ideational (Adler and Pouliot, 2011; Adler-Nissen, 2012; Bueger and Gadinger, 2015; Hopf, 2010). Actor-network theorists argue that artefacts are not simply objects, but actants, which shape the behaviours of human beings (Best and Walters, 2013). Others reach much further and attribute a certain independent vitality to matter, with which they explain a vast array of

phenomena, including the impressions garbage leaves on us, the operations of electricity grids, and the effects of food on our moods (Bennett, 2010). We can loosely group these strands of scholarship under the heading of New Materialisms, even as the authors differ on the degree of autonomy, agency, and effects they attribute to matter (Coole and Frost, 2010; Lundborg and Vaughan-Williams, 2015; Srnicek et al., 2013). Common to all New Materialists is the view that matter plays an irreducible role in social relations and does not entirely depend upon what people make of it. At the same time, New Materialists take seriously the poststructuralist critiques of the old materialisms of realist and some strands of Marxist scholarship. They thus avoid a purely functionalist account of materiality devoid of meaning-making. Various strands of New Materialism have produced an impressive range of theoretical and empirical contributions that highlight the interpenetration of the material and the ideational. Yet, to date no sustained debate has taken place about the methodological foundations of such an undertaking.

The present paper makes a start in developing a systematic methodology for the New Materialisms. To be sure, the paper is less ambitious in its scope than the full spectrum of New Materialism. Notably it falls short in providing a methodology for vitalist claims, which attribute a certain life force to matter. The purpose of the paper is to highlight ways in which we can study the meanings materiality can create in processes of signification without having to resort to purely ideational modes of analysis, or being trapped in an exclusively functionalist and mechanical understanding of materiality. It proposes conceiving of embodied practices and things as material signs that can sometimes communicate more abstract concepts and structures directly, without the intervention of discourse or background knowledge. I introduce Peircean semeiotics to accomplish this. Peircean semeiotics can retain a sign's materiality, taking into account that how material things signify differs from the conventional understanding of how language signifies, namely by arbitrary social convention. To be sure, material things can signify by arbitrary social convention (humans can impose meaning upon things), but they can also signify by similitude. Rene Magritte drew attention to this often forgotten process of signification in his painting *Ceci n'est pas une pipe*: A painting of a pipe is not actually a pipe, but a sign that refers to a pipe (Foucault, 1983). Furthermore, signs can signify by being causally connected to the object they represent, which is their indexical

dimension. Through satellite relays a drone's video images get sent to the control station, and by virtue of this indexical connection they represent the surveillance target. In Peircean semeiotics the relation by which a sign represents a particular object is separate from how a sign is interpreted. The three forms of signification (by social convention, by similitude, by causation/contiguity) can be interpreted by provoking a thought in the person who notices them, but they can also provoke an emotion or an action—that is, they can provoke a response that has a material impact on the world. Humans can change matter. The drone operator can fire and develop Post Traumatic Stress Disorder as he/she observes the consequences of his or her actions.

While Peircean semeiotics provides a potential platform for integrating materialist analytical tools and discourse analysis approaches into a single framework, it also differs fundamentally from both. Different from discourse analysis, it suggests not only that language affects how we see the world, but also that what we see in the world affects our modes of communication. Peircean semeiotics deviates from old materialists' typical understanding that signs objectively represent an independent reality by highlighting that even though there can be a direct causal relation between the signs we observe and the material objects those signs are supposed to represent, such a causal relation is not a necessity.

While available materialist and discourse analysis tools have their own raison d'être, they have some limitations for analyzing specific phenomena. These limitations become particularly apparent in the analysis of artifacts – a seldom-studied phenomenon in IR, perhaps because an appropriate research apparatus has been lacking. Take the example of a gun. Following realist premises the possession of weapons exerts power because of their potential to kill, but guns can serve numerous other social purposes. For instance, in the seventeenth century differences in rank (and wealth) within an army were expressed in the luxurious ways in which officers' weapons were decorated, not in their superior killing power. Furthermore, many aristocrats established weapons collections to exhibit the honour and good taste of their family.[1] In another case the very same weapons serve in an exhibition, as the historical testimony of a bygone era. The symbolic and functional

[1] Imperial Armory, Military Historical Institute, Schwarzenberg Palace, Prague, Czech Republic, Visit on the 26th of December 2012

purposes of a gun vary, and yet they are limited by its very materiality. A gun is not a useful device for learning how to swim, and it cannot symbolize the medical achievements obtained in cancer treatment. In Webb's (2003: 411) words, "the goal is to open up social analysis to the historicity and social power of material things without reducing them either to being only vehicles of meaning, on the one hand, or ultimate determinants, on the other."

The present paper proposes Peirce's semeiotics as one possible methodological apparatus for achieving this goal. It first highlights that more work needs to be done in the methodological realm in order to catch up with the significant theoretical achievements New Materialists obtained in transcending Cartesian dualism. Subsequently the paper highlights the ontology of a Peircean semeiotics with its focus on the interpenetrated nature of the ideational and the material. It then develops a specific research method and strategy derived from the tools provided by Peircean semeiotics, with a particular emphasis on the index as a sign that represents through causal/contiguous connection and the icon as a sign that represents by similarity, while simultaneously maintaining with the symbol a sign that represents its object because of a social convention that it does so. The last section demonstrates how Peirce's semeiotics can be applied to analyse GDP as an inscription device—a material sign that physically inscribes elements of reality on paper and into computer programs.

Before proceeding, a note of caution is called for. The goal of the present analysis is not to provide an authoritative account of Peirce's theory, but to demonstrate the usefulness of Peirce's semeiotics as a tool for International Relations analysis. Peirce's insights are scattered across a range of long and short writings, and the lack of single, synthetic work makes indentifying a unified account difficult. On the one hand this has led to a considerable neglect of his work (Hookway, 1985; Short, 2007; Short, 2004). On the other hand it has contributed to significant disagreements among Peirce scholars about how to interpret the often incomplete and at times contradictory sketches Peirce has bequeathed to posterity (see for example Liszka, 1996; Short, 1996; Short, 2004). Instead of arbitrating between competing interpretations of Peirce's work, I highlight how a Peirce-inspired methodology can solve some of the emerging issues in IR scholarship.

2 IR methodological approaches seeking to bridge Cartesian dualism

The New Materialisms avoid the Cartesian dualism between the ideational and the material, which has haunted IR scholarship for so long with poststructuralists, postmodernists and some constructivists (among others Ashley and Walker, 1990; Kratochwil, 2000) on one end of the spectrum and neorealists and historical materialists on the other end (see for example Krasner, 2000; Wallerstein, 1979; Waltz, 1979).[2] Matter partly creates meaning on its own terms and has constitutive effects on embodied humans, who are fully immersed within its purview. Humans, in turn, shape matter through their actions. "Consciousness emerges from, yet remains enmeshed in, this material world" (Coole 2010: 101).

Despite this important message, the New Materialisms have not yet moved beyond the observation that matter operates as an actant, is vibrant, and has an agency of its own. It is not clear how exactly material things can at least partly create meaning and have constitutive effects upon humans. Unless we develop appropriate methodological tools, there is a danger that New Materialists will fall into the trap of functionalism and focus on process tracing a series of material effects and their impacts (Aradau, 2010; Lundborg and Vaughan-Williams, 2015; Mitchell, 2014), that they will return to purely discursive modes of analysis, or that they will fall prey to the critique that they are analyzing without any systematicity personalized impressionistic affects that certain kinds of matter leave upon them. Thus Bennett, one of the most cited New Materialist scholars in the social sciences, has difficulties specifying her methodology. By her own account she has "tried to learn to induce an attentiveness to things and their affects from Thoreau, Franz Kafka and Whitman…" (Bennett, 2010: xiv) with the result that "stuff exhibited its thing-power: it issued a call, even if [she] did not quite understand what it was saying. At the very least, it provoked affects in [her]" (Bennett, 2010: 4).

While the difficulties with this kind of personalized impressionistic account are apparent, discourse analytical approaches also do not provide an adequate framework to

[2] I define ideas as the intersubjectively shared interpretations and understandings of social reality rather than as individually held causal beliefs, as neoliberal institutionalists tend to do (Goldstein and Keohane, 1993).

fully tease out the material dimension of meaning making. In a discourse analysis approach, signifiers do not relate to the signified, but rather to other signifiers. Intertextual relations are more important than a connection to objects in the material world (Doty, 1993). The goal is to identify how language constitutes and produces power. Because language creates meaning, it directs the possiblities for action (Hall, 2003; Milliken, 1999). In this sense discourses have real material effects: "The words that [high level officials] write and speak do have extraordinary power. With the stroke of a pen, people can get turned into friends or enemies, while their villages are turned into targets or free fire zones" (Milliken and Sylvan, 1996: 323).

Speech act theory shares with discourse analysis the idea that language can result in real material effects, because we can act through verbal utterances (Searle, 1995). The speech act itself is an event, a material occurrence whose force depends to some extent on the place from which it emanates, and on the institutional backing it receives (Waever, 1995). Foucault (2010) shares this perspective in his *Archaeology of Knowledge*.[3] So there are material elements in different branches of discourse analytical scholarship. However, while discourse analysis has developed a sophisticated toolbox to study discourses—predicate analysis, binary oppositions, and metaphorical analysis—it does not provide systematic guidelines for studying the material side of the equation or interrelating the material and the ideational.

Perhaps for this reason some authors suggest that even the material world can be read like a discourse, or a text. In IR scholarship Neumann (2008: 75-76), for example, develops a discourse analysis toolkit, suggesting, "tool two would be an equalizer that makes other phenomena (for example, a semaphore, an ad, a body) into material to be analyzed on a par with texts. Tool three would be something like a herding dog that would group these phenomena together based on them being about the same thing. Tool four would be a slicer, cutting the phenomena into different representations of the same thing. Tool five would be some kind of optic device that would make visible the meaning dimension of the material phenomenon to its users." Yet, employing the same discursive

[3] Foucault's understanding of the relation between the discursive and the material is very complex, and subject to sustained debates, whose elaboration would reach beyond the scope of this paper (Hekman, 2009; Kelly, 2009). It appears clearly,though that, for Foucault a non-discursive reality exists, and interacts in complex ways with discourses (see, for example, Foucault, 2010: 175, 186). In some of his writings Foucault even appears to adopt a Peircean semeiotic approach (Foucault, 1983).

tools used for the analysis of language to analyze material objects means that the sign an object represents is unrelated to the materiality of that object, just as a word like *dog* is arbitrarily attributed to the barking being with four legs and a wagging tail. The problem with analyzing material objects as words incorporated in a discourse is that we lose their materiality, the functional effects they can have, the bodily perception, and the component of pre-discursive practical knowledge that is attached to them. Thus, while material objects do form a code that has to be decoded in order to understand the meaning of objects and their constitutive effects, merely extending the linguistic model to all forms of signification is insufficient.

On the other end of the spectrum, scholars focusing on the material side of reality have automatically assumed an unequivocal link between material reality and what that reality signifies or how it is being signified (Chase-Dunn, 1979; King et al., 1994; Pape, 2003).[4] Under these circumstances the goal of research is to identify generalizable causal connections between dependent and independent variables with the help of either large-N studies, case studies, or both in the form of mixed methods approaches. With such premises, context-dependent meaning cannot be taken into account — only the functional dimension of material reality is being considered. More recently, it has become common for scholars to add an ideational component as an additional independent variable to the analysis (Nelson, 2014; Nye, 1990). However, such approaches analyse an ideational dimension next to material elements without considering the profound interconnectivity between the two. Quite frequently these approaches treat the ideational dimension in the same way they treat the material components in their analysis. That is, they focus purely on its causal and functional effects, as if ideas were another, independent, element of material reality, merely one that cannot be touched or seen.

In order to eliminate the difficulties linguistic and materialist approaches each face in isolation, many scholars mix several methods to study the combined effects of material and ideational phenomena and highlight the cumulative effects of symbolic and functional forces (Checkel 2005; Sil and Katzenstein 2010). For example, Pouliot (2007) has coined the term "sobjectivism" to express the combination of a "recovery of subjective meanings," with the help of such methods as ethnography and qualitative

[4] The literature is too prolific to list it all; the references cited serve merely as a few illustrations.

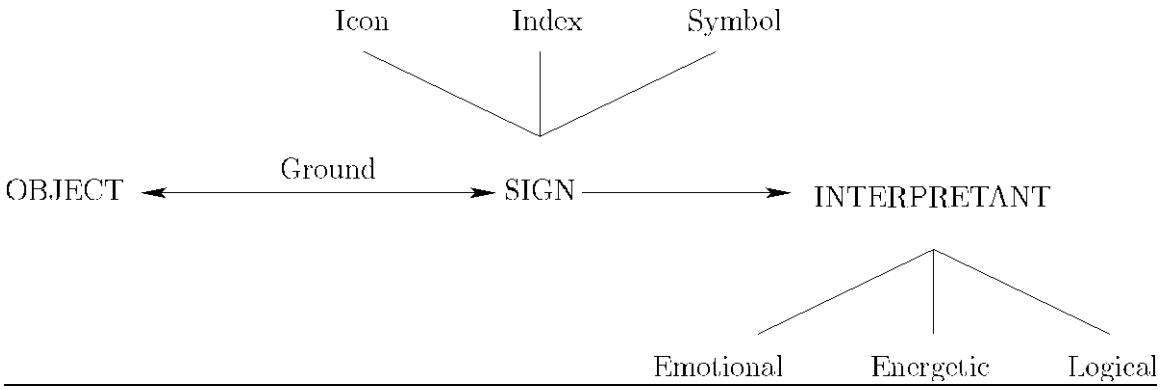
interviews, and their intersubjective contextualization through discourse analysis. He sees discourses as "productive of the social realities they define" (Pouliot, 2007: 371) and establishes a dialectical relationship between reality and discourse, in the sense that "discursive intersubjective structures falter unless constantly instantiated and reinstantiated through agents' practices." Pouliot's work effectively demonstrates the interplay between materiality and discourses. But, as with other mixed methods approaches, it does not fully address the question of how we can systematically study the meaning generated by practices and things which directly emerges from them and exists beyond their discursive interpretation.

Peircean semeiotics is one possible way to systematically study practices and things as material signs that partly incorporate discursive elements in them, but that can also communicate meaning non-discursively. Perhaps the main advantage of a Peircean semeiotic approach is that it provides a clearly structured framework to study the interpenetrated nature of the material and the ideational. While a few scholars in other disciplines, such as anthropology, archaeology, tourism studies, or communication studies have used a Peircean semeiotic approach (Lele, 2006; Metro-Roland, 2009; Mick, 1986), to my knowledge in IR only Kangas (2009) has used Peircean semeiotics, in her study of popular culture as interpretants of International Relations. The present paper adds to Kangas's work by extending its reach, and suggests that a Peircean semeiotic approach can provide a useful analytical framework for the New Materialisms emerging in IR scholarship.

3 Peirce's semeiotics

Before delving into an in-depth analysis of Peirce's semeiotics, I will first provide a brief overview of his basic semeiotic apparatus. This sketch can serve the reader as a roadmap to which she can return for orientation when getting lost in the argument: Peirce's semeiotics is based on tripartite divisions, the most fundamental of which is his tripartite division between an object; a sign, which represents the object; and an interpretant, which is the potential for interpretation resulting from the sign. A sign represents an object thanks to a ground, which is the relation that links the sign to the object. Depending on that relation we classify signs into icons (representing based on similarity), indices

(representing based on a causal or contiguous relationship) and symbols (representing based on a social convention). It is noteworthy that the arrow between object and sign runs in both directions because at times the object leads to the creation of the sign, while at other times the sign creates its object. Lastly, the sign brings about a particular interpretant, which is the possibility for interpretation. The interpretant can be classified into three possible forms of interpretation: emotional (resulting in feelings), energetic (resulting in action), and logical (resulting in thoughts). The graph below provides an overview of these tripartite divisions and the following sections will analyze them in more depth.



3.1 Peirce's ontology: a rejection of the dualism between the material and the ideational

Like the New Materialisms, Peirce's semeiotics is based on an understanding of the continuity between mind and nature. The effects of our thoughts are displayed in the environment so that we cannot discern a clear boundary between the two (Short, 2007: 9). Clark (1997) notes similarly that we tend to externalize our mind onto the world. For example, we use a pen and a piece of paper to make complicated calculations, or when we write on a computer we move chunks of text around on the screen to organize our thoughts. Our thought processes are not purely ideational, but inextricably linked to the manipulation of material objects, and by consequence those objects structure our thought processes.

According to Peirce "it is much more true that the thoughts of a living writer are in any copy of his book than they are in his brain" (Peirce, 1931-1935, Vol. 6: 364).[5] A book is neither purely material nor purely ideational, but rather a combination of the two, even though an excessive focus on "symbols, which signify via arbitrary convention, has led [scholars] to treat 'material qualities' of a sign, such as a word's letters, as entirely irrelevant to its signification" (Legg, 2008: 225). In contrast, Peirce focused on the "concrete instances where the specific material quality of a sign enables it to function as the precise kind of sign it is, thus in turn enabling the precise kind of reasoning it makes possible" (Skagestad, 2004: 251/ 252).

For example, perspectival painting operated as a sign system that permitted Renaissance artists to identify new geometrical regularities that then contributed to the development of modern mapping techniques with which the territorial state could be represented (Branch, 2011; Edgerton, 1975). The vanishing point is the central element that orders the proportionality of all the other elements in the painting into a singular, unified, and abstract space with the help of a grid system. The exact location of the elements in the painting, their spatial relations to each other, and the distances between them all become discernible to the viewer. Perspectival painting allowed for the development of projective geometry. Out of a fascination for linear perspective, artists started to draw city views from an oblique elevation, as bird's-eye views. Initially these oblique positions were actually existing views of the city, for example from a hill. Once the city-view became an imagined view, such as in da Vinci's drawing of Milan, it was necessary to perform "an abstraction based on the principles of mathematical perspective in an effort to preserve accuracy" (Rees, 1980: 69). From here it was only a small step to draw a city-view from an entirely vertical perspective. Because such a vertical view from directly above the city did not exist at the time, painters had to extrapolate it with the help of similar geometrical calculations and methods of triangulation as the ones used for the imaginary oblique perspective (Smith, 2008). But a city view drawn from a position

[5] This differs from, for example, Bourdieu (1990) and Searle (1995), who conceive of the habitus and the background as the aggregate of individuals' dispositions and beliefs. Peirce and Popper share the perspective that ideas exist objectively, beyond the individuals' minds. They disagree, however, in that for Popper (1978) thoughts are located in a World 3 that is causally linked to the World 1 of material objects, whereas for Peirce the material objects are inseparable from the thoughts they contain (Haack, 1977). I thank Emanuel Adler for clarifying this point.

vertically above the city and in line with the rules of linear perspective is nothing other than a modern map. To depict territorial states it was merely necessary to extend the scope of the map. Projective geometry then allowed establishing an indexical connection between the map and the terrain, and by virtue of this indexical connection the map could resemble the terrain, it could function as an icon of the territory.

3.2 Towards a method of Peircean semeiotics

Peirce's semeiotics permit us to decodify material and linguistic signs. We can trace how the combined effects of Peirce's tripartite division of signs into icons, indices, and symbols establish a rich sign system with a variety of communicational patterns.[6] These in turn result in emotional, energetic, and logical interpretants that subsequently alter the reality that will enter the sign system.[7]

The first step of this method is to search for signs that represent the objects that interest us by gathering qualitative data to serve as the raw material for the analysis. Any of the existing methods of data gathering can be useful, including participant observation, qualitative interviews, archival research, site-visits, museum and exhibition visits, or secondary literature researches (Bueger, 2014; Yanow, 2000).

The next step is to identify the grounds upon which the collected signs represent their objects. The ground is the relationship that connects the sign to the object; it is the reason that a sign represents a given object. In other words, not every characteristic of the sign is important for establishing its representativeness. For example, a color-filled map of a country represents that country's territory because it resembles the country's shape and is causally connected to its geography by surveying techniques. But the concrete color used for filling the map is irrelevant. Furthermore, different signs can represent the same object, in each case focusing on a different ground (Short, 2007). Thus while a map is simultaneously indexically and iconically linked to the country, a flag represents a country by social convention. Peirce classified signs into icons, indices, and symbols based on the ground that connects the sign to its object. This tripartite differentiation

[6] Peirce distinguished between up to 66 categories of signs (for more detail see Liszka, 1996 or Short, 2007). However, the distinction between icon, index, and symbol is generally considered the most significant of Peirce's classifications (Hookway, 1985; Liszka, 1996) and it is the most pertinent for our analysis.

[7] Peirce's semeiotics can lead to a myriad of other methods (Liszka, 1996; Skagestad, 2004).

provides the researcher with a vocabulary that directs her attention to the different relations by which signs can signify a particular meaning.

3.2.1 The index

It is probably easiest to first identify the indexical relations between signs and their objects because the index establishes a direct physical connection to its object (Skagestad, 2004) that exists independently of social convention (Atkin, 2005). The indexicality of speech, for instance, ties spoken words to the person of the speaker and her position – a tool, which can be useful for speech act theorists.

Index and object can be physically connected in two different ways. First, the object and the index can be connected on the basis of spatial and temporal proximity (Goudge, 1965; Liszka, 1996: 38). The index can draw our attention to a particular object. Arrows are typical examples of indices. Yet we can broaden the notion of the index much further. The index can include memorial plaques, which highlight that a particular event occurred in a certain location. Perhaps even more politically salient, many religious sites derive their significance from being the location of a particular event, from containing holy relics, and/or from being the site of daily practices of worship. There is often a material and irreplaceable relation that ties the religious site to specific events or things, even though it is not a functional relation. How those ties are then interpreted, and which kinds of emotional reactions, thoughts, or actions they evoke, will be different for different people (Hassner, 2003). Without a Peircean semeiotic approach it can be hard to discern how sacred space can contain a material dimension of sacredness (which is its indexicality tied to the occurrence of a particular event, the positioning of relics, etc.), while simultaneously being subjectively sacred, i.e. how that indexicality is interpreted depends on the eyes of the beholder. Goddard (2006), for one, did not grasp the material dimension in Hassner's argument, which led her to claim that her own argument about the intersubjective construction of the indivisibility of sacred space is superior to Hassner's claim of subjectively held beliefs of sacredness. Yet, the indexicality of sacred space means that there are hard limits to socially constructing sacredness, which is important for understanding the intractability of many conflicts over religious sites, as well as the search for possible solutions to those conflicts. Acknowledging this indexical

dimension has the advantage of taking religion seriously and not entirely reducing it to a social construction (Gregory, 2006).

Next to a connection based on spatial and temporal proximity, a causal relationship can exist between an index and its object. This can be based on the need for financial resources to obtain a particular sign or because of a functional link that connects the sign to its object. Much of the newly emerging status literature focuses on this dimension. For instance, China's aircraft carriers represent China's increasing economic wealth and development: aircraft carriers are very expensive and require high levels of technological and organizational skill to operate (Pu and Schweller, 2014). It is not surprising that there is a correlation between the acquisition of aircraft carriers and the availability of economic resources: "China is not a unique case as there is always a clear correlation between economic resources and the strength of naval power" (Pu and Schweller, 2014: 156). The indexical relation here merely indicates that a state has the necessary resources to be able to afford aircraft carriers; it does not tell us anything about how others interpret this acquisition, whether as an unnecessary wastage, a threat, or an awe-inspiring move.

Quantitative research makes use of the index when employing 'proxies' as measurable variables that are causally related to potentially immeasurable phenomena. For example, number of battle deaths is frequently used as an indicator for the intensity of a war, or income can serve as a proxy for social class (Bryman and Cramer, 2009). It is of course not possible to simply assume the validity of proxies. Researchers need to clarify "the extent to which a measure assesses the construct that it is intended or supposed to measure" (Cramer and Howitt, 2004: 36). Even so, proxies can be extremely useful indicators in a large variety of different fields. For clarification, it is worth noting that the causal relationship inherent in the index differs from the positivist understanding of causality: the indexical causality is merely a causality between an object and its sign. It does not necessarily establish causality between a dependent and an independent variable as two phenomena of a real and unmediated world.

We can often identify the existence of an indexical relation between an object and a sign in language usage with the help of the rhetorical device of metonymy. Metonymy is a common linguistic practice that signifies the use of "one entity to refer to another that is related to it" (Lakoff and Johnson, 1980: 35). "Metonymic concepts are grounded in

our experience. In fact, the grounding of metonymic concepts is in general more obvious than is the case with metaphoric concepts, since it usually involves direct physical or causal associations" (Lakoff and Johnson, 1980: 39). Lakoff and Johnson provide numerous examples of daily usage of metonymy, such as "Wall Street is in a panic" or "the White House isn't saying anything" (Lakoff and Johnson, 1980: 35-38). We can identify from these phrases that there is a direct association of physical proximity between Wall Street and the New York stock exchange, as well as between the US presidency and the White House.

3.2.2 The icon

Because the indexical relationship merely establishes a material connection between a sign and its object, it is subsequently necessary to deduce specific characteristics of the object from the sign at hand. One way of doing this is to identify an iconic relationship between a sign and an object (which can at times also exist independently of an indexical relationship). An icon represents an object because of a similarity in a particular characteristic shared by both sign and object. The resemblance that relates an icon to its object can be sensory—for example, a pictorial resemblance. The portrait of a king is an icon in the sense that it resembles the king. But Peirce also considered music an icon because it incarnates musical feelings, which are its object (Short, 1996).

Furthermore, the relationship between icon and object can be a structural resemblance, in which case "[the icon's] parts should be related in the same way that the objects represented by those parts are themselves related" (Legg, 2008: 207). Analogies are a typical example, because they establish a relational resemblance where the relation between A and B is the same as the relation between C and D (Liszka, 1996). Diagrams are another category of icons that represent through structural resemblance; a typical example is a graph representing economic growth in a given country.

Icons as means of signification can be found outside of language and cognition; Peirce considered icons typical for the fine arts (Short, 2007), where they can lead in particular to emotional interpretants, that is, they evoke feelings rather than thoughts. It then becomes apparent that iconic representation can be material on two accounts. On the one hand the sign, the icon itself, can be material – an artifact, a practice, or a natural

occurrence – but the icon can also be a linguistic expression, metaphors being a case in point. On the other hand the icon is material in the sense that in its pure form the icon represents its object solely on the basis of similarity. Hence the object can be inferred from the icon through unmediated phenomenological perception, directly by the senses and through the body, without the need for intersubjectively shared rules (Kolenda, 1977). The pure icon is a non-arbitrary sign, although we will see that few signs exist in this pure form.

3.2.3 The symbol

To determine a symbolic connection between a sign and its object, we have to identify the intersubjectively shared understanding that underlies a symbol's signification. The symbol represents a particular object only because there is shared background knowledge that it does so. Symbols have the same characteristics as all signs in the conventional linguistic understanding of sign systems. It is therefore useful to apply the usual discourse analytical tools to the study of symbols (Doty, 1993; Hansen, 2006; Milliken, 1999). Most, but not all, words are typical examples of symbols, but cultural artifacts or practices can equally be of a symbolic nature (Liszka, 1996). For instance, some scholars in a growing IR literature on forms of popular culture analyze movies, board games, or computer games with the help of discourse analytical tools. Thus Weldes edited a volume in which the authors "view [Science Fiction] as a generic discourse or system of meaning-producing codes" (Weldes, 2003: 13).

3.2.4 Complex signs: combinations of icons, indices, and symbols

The three categories of signs – icon, index, and symbol – are irreducible to each other; each fulfills a distinct function in semeiosis, which cannot operate if any one of them is missing. At the same time it is very hard to find a sign that is a pure icon, index, or symbol. It is rather common to find complex signs incorporating a mix of these three categories (Atkin, 2005; Hookway, 1985; Legg, 2008). Typical examples of signs that combine iconic and indexical components are biometrics, such as fingerprints that are increasingly used in modern border control technologies (Scheel, 2013). Fingerprints are indexically tied to a particular person through the process of taking fingerprints, and they

iconically represent the imprint of a person's finger. Demonstrative pronouns are combinations of symbols and indexes because they are different in each language, and at the same time they incorporate an unmediated relationship to an object marked by spatial and temporal proximity (Atkin, 2005; Savan, 1987). Lastly, metaphors are an example of signs composed of symbolic and iconic components. On the one hand they rely on language, which is largely of a symbolic nature, on the other hand they are based on similarities, on pictorial imaginations, which often seek to express otherwise inexpressible emotional states. Disentangling signs according to the different grounds based on which they represent an object can help researchers to identify the functional and symbolic connections between signs and their objects.

The combined effects of icon and index permit signs to simultaneously refer to an object, which is the indexical part, and characterize that object, which is the iconic part (Liszka, 1996). In Peirce's understanding the arbitrary connection between symbol and object can hinge on the non-arbitrary functions of index and icon (Sorrell, 2004). Over time the connection between index and object can grow into general conventions and rules (Short, 2004). Thus we might be able to establish a temporal sequence during which the sign changes its function from index to icon to symbol (Goudge, 1965; Legg, 2008; Short, 2007: 227). Process-tracing such temporal progressions of changing forms of signification can be a powerful tool to understand how certain social conventions develop or how some symbolic significations emerge.

A brief sketch of the historical development of money can serve as an illustration. Money is a popular constructivist example for explaining intersubjectively shared norms (see for example Adler, 1997; Searle, 1995). According to the conventional constructivist understanding money can only function as a medium of exchange if it is accepted and recognized as such within a given community. Constructivists highlight the symbolic nature of money when they rightly claim that whales' teeth are unlikely to be accepted as a medium of payment in a North American supermarket, even though they might still be accepted on the Fijian islands.

While I do not want to deny the symbolic nature of money, a more historical perspective suggests that indexical and iconic features played a crucial role in the emergence of particular forms of money. Contra linguistic-turn approaches, the

materiality of money shaped the meaning it evoked and the uses it served. Especially in its earlier stages of development, money had to fulfill certain material and functional characteristics — specifically, the objects serving as money had to be transportable, relatively rare, quite hard to counterfeit, and easily divisible. Precious metals were one type of material that fulfilled these criteria. A cursory glance at monetary development in Western Europe demonstrates that during the Middle Ages the nominal value of a coin was initially equivalent to the value of the metal out of which the coin was made. An indexical and an iconic relationship existed between a coin's nominal and intrinsic metallic value. But over time, in order to overcome budgetary difficulties, the princes who had the right to coinage began to debase the currency. So-called "token money" emerged. The nominal value exceeded its metallic content, although the coins looked the same. The indexical relation between the coin and its value disappeared, whereas the iconic relation remained intact. Although this maneuver was initially considered fraud, in the sixteenth and seventeenth centuries economists started to suggest that it was necessary to have token money in circulation for the smooth functioning of the economy, as long as the supply of coins did not exceed the demand for transactions (Cipolla, 1956). Thus, a social convention emerged, and a symbolic character was added to the relation between coins and their value. Towards the end of the 17th century banknotes came into circulation (Braudel, 1979: vol. I, 414-418). By then the relationship between money and its value ceased to be an iconic one, and became a symbolic relation based on a shared rule of accepting those pieces of paper as money.

We can identify a very similar temporal progression of changing forms of signification in an entirely different case, namely the establishment of the principle of sovereign equality on the basis of diplomatic forms of representation. The precondition for this development was the emergence of a clear indexical relation that tied a diplomat to his sovereign (instead of having a diplomat serve numerous sovereigns simultaneously), which emerged by the end of the 17th century and was materially manifested in the diplomat's wage, his letters of credence, and his diplomatic instructions (Queller, 1967). By virtue of the indexical relationship between the diplomat and his sovereign, the diplomat could also operate as an icon that represented the sovereign through a relationship of structural similarity. Perhaps the most immediate indicator of

the rank of a particular sovereign in the European hierarchy was the embodied practices of diplomatic precedence, in particular the spatial positioning of diplomats at social occasions. Where a diplomat was located in a procession indicated the social rank of his sovereign. As a result disputes over precedence were very common. In order to avoid these disputes rulers increasingly resorted to diplomatic practices that would express the equal standing between rulers, such as entering a room simultaneously on the sound of a horn (Hamilton and Langhorne, 2011). Over time the social convention of sovereign equality could emerge out of these iconic diplomatic practices. At the Congress of Vienna in 1815 rulers agreed that diplomatic precedence seized to play its iconic role. The norm emerged that among equally ranked diplomats the person who is on her post for the longer time period takes precedence (Wight, 1977). The new diplomatic practices symbolized sovereign equality by virtue of the agreed social norm; they did not represent it any longer iconically.

3.2.5 The interpretant

The last step of the analysis is to identify the interpretant. The interpretant is the potential for interpretation or misinterpretation that is inherent in a sign (Skagestad, 2004; Sorrell, 2004), even if that potential does not always become an actuality, or does not always become an actuality in the same way. In Peirce's understanding signs are usually interpreted in relation to other signs (Gottdiener, 1995). The context of a given situation matters for completing the meaning of a sign, as do the historical experiences and knowledge of the interpreter, "the collateral information" (Metro-Roland, 2009: 274). Depending on context, a sign can stand for different interpretants (Short, 2007). Thus the palace of Versailles with its adjacent gardens evoked a sense of glory and prestige in Louis XIV, while it provoked a fear of supremacy in other rulers, which led them into a balancing alliance against the Sun King (Mukerji, 1997).[8]

The researcher's task is to trace the connections between sign and interpretant and identify how particular components of a sign, given a specific context and collateral information, lead the actors to feel (emotional interpretant), act (energetic interpretant), or

[8] The fact that a sign can lead to different interpretants does not negate the possibility of a causal and material connection between the sign and its object.

think (logical interpretant) in certain ways. A first approach can be to draw "on the researcher-analyst's participative experiences as proxy for others' behaviors and actions: Through those firsthand, immediate experiences the analyst gains entry into understanding others' responses" (Yanow, 2000: 64). Nonetheless, these experiences of the self should be further backed up with interviews or documentary analysis in order to identify other people's responses to a particular sign in a given context and relate those to their historical experiences and knowledge (Yanow, 2000).

Peircean semeiotics provides one way to highlight the profound interconnectivity of the material and the ideational. At the same time, other methodological approaches have different advantages and it is possible to combine Peircean semeiotics with other tools. One typical example would be to combine Peircean semeiotics with discourse analysis. One could also combine Peircean semeiotics with abduction – the process whereby we intelligently guess the most likely explanation for a particular phenomenon, usually by moving back and forth between theory and empirics (Hookway, 1985: 224; Peirce, 1931-1935, Vol. 6: 530). Peirce would not have considered his semeiotics incompatible with abduction, a concept he himself invented. One of several ways that he related abduction and semeiotics was to suggest that the semeiotic apparatus permits the analysis of signs that provide the empirical material from which abduction can develop.

4 GDP as a complex sign

Scholars whose work falls under the old materialism, be it quantitative or qualitative, often simply assume that GDP is an indexical sign that provides an accurate measure of the size of the economy (see for example Maersheimer, 2010; Beaulieu et al., 2012; Büthe et al., 2012; Brooks and Wohlforth, 2000-1). Yet, significant changes in GDP can be statistical artifacts, unrelated to any underlying changes in the economy. Thus a change in the way in which businesses' Research and Development is accounted for has led to upward revisions of GDP of up to 14% (Coyle, 2014).[9] Similarly, Italy's decision in 1987 to include the informal economy in its calculations of GDP resulted in an

[9] Prior to 2008 businesses' Research and Development appeared in national accounts as an intermediate good, which was necessary for the production of a final product, and hence businesses' R&D did not lead to an increase in GDP. Since 2008 businesses' R&D is considered an investment and therefore increases GDP.

approximately 20% increase of GDP, and made Italy the fifth largest economy in the world at the time, surpassing the United Kingdom. Italians called the event il sorpasso, the overtaking (Coyle, 2014: 106).

On the interpretivist side scholars study statistics such as GDP as a form of rhetoric, as "figures of speech in numerical dress" (McCloskey, 1998: 21). They might highlight the constitutive nature of GDP, the ways in which it constructs the economy, and how it shapes the policy priorities elites adopt (Suzuki, 2003). Thus Waring (1989) notes how GDP systematically underrepresents work done by women, and therefore constitutes their work as unproductive. Policy options that would improve the working lives of women are consequently neglected. Other interpretivist scholars might demonstrate how GDP gains its meaning through its embeddedness in discursive formations and in relation to other concepts (for a similar analysis for accounting see Arrington and Francis, 1989).

Yet, while GDP certainly does have this kind of productive power, neglecting that GDP has significant indexical elements which provide a direct connection of the sign to material reality would lead us to omit another source of power that emanates from GDP. By virtue of the indexical connection GDP is an important technology with the help of which governments can exert control.[10] Thus Kuznets and Nathan used national accounting techniques (which form the basis for the calculation of GDP) to advise Roosevelt on the feasibility of munitions programs. They suggested revisions to set targets (Carson, 1975; Fogel et al., 2013) and helped expand the proportion of GNP dedicated to war production from an initial 4% in 1941 to 48% in 1944 (Perlman and Marietta, 2005). According to another account, Nazi Germany's excellent use of national accounting techniques provided it with a superior control over its economy. It could identify underutilized resources, and integrate them into the planning efforts. National accounting techniques thus formed one of the bases of Nazi German power (Aly and Roth, 1984). The indexical connection of GDP to the economy allows exerting a certain control over the economy from a distance, which is necessary for government to operate on a given territory (Latour, 1990). Conversely, when the numbers are inaccurate, as is

[10] Foucault's (2007) concept of governmentality depends on the knowledge of territory and population generated through such indexical connections, as for example between the economy and GDP.

the case in many African countries, governing becomes a lot more difficult (Jerven, 2013).

GDP operates as an inscription device (Latour, 1990). Inscriptions are "the material and graphical representations" (Robson, 1992: 685), "the various techniques of 'marking' an object or event that is to be known – writing, recording, drawing, tabulating" (Robson, 1992: 689). Like other inscription devices, such as maps, diagrams or statistics, GDP inscribes reality on paper or on hard disks. However, inscription devices "are not techniques of representation that simply extract information from externally given worlds while leaving the worlds they represent untouched. The device of extraction enacts worlds in the sense that it is an active force that is part of a process of continuous production and reproduction of relations, an endless process of bringing worlds into being" (Aradau and Huysmans, 2014: 603). Inscription devices not only enact objects, but are also tools to be acted upon.

In the following I will demonstrate using the example of GDP how a Peircean semeiotic apparatus can analyze material signs, such as inscription devices, as complex signs which often integrate symbolic, indexical, and iconic features in them. In addition, emotional, energetic, and logical interpretants help us understand the effects material signs have on the world in interaction with humans.

4.1 GDP's indexical features

The emergence of money, accounting, and numeration have been historically linked (Latour 1990; Robson, 1992; Roover, 1963; Schmandt-Besserat, 1984). Scholars have argued that commerce and monetary exchange were at the origin of index numbers in general (Klein 1997: 76). The exchange that occurs on markets in monetary terms allows accountants to observe the monetary, and therefore numerical, values that are attributed to the goods traded on markets. Accountants can thus aggregate the monetary values of a large number of items, which otherwise do not share any other characteristic in common. "A fundamental merit of market transactions is that they provide 'objective' prices that serve to value quantities of goods and services" (Stiglitz et al., 2009: 86).

The concrete ways in which national accountants observe the monetary values of traded items, that then become aggregated to a GDP figure, include tax returns, import

and export documents, the public accounts of the government and the institutions it finances, "published financial accounts of private enterprises such as listed public companies, producer boards, and nonprofit organizations" (Waring, 1989: 116), data gathered in connection with other governmental regulatory activities, data collected by trade bodies, large-scale censuses, periodical questionnaires, and sample surveys (Fogel et al., 2013). One specific method developed by Wassily Leontief, namely input-output tables, traces the movement of intermediate goods through the economy to compute the value added in production (Coyle, 2014). The sum of all the values added in the economy gives us the GDP measured from the production side of the economy.

4.2 GDP's symbolic features

Despite the clear indexical connection between GDP and the economy, many symbolic features enter into the calculation of GDP. GDP is an aggregate indicator, and therefore depends on categorizations which regulate what is included within its purview and what is excluded. "Distinct normative purposes determine what is to be measured" (Perlman and Marietta, 2005: 227),[11] but at the same time it is necessary to take into account what can be measured. In the case of GDP, there is a connection between the socially agreed upon rules about which items are included in the measurement of GDP, and the possibility of directly observing the monetary values of those items. That is to say, there is some connection between the symbolic and the indexical features of GDP. GDP is mainly, but not exclusively, a measure of market production (Stiglitz et al., 2009). It requires the Peircean semeiotic apparatus to be able to identify this connection between the symbolic and the indexical dimension. A discourse analytical approach cannot account for the fact that certain components are excluded from GDP because they lack the indexicality that would allow to attribute a numerical value to a certain object, as discourse analysis does not consider the possibility of a direct link between a signifier and a signified. Old materialists, in turn, do not consider the role of socially agreed

[11] Historically different understandings existed as to what should be included in the calculation of national income. Thus Adam Smith thought that services should not form a part of income accounting, because they redistributed resources to the unproductive classes. Communist countries later adopted a similar perspective (Coyle, 2014). Alternatively, the physiocrats, with Quesnay in the lead, thought that only agricultural production should be counted towards income (Kendrick, 1970).

conventions that play a role for including certain components in the calculation of GDP while excluding others.

When items are not exchanged on the market, it is impossible to observe their monetary value and identify a recorded exchange (Anderson, 1991). We have to work with imputed values, which are highly assumption driven data—data, which are based on social conventions and theoretical commitments, and therefore of a symbolic nature. In such cases the indexical link to the real economy is very dubious; the data become less reliable (Stiglitz et al., 2009). Yet, some items are included in GDP calculations although they are not recorded market exchanges, among them measures for the home production of goods, imputed rents of homeowners, or the shadow economy. Other items, such as leisure, or the home production of services like cooking, cleaning, and raising children, have not been included in GDP (Waring, 1989). Given that the amount of time dedicated to these tasks varies among countries, an inclusion of such measures would affect comparisons between countries. For example, it is estimated that the production of household services is at the level of 35% of GDP in France, while it is 30% of GDP in the US (Stiglitz et al., 2009: 130). An additional inclusion of leisure as a good that people enjoy, might add another estimated 80% to GDP (Stiglitz et al., 2009: 90). However, the question how to attribute market prices to leisure is quite daunting. The unreliability of imputed data also haunts alternative aggregate economic indicators, such as Net Domestic Product (which accounts for the depreciation of capital goods), or environmentally adjusted GDP. These alternative indicators place a higher premium on sustainability, but national accountants resist their implementation, because they rely so heavily on imputed data.

Also the ways in which GDP is calculated depend significantly on social norms. Many of the rules according to which GDP is computed are derived from economic theory. In particular Keynesianism was at the origin of GDP's invention in the 1940s. Following Keynesian theory, fundamental identities underlie the calculation of GDP. For example, if we want to calculate GDP from the demand side of the economy, we have to follow the equation Y=C+I+G+(X-M), that is income = consumption + investment + government expenditure + (exports - imports). Economists contested these identities in the 1940s (Suzuki, 2003). For instance, while Kuznets wanted to subtract government

spending from GDP rather than add it to it, Roosevelt was interested in accounting for government spending as an addition to GDP, because he did not wish for the war effort to result in an ostensible reduction of output (Carson, 1975; Coyle, 2014).

Following another underlying assumption for the measurement of GDP, we can calculate GDP in one of three ways: by adding all the incomes in the economy, all the expenditures, or all the output. In line with equilibrium theory and the technique of double entry bookkeeping, these three methods have to yield the same results. By definition the income side has to match the expense side. These theoretical commitments were so strong that Stone, one of the leading economists in the implementation of the UN System of National Accounts, remarked "it has always seemed to me that in national income and expenditure work where the true values of the variables must satisfy certain definitional equations it would be desirable to adjust the observations actually obtained so that these equations were exactly satisfied" (Stone, 3 March 1949a, in: Suzuki, 2003: 485). So in this case the indexical and the symbolic features of GDP run against each other, with the symbolic features gaining the upper hand.

While GDP measures are occasionally adapted to be in line with theoretical commitments, at other times it is impossible to obtain specific components of GDP by direct observation and measurement. It can for example be the case that a state lacks the capacity to collect all the relevant data, as is the case in many developing countries. Under such circumstances mathematical equations that depend on specific assumptions and theoretical arguments help to determine the missing numbers. Even Keynes's notations of the calculation of GDP contained such footnotes as "obtained by subtracting" (in: Suzuki, 2003: 497). Nowadays many GDP data of developing countries are not based on observed measures, but on social conventions about how to calculate specific variables. Thus the UN reports GDP data for 47 sub-Saharan countries for the time period between 1991 and 2004, even though it obtained measures for less than 50% of these observations. In cases of missing data, the World Bank Statistics Manual uses "a method for filling the data gap, which is based on the assumption that the growth of the variable from a period of which data exists has been the same as the average growth for those other countries in the same regional or income grouping, where data exists for both periods" (in: Jerven, 2013: 22). The World Bank transforms social conventions into

statistical numbers. GDP's symbolic features fill the gap left by missing indexical features.

Even in cases with good data availability, national accountants have to rely on some theoretical assumptions because it is tricky to observe certain phenomena directly. For example, inflation interferes with the stability of GDP numbers (Robson, 1992). In order to make GDP data comparable from one time period to another, we want to evaluate which portion of the change in GDP is due to a mere increase in prices, and which portion of the change is due to changes in the real economy. Unfortunately, measuring the GDP deflator with the help of which we can identify inflation is very complicated.[12] One particularly daunting issue is the question of how to differentiate between a product's price increase that is due to the product's qualitative improvement, and one that is merely the result of inflation. In the United States the Boskin Commission focused on this very issue, and created a hedonic price index. The hedonic price index estimates how the price of each feature of a product is linked to specific quality improvements, such as an increase in the size of the memory of computers. Any residual price increase not linked to qualitative improvements is attributed to inflation. However, the method is complex, contested, and depends on many social conventions (Stiglitz et al., 2009). Even so, the Commission reached the conclusion that not taking into account qualitative improvements of products led to an overstatement of the inflation rate by 1.3% and a corresponding understatement of real GDP growth. The adoption of the hedonic price index resulted in increased US GDP and its growth over several years, which has been linked to the Silicon Valley boom in the late 1990s and the early 2000s. Other countries started to catch up with the US economy once they included similar measures in their calculations of GDP (Coyle, 2014: 88-90). The episode highlights the importance of social conventions, but these conventions evolve around efforts to establish the appropriate indexicality of GDP as a sign of the economy. Available methodological approaches are unable to capture this complex interplay between symbolism on the one hand and indexicality on the other.

4.3 GDP's iconic features

[12] Making GDP comparable across countries is even more complicated (Coyle, 2014).

The economy and economic growth are either "invisible to the naked eye" (Latour, 1990: 42), or so complex and confusing that they cannot be deciphered without signs. Only after a lengthy process of extracting data and combining them in various ways "can the economy be made visible inside piles of charts and lists. Even this is still too confusing, so that redrawing and extracting is necessary to provide a few neat diagrams that show the Gross National Product" (Latour, 1990: 38). The figure of GDP makes the economy visible; it makes it readable (Speich, 2011). Some would even say it brings it into existence (Mitchell, 2002). The specific GDP number represents the economy by similitude. This is GDP's iconic feature.

The iconic character of GDP as a number is an important, but often overlooked, material feature of the sign. Existing methodological approaches lack the tools needed to understand the role a sign's material qualities play in the process of signification. Without these material characteristics, we lose important dimensions of signification, equating all signs to linguistic signs, or omitting the characteristics of signs all together.

As a number, GDP portrays certain useful characteristics that go beyond its rhetoric purposes. GDP is significantly more mobile than most other forms of signs, be they material artifacts, or even words, which can be more easily reinterpreted in different contexts. The GDP number is light, but maintains its consistency and can thus easily travel across a variety of different settings, through computer systems and networks, without being corrupted (Latour, 1990). In addition, the number can be recombined with other numbers with the help of mathematical procedures, including multiplications, divisions, and additions, as well as statistical methods, such as regression analyses, to yield new interesting findings in ways that are precluded to linguistic signs (Hansen and Porter, 2012; Robson, 1992). With the help of GDP numbers we can calculate an average GDP per capita, ranking countries according to economic performance while their diverging characteristics disappear from view behind the unified numerical notation (Speich, 2011).

The decimal character of the Arabic numerical system helps to perform these mathematical functions, which could not be performed so easily if numbers were written out in words, or even in the Roman numerical system, given their heterogeneous bases. "Computing the sum LXI (61) plus III (3) is manageable without writing, but the point is

that the adjacent columnar ordering of these number-symbols is arbitrary because of the operation of inconsistent bases. The use of Arabic numerals assists calculation of complex sums by allowing columns of numbers to be ordered by their decimal relation. A sign for zero supplies a written symbol for what would otherwise be an empty space" (Robson, 1992: 696).

Furthermore, GDP's representation in quantitative form creates an air of objectivity. Despite the many imprecisions and social norms associated with measuring GDP, the overwhelming majority of policy makers and scholars treat the sign as if it provided a factual measure of the size of the economy. I would suggest that this is due to GDP's numerical notation. Numbers reduce the ambiguity that is typical for qualitative statements, as quantification establishes an unequivocal identity (rather than merely a similarity) between the objects that are counted towards the aggregate indicator. By virtue of being aggregated those objects have to be identical in some regard (Robson, 1992). In the case of GDP, actually observed product prices, are aggregated with assumption driven imputed data and government provided services, the latter of which are still measured according to the costs that go into their production rather than according to their (non-existent) market value. These differences in data accuracy and signification disappear behind a singular GDP number.

Additionally, all the doubts and assumptions associated with measuring GDP are swept away in their official publication—the material and iconic form in which they appear. Instead of publishing GDP numbers as a bandwidth, or adding comments about data reliability, GDP has been published as a singular number since its invention in the 1940s—despite the fact that GDP data has always been subject to revision and uncertainty. In one particular instance Keynes remarked "'you know as well as I do that the change in Commonwealth balances (or whatever it was) cannot have been zero last year, it must have been several hundred millions; what do you think it was?' 'We really do not know', was the reply, 'but probably between three and four hundred million.' 'Then put it down at £350 million' said Keynes 'and try to get some accurate information in the future for by your own admission it is very important" (Stone, 21 June 1976b in: Suzuki, 2003: 497). The missing indexicality in the data was not noted in their final publication. Even today the World Bank does not publish the data it uses to calculate

GDP. In response to Jerven's query about GDP metadata, the World Bank noted that "raw data provided by the National Statistics Agencies are not available for external users and only a handful of people at the World Bank have access to it" (in Jerven, 2013: 97). The absence of qualifying information concerning the reliability of the data increases the apparent objectivity of GDP as a measure of the economy.

4.4 GDP's Interpretants

Interpretants are the possibilities of interpretation that emerge from a sign. They are the effects a sign can have on the emotions, actions, and thoughts of human beings. According to Peirce's tripartite division of object, sign, and interpretant, there can be no interpretant without a sign. This means that prior to the invention of GDP in the 1940s, GDP could not have influenced leaders' policy decisions, such as balance of power considerations. Thus at the Congress of Vienna, the great powers established a balance of power on the continent purely on the basis of population numbers. Although they realized that wealthier inhabitants might be bigger assets than poorer inhabitants, they did not know how to systematically measure the income of the people (Webster, 1963). Yet, materialist scholars who focus on the relation between economic strength and great power status routinely make use of reconstructed historical GDP data (such as Maddison's data set which contains GDP figures up to the Roman Empire) to back up their claims (Brooks and Wohlforth, 2000-2001; Kennedy, 1987; Krasner, 2000; Maddison, 2007). The point is not merely that GDP might not be the right measure to evaluate economic strength in different historical and geographical contexts (Coyle, 2014; Speich, 2011), but also that it is unclear how statesmen and diplomats could have acted upon a measure which did not yet exist. The fact that GDP is not a purely indexical sign, but contains important symbolic elements that are subject to change over time, makes matters worse.

Black (2008) has argued that instead of focusing on GDP to identify great power status, scholars should rather rely on what people at the time thought was a great power. The present approach certainly agrees with this perspective, but it would add that whom statesmen considered a great power at a particular time depended upon the signs that portrayed great power status. Thus in the late 17th and the early 18th century, consumption

was considered the "foundation of all wealth" (Boisguilbert in Kendrick, 1970: 292), and Louis XIV's lavishly decorated palace of Versailles rose concerns among other rulers, who partly for that reason formed a balancing alliance against the Sun King (Mukerji, 1997). From a Peircean perspective the existence of specific signs is a necessary condition for particular interpretants to emerge. Actions, thoughts, and emotions can only result from particular objects, if those objects are visible—that is, if they have a sign dimension. In the following I highlight some of the interpretants that have resulted from GDP as a sign of the economy.

4.4.1 Emotional Interpretants

Emotional interpretants are the emotions that result from GDP as a sign. It is a commonplace that reduced GDP growth signifies an economic downturn and evokes fears and anxieties, while high GDP growth arouses euphoria. Beyond a sense that individuals' employment prospects and prosperity depend on the GDP indicator, GDP has become a sign of sovereignty for many developing countries, and as such it generates a sense of national pride. Like a seat in the United Nations, a national flag, or an anthem, the GDP figure is a representation of the state. For most countries high GDP and economic growth levels engender strong national self-esteem (Kendrick, 1970). As a result, those activities that enhance GDP are highly valued, whereas activities that are not included in GDP evoke indifference. Foremost among those are housework and leisure (Stiglitz et al., 2009; Waring, 1989).

4.4.2 Energetic Interpretants

One set of energetic interpretants that results from GDP is due to the fact that GDP has served as an input for policy decisions. Policy makers have used GDP figures to reduce the effects of recessions with the help of Keynesian demand management. When economic growth is low governments can increase public spending in order to increase aggregate demand. Or central banks can decrease interest rates to encourage investments. Next to influencing government actions, GDP also has effects on the behavior of a whole range of other actors. Private investors decide whether a sovereign debt is sustainable partly on the basis of debt/GDP ratios, and accordingly buy or sell government bonds.

Additionally, GDP measures influence action in international organizations. For example, countries with low levels of GDP get access to comparatively inexpensive loans from the World Bank. Too high debt/GDP ratios can lead to emergency lending from the International Monetary Fund, complete with conditionality measures to ensure repayment.

Next to informing actions, GDP is also often the target of particular activities. Governments can decide to support certain undertakings rather than others in order to increase GDP. For example, they can encourage mining at the expense of a protection of the environment, because environmental degradation does not directly affect GDP, and is therefore less visible (Waring, 1989). Similarly, as a result of enhanced productivity societies could produce the same amount of goods in less time and thus increase their leisure, but usually there tends to be a bias in favor of producing more goods instead, perhaps because more leisure time does not increase GDP (Anderson, 1991). For these reasons Stiglitz et al. have proposed a range of other indicators to supplement GDP in the hope that "the report and its implementation may have a significant impact on the way in which our societies looks (sic) at themselves and, therefore, on the way in which policies are designed, implemented and assessed" (Stiglitz et al., 2009: 9).

4.4.3 Logical Interpretants

Logical interpretants are the thoughts that emerge from specific signs. Econometricians use GDP figures in their analyses, generating a wide range of theories about business cycles and long-term economic development that inform economic thinking. With the introduction of GDP and other aggregate economic measures, economics gradually transformed into a discipline based on quantitative analyses (Suzuki, 2003); the apparently precise nature of GDP as a number might have provided a greater sense of scientificity than qualitative indicators. From its origins among the other social science disciplines, economics grew from the 1960s ever closer to statistics and acquired a highly quantitative focus (Fourcade, 2009; McCloskey, 1998). Quantitative measures like GDP extract the economic from its social, political, and natural surroundings when they aggregate the purely monetary dimension of particular items and provide a value for the

size of the economy. In this sense figures like GDP might have contributed to the imagination of a separate economic sphere (Mitchell, 2002).

In the policy world GDP measures are not only "a basis of calculation for management," but also bare a "significant impact upon government accountability, reporting and consensus on matters of the national economy" (Suzuki, 2003: 502). Low economic growth is interpreted as government failure, high economic growth affirms success. Over time our societies have become used to interpret GDP not merely as a measure of economic market production, but rather as a measure of overall well-being. The phenomenon is not linked to the sign of GDP itself, but rather emerges from the social context in which it is used.

5 Conclusion

In a context in which the New Materialisms question the Cartesian divide between materialism and ideas with such concepts as practices and artefacts, this paper has suggested Peirce's semeiotics as a methodology that permits the systematic and unified synthesis of material and ideational components. Based on the epistemological foundation that signs always mediate our access to reality, Peirce's semeiotics establishes, by using the concept of the index, a direct, non-arbitrary relationship between a sign and its object that is based on representation by contiguity. Yet, the index merely indicates the presence of the object. It does not denote any of its qualitative characteristics. Icons, which represent by a relationship of similarity, and symbols, which represent by social convention, fulfil this purpose within Peirce's design. This tripartite division of signs, and the fact that many signs combine at least two of these categories, establishes the interconnectivity between material reality and the ideational realm. Furthermore, the tripartite division of interpretants into emotions, actions, and thoughts means that the infinite chain of intertextuality can be broken and the process of sign interpretation can result in concrete action on the world.

The paper has demonstrated the potential of Peirce's semeiotics by analyzing how GDP as an inscription device and a complex sign has come to signify the size of a given economy. Other fleetingly mentioned examples focused similarly on the material and simultaneously ideational constitution of social facts over long periods of time, such as

money, the territorial state, or the principle of sovereign equality. Yet, Peircean semeiotics can be equally useful for the analysis of more short-term political phenomena, like concrete diplomatic negotiations, processes of alliance formation, or the occurrence of wars, in that Peircean semeiotics allows us to identify a richer array of communication patterns between parties than purely interpretive or old materialist perspectives have tended to do. A Peircean semeiotic approach could, for example, integrate signaling studies (which focus on signaling costs—an indexical dimension of signs) (Fearon, 1995) with linguistic power studies (which focus on symbols) (Bially Mattern, 2001). This approach would have the added benefit of keeping the effects icons can have on the perceptions of embodied actors involved in negotiations in concrete situations.

Ultimately, however, Peircean semeiotics can only help us operationalize a subsection of the vast array of claims the New Materialist scholarship makes, namely those which relate to the role of signs and signification. Beyond providing the material for signification, matter performs other roles. In one of those roles things are tools with which we undertake certain actions. We then usually perceive things according to their "affordances": the opportunities for use they provide us with. Thus a chair provides us with the opportunity to sit on it or stand on it in order to reach higher. While the affordances of things can be tied to a thing's sign dimension, as was the case in the GDP example, they do not have to be, and other analytical tools might be needed to study them.

References

Adler, E. 1997. "Seizing the Middle Ground: Constructivism in World Politics. *European Journal of International Relations* 3(3): 319-363.

Adler, E. and V. Pouliot. 2011. *International Practices*. New York: Cambridge University Press.

Adler-Nissen, R.. 2012. *Bourdieu in International Relations: Rethinking Key Concepts in IR*. London: Routledge.

Aly, G. and K.-H. Roth. 1984. *Die restlose Erfassung: Volkszählen, Indentifizieren, Aussondern im Nationalsozialismus.* Berlin: Springer.

Anderson, V. 1991. *Alternative Economic Indicators*. London: Routledge.

Aradau, C. 2010. "Security That Matters: Critical Infrastructure and Objects of Protection." *Security Dialogue* 41 (5): 491-514.

Aradau, C. and J. Huysmans. 2014. "Critical methods in International Relations: The politics of techniques, devices and acts." *European Journal of International Relations* 20(3): 596-619.

Arrington, C. and J. Francis. 1989. "Letting the Chat out of the Bag." *Accounting, Organizations and Society* 14 (1-2): 1-28.

Ashley, R. and R. Walker. Eds. 1990. "Speaking the Language of Exile: Dissidence in International Studies." Special Issue of *International Studies Quarterly* 34(3).

Atkin, A. 2005. "Peirce on the Index and Indexical Reference." *Transactions of the Charles S. Peirce Society* 41(1): 161-188.

Beaulieu, E., Cox, G., and S. Salegh. 2012. "Sovereign Debt and Regime Type: Reconsidering the Democratic Advantage." *International Organization* 66(4): 709-738.

Bennett, J. 2010. *Vibrant Matter: a political ecology of things*. London: Duke University Press.

Best, J. and Walters, W. 2013. "'Actor-Network Theory' and International Relationality: Lost (and Found) in Translation: Introduction." *International Political Sociology* 7(3): 332-334.

Bially Mattern, J. 2001. "The Power Politics of Identity." *European Journal of International Relations* 7(3): 349-397.

Black, J. 2008. *Great Powers and the Quest for Hegemony: The World Order since 1500*. London: Routledge.

Bourdieu, P. 1990. *The Logic of Practice*. Stanford: Stanford University Press.

Branch, J. 2011. "Mapping the Sovereign State: Technology, Authority, and Systemic Change." *International Organization* 65(1): 1-36.

Braudel, F. 1979. *Civilisation matérielle, Economie et Capitalisme, XVe – XVIIIe siècle*. Paris: Armand Colin, 3 vols.

Brooks, S. and W. Wohlforth. 2000-1. "Power, Globalization, and the End of the Cold War: Reevaluating a Landmark Case for Ideas." *International Security* 25(3): 5-53.

Bryman, A. and D. Cramer. 2009. "Constructing Variables." in M. Hardy and A. Bryman. Eds. *Handbook of Data Analysis*. London: Sage Publications.

Bueger, C. 2014. "Pathways to practice: praxiography and international politics." *European Political Science Review* 6(3): 383-406.

Bueger, C. and F. Gadinger. 2015. "The Play of International Practice: Minimalism, Pragmatism and Critical Theory." *International Studies Quarterly,* FirstView.

Büthe, T., Major, S. and A. de Mello e Souza. 2012. "The Politics of Private Foreign Aid: Humanitarian Principles, Economic Development Objectives, and Organizational Interests in NGO Private Aid Allocation." *International Organization* 66(4): 571-607.
Carson, C. 1975. "The history of the United States national income and product accounts: the development of an analytical tool." *Review of Income and Wealth* 21(2): 153-181.
Chase-Dunn, C. 1979. "Comparative Research on World System Characteristics." *International Studies Quarterly* 23(4): 601-623.
Checkel, J. 2005. "International Institutions and Socialization in Europe: Introduction and Framework." *International Organization* 59(4): 801-826.
Cipolla, C. 1956. *Money, Prices, and Civilization in the Mediterranean World, Fifth to Seventeenth Century*. Princeton: Princeton University Press.
Clark, A. 1997. *Being There: Putting Brain, Body and World Together Again.* Cambridge, Massachusetts: MIT Press.
Coole, D. 2010. "The Inertia of Matter and the Generativity of Flesh." in D. Coole and S. Frost. Eds. *New Materialisms: Ontology, Agency, and Politics*. London: Duke University Press, pp. 92-115.
Coole, D. and Frost, S. 2010. *New Materialisms: Ontology, Agency, and Politics*. London: Duke University Press.
Coyle, D. 2014. *GDP: A Brief but Affectionate History*. Princeton: Princeton University Press.
Cramer, D. and D. Howith. 2004. *The Sage Dictionary of Statistics*. London: Sage Publications.
Doty, R. 1993. "Foreign Policy as Social Construction: A Post-Positivist Analysis of U.S. Counterinsurgency Policy in the Philippines." *International Studies Quarterly* 37(3): 297-320.
Edgerton, S. Y. 1975. *The Renaissance Rediscovery of Linear Perspective*. New York: Basic Books.
Fearon, J. 1995. "Rationalist Explanations for War." *International Organization* 49(3): 379-414.
Fogel R., Fogel, E., Guglielmo, M., and M. Grotte. 2013. *Political Arithmetic: Kuznets and the Empirical Tradition in Economics.* Chicago: The University of Chicago Press.
Foucault, M. 1983. *This is not a pipe*. Berkley: University of California Press.
Foucault, M. 2007. *Security, Territory, Population*. New York: Palgrave Macmillan.
Foucault, M. 2010. *Archaeology of Knowledge*. New York: Vintage Books.
Fourcade, M. 2009. *Economists and Societies: Discipline and Profession in the United States, Britain, and France, 1890s to 1990s*. Princeton: Princeton University Press.
Goddard, S. 2006. "Uncommon Ground: Indivisible Territory and the Politics of Legitimacy." *International Organization* 60(1): 35-68.
Goldstein, J. and R. Keohane. 1993. *Ideas and Foreign Policy: Beliefs, Institutions, and Political Change*. Ithaca: Cornell University Press.
Gottdiener, M. 1995. *Postmodern Semiotics: Material Culture and the Forms of Postmodern Life*. Oxford: Blackwell.
Goudge, T. A. 1965. "Peirce's Index." *Transactions of the Charles S. Peirce Society* 1(2): 52-70.
Gregory, B. 2006. "The other Confessional History: On Secular Bias in the Study of Religion." *History and Theory* 45(4): 132-149.

Haack, S. 1977. “Two Fallibilists in Search of the Truth.” *Proceedings from the Aristotelian Society*. Supplementary Volumes 51: 63-84.
Hall, R. 2003. “The Discursive Demolition of the Asian Development Model.” *International Studies Quarterly* 47(1): 71-99.
Hamilton, K. and R. Langhorne. 2011. *The Practice of Diplomacy: Its Evolution, Theory and Administration*. London and New York: Routledge.
Hansen, L. 2006. *Security as Practice: Discourse Analysis and the Bosnian War*. New York: Routledge.
Hansen, H. and Porter, T. 2012. “What Do Numbers Do in Transnational Governance?” *International Political Sociology* 6(4): 409-426.
Hassner, R. 2006. “‘To Halve and to Hold’: Conflicts over Sacred Space and the Problem of Indivisibility.” *International Security* 12(4): 1-33
Hekman, S. 2009. “We have never been postmodern: Latour, Foucault and the material of knowledge.” *Contemporary Political Theory* 8(4): 435-454.
Holmqvist, C. 2013. “Undoing War: War Ontologies and the Materiality of Drone Warfare.” *Millennium: Journal of International Studies* 41(3): 430-450.
Hookway, C. 1985. *Peirce*. London: Routledge.
Hopf, T. 2010. “The Logic of Habit in International Relations.” *European Journal of International Relations* 16(4): 539-561.
Jerven, M. 2013. *Poor Numbers: How We are Misled by African Development Statistics and what to do about it.* Ithaca: Cornell University Press.
Kangas, A. 2009. “From Interfaces to Interpretants: A Pragmatist Exploration into Popular Culture as International Relations.” *Millennium: Journal of International Studies* 38(2): 317-343.
Kelly, M. 2009. *The political philosophy of Michel Foucault*. New York: Routledge.
Kendrick, J. 1970. “The Historical Development of National-Income Accounts.” *History of Political Economy* 2(2): 284-315.
Kennedy, P. 1987. *The Rise and Fall of the Great Powers*. New York: Random House.
Kiersey, N. and I. Neumann. Eds. (2013) *Battlestar Galactica and international relations.* London: Routledge.
King, G., Keohane, R., and S. Verba. 1994. *Designing Social Inquiry*. Princeton: Princeton University Press.
Klein, J. 1997. *Statistical Vision in Time*. Cambridge: Cambridge University Press.
Kolenda, K. 1977. “Two Fallibilists in Search of the Truth.” *Proceedings from the Aristotelian Society*. Supplementary Volumes 51: 85-104.
Krasner, S. 2000. “State Power and the Structure of International Trade.” in J. Frieden and D. Lake. Eds. *International Political Economy: Perspectives on Global Power and Wealth*, Boston: Bedford/ St. Martin’s, pp. 19-36.
Kratochwil, F. 2000. “Constructing a New Orthodoxy? Wendt’s ‘Social Theory of International Politics’ and the Constructivist Challenge.” *Millennium: Journal of International Studies* 29(1): 73-101.
Lakoff, G. and M. Johnson. 1980. *Metaphors we Live by*. Chicago: The University of Chicago Press.
Latour, B. 1990. “Drawing Things Together.” in M. Lynch and S. Woolgar. Eds. *Representation in Scientific Practice*. Cambridge, Mass.: MIT Press.

Legg, C. 2008. “The Problem of the Essential Icon.” *American Philosophical Quarterly* 45(3): 207-232.
Lele, V. 2006. “Material habits, identity, semeiotic.” *Journal of Social Archaeology*, 6(1): 48-70.
Liszka, J. J. 1996. *A General Introduction to the Semeiotic of Charles Sanders Peirce*. Indianapolis: Indiana University Press.
Lundborg, T. and N. Vaughan-Williams. 2014. “New Materialisms, discourse analysis, and International Relations: a radical intertextual approach.” *Review of International Studies* 41: 3-25.
Maddison, A. 2007. *Contours of the world economy, 1–2030 AD: essays in macro-economic history*. Oxford: Oxford University Press.
Maersheimer, J. 2010. “The Gathering Storm: China’s Challenge to US Power in Asia.” *The Chinese Journal of International Politics* 3(4): 381-396.
McCloskey, D. 1998. *The Rhetoric of Economics*. Madison: The University of Wisconsin Press.
Metro-Roland, M. 2009. “Interpreting Meaning: An Application of Peircean Semiotics to Tourism.” *Tourism Geographies* 11(2): 270-9.
Milliken, J. 1999. “The Study of Discourse in International Relations: A Critique of Research and Methods.” *European Journal of International Relations* 5(2): 225-54.
Milliken, J. and D. Sylvan. 1996. “Soft Bodies, Hard Targets, and Chic Theories: US Bombing Policy in Indochina.” *Millennium: Journal of International Studies* 25(2): 321-359.
Mick, D. G. 1986. “Consumer Research and Semiotics: Exploring the Morphology of Signs, Symbos, and Significance.” *Journal of Consumer Research* 13(1): 196-213.
Mitchell, T. 2002. *Rule of Experts*. Berkley: University of California Press.
Mitchell, A. 2014. “Only human? A worldly approach to security.” *Security Dialogue* 45(1): 5-21.
Mukerji, C. 1997. *Territorial Ambitions and the Gardens of Versailles*. Cambridge: Cambridge University Press.
Nelson, S. 2014. “Playing Favorites: How Shared Beliefs Shape the IMF’s Lending Decisions.” *International Organization* 68(2): 297-328.
Neumann, I. 2008. “Discourse Analysis.” in A. Klotz and D. Prakash. Eds. *Qualitative Methods of International Relations: A Pluralist Guide*, New York: Palgrave Macmillan, pp. 61-77.
Nye, J. 1990. “Soft Power.” *Foreign Policy* 80(Fall 1990): 153-171.
Pape, R. 2003 “The Strategic Logic of Suicide Terrorism.” *American Political Science Review* 97(3): 343-361.
Peirce, C. S. 1931-1935. *Collected Papers of Charles Sanders Peirce*, volumes 1-6. C. Hartshorne and P. Weiss. Eds. Cambridge, Mass: Harvard University Press.
Popper, K. 1978. “Three Worlds.” *The Tanner Lecture on Human Values*. delivered at the University of Michigan, April 7 1978, available at http://www.thee-online.com/Documents/Popper-3Worlds.pdf, last accessed October 8 2013.
Perlman, M. and M. Marietta. 2005. “The Politics of Social Accounting: Public Goals and the Evolution of the National Accounts in Germany, the United Kingdom and the United States.” *Review of Political Economy* 17(2): 211-230.

Pouliot, V. 2007. "'Sobjectivism': Towards a Constructivist Methodology." *International Studies Quarterly* 51(2): 359-384.
Pu, X. and R. Schweller. 2014. "Status Signaling, Multiple Audiences, and China's Blue-Water Naval Ambition." in T. Paul, D. Larson, W. Wohlforth. Eds. *Status in World Politics*, Camrbidge: Cambridge University Press.
Queller, D. 1967. *The office of ambassador in the Middle Ages*. Princeton, New Jersey: Princeton University Press.
Rees, R.1980. "Historical Links Between Cartography and Art." *Geographical Review* 70(1): 60-78.
Robson, K. 1992. "Accounting Numbers as 'Inscription': Action at a Distance and the Development of Accounting," *Accounting, Organizations and Society* 17(7): 685-708.
Roover, R. 1963. *The Rise and Decline of the Medici Bank*. Cambridge, MA: Harvard University Press.
Savan, D. 1987. *An Introduction to C. S. Peirce's Full System of Semeiotic*. Toronto: Victoria College in the University of Toronto.
Scheel, S. 2013. "Autonomy of Migration Despite Its Securitisation? Facing the Terms and Conditions of Biometric Rebordering," *Millennium: Journal of International Studies* 41(3): 575-600.
Schmandt-Besserat, D. 1984. "Before Numerals." *Visible Language* 18(1): 48-60.
Searle, J. 1995. *The Construction of Social Reality*. New York: Free Press.
Short, T. 1996. "Interpreting Peirce's Interpretant: A Response to Lalor, Liszka and Meyers." *Transactions of the Charles S. Peirce Society* 32(4): 488-541.
Short, T. 2004. "The Development of Peirce's Theory of Signs." in C. Misak. Ed. *The Cambridge Companion to Peirce*. Cambridge: Cambridge University Press, pp. 214-240.
Short, T. 2007. *Peirce's Theory of Signs*. Cambridge: Cambridge University Press.
Sil, R. and P. Katzenstein. 2010. *Beyond Paradigms: Analytic Eclecticism in the Study of World Politics*. New York: Palgrave Macmillan.
Skagestad, P. 2004. "Peirce's Semeiotic Model of the Mind." in C. Misak. Ed. *The Cambridge Companion to Peirce*. Cambridge: Cambridge University Press, pp. 241-256.
Smith, D. K. 2008. *The Cartographic Imagination in Early Modern England: Re-writing the World in Marlow*. Spenser Raleigh and Marvell, Aldershot: Ashgate Publishing Limited.
Sorrell, K. S. 2004. *Representative Practices: Peirce, Pragmatism and Feminist Epistemology*. New York: Fordham University Press.
Speich, D. 2011. "The use of global abstractions: national income accounting in the period of imperial decline." *Journal of Global History* 6(1): 7-28.
Srnicek, N, M. Fotou, and E. Arghand. 2013. "Introduction: Materialism and World Politics." *Millennium: Journal of International Studies* 41(3): 397
Stiglitz, J., A. Sen, and J.-P. Fitoussi. 2009. "Report by the Commission on the Measurement of Economic Performance and Social Progress." Available at: http://www.communityindicators.net/system/publication_pdfs/9/original/Stiglitz_Sen_Fitoussi_2009.pdf?1323961027, last accessed on the 5th of August 2015.
Suzuki, T. 2003. "The epistemology of macroeconomic reality: The Keynesian Revolution from an accounting point of view." *Accounting, Organizations and Society* 28(5): 471-517.
Waever, O. 1995. "Securitization and Desecuritization." in R. Lipschutz. Ed. *On Security*. New York: Columbia University Press. pp. 46-86.

Wallerstein, I. 1979. *The Capitalist World Economy*. Cambridge: Cambridge University Press.
Waring, M. 1989. *If Women Counted: A New Feminist Economics*. London: Macmillan.
Waltz, K. 1979. *Theory of International Politics*. Reading: Addison-Wesley.
Webb, K. 2003. "Semeiotics and the Social Analysis of Material Things." *Language and Communication* 23(2-3): 409-425.
Webster, C. 1963. *The Congress of Vienna*. London: Thames and Hudson.
Weldes, J. 2003. *To Seek Out New Worlds: Exploring Links between Science Fiction and World Politics*. New York: Palgrave Macmillan.
Wight, M. 1977. *Systems of States*. Bristol: Leicester University Press.
Yanow, D. 2000. *Conducting Interpretive Policy Analysis*. Sage University Press.