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What is social structural explanation? A causal account

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Abstract

Social scientists appeal to various "structures" in their explanations including public policies, economic systems, and social hierarchies. Significant debate surrounds the explanatory relevance of these factors for various outcomes such as health, behavioral, and economic patterns. This paper provides a causal account of social structural explanation that is motivated by Haslanger (2016). This account suggests that social structure can be explanatory in virtue of operating as a causal constraint, which is a causal factor with unique characteristics. A novel causal framework is provided for understanding these explanations–this framework addresses puzzles regarding the mysterious causal influence of social structure, how to understand its relation to individual choice, and what makes it the main explanatory (and causally responsible) factor for various outcomes.

1 | INTRODUCTION

Social scientists appeal to various "structures" in their explanations. These structures include public policies, economic systems, and social hierarchies and they have been invoked to explain various outcomes. These social structural explanations are often contrasted with individualistic explanations that view an individual's choices, decisions, or psychology as the main explanatory factor. These explanation types are classified as social macrotheory and microtheory, respectively,

in which either large-scale structure or lower-level individual details do the main explanatory work (Jackson & Pettit, 1992).

Significant debate surrounds the explanatory relevance of these factors for various outcomes, including health, behavioral, and economic patterns. Is a particular societal outcome the result of social structure or individual choice? What rationale, if any, justifies the explanatory priority of one over the other? Answering these questions is important because it would allow us to explain why particular social outcomes are present, to identify what is responsible (and to blame) for their occurrence, and to determine what factors can be targeted to change them. This is especially pressing because it would allow us to explain, prevent, and change various social inequities, in which particular social groups experience disproportionate disadvantage. For these and other reasons, there have been efforts to provide a framework for understanding what social structures are and how they explain (Ritchie, 2020). Many of these frameworks aim to capture social scientists' claims that structural factors are sometimes the main, "fundamental causes" of an outcome, while individual decisions are not (Link & Phelan, 1995). In these cases, scientists claim that structural factors have features that justify their explanatory significance, despite the fact that they are often sidelined by an overemphasis on individuals.

An influential and rich framework for understanding social structure and its role in explanation is provided by Haslanger (2016). In this framework, social structure is represented as a network that involves nodes and connecting edges. In this network, nodes represent different positions an individual can occupy, while edges capture social practices that connect these positions. This clarifies how it is not the individual that explains an outcome, but instead the social structure they are part of and their position in this structure. Haslanger's account makes two central claims about the explanatory power of social structure. First, it suggests that the explanatory nature of social structure is best understood in terms of part-whole relations, in which "we explain the behavior of the [individual] by its being part of something larger whose behavior we explain" (Haslanger, 2016, 114). These explanations hinge on identifying and citing "the whole of which the individual is a part" (Haslanger, 2016, 117). Second, the part-whole framework captures how social structures explain in virtue of their constraining influence. Social structures constrain the choices of individuals and, in so doing, they limit, guide, and shape their behavior.

This paper provides a novel framework for understanding *causal* forms of social structural explanation. This framework is motivated by Haslanger's (2016) constraint component, but it omits the part-whole feature, due to challenges in using such relations to capture explanatory and causal relationships. Instead of part-whole relations, this work suggests that social structure and individual agency are *interacting causes* that work together to produce outcomes. This framework leaves room for both factors to play an explanatory role, but it also captures how the main explanatory burden can reside with one factor over the other. While social structure and individual agency are both causes, they are distinct in ways that alter their explanatory status. In particular, social structure can take on more explanatory power in virtue of the fact that it operates as a *causal constraint* on individual agency. This work provides an analysis of what it means for a factor to be a *causal constraint*, how these constraints differ from standard causes, and how this difference justifies their greater explanatory contribution. This helps address puzzles regarding the causal influence of social structure and its role in explanation. It suggests that the explanatory nature of social structure is perfectly intelligible within a causal framework and that principled reasons exist for viewing structure as more explanatory–and causally responsible–than individual agency.

The social sciences are sometimes viewed as inexact, "soft," and less rigorous than other scientific fields (Salmon, 1989). This might seem to imply that social science explanations are inferior

or less principled than explanations in other domains. My analysis resists these claims. Not only are social structural explanations backed by a principle rationale, but they bear strong similarity to causal explanations that are accepted in other scientific domains.

2 | SOCIAL STRUCTURAL EXPLANATION

Scientists often cite social structures in explaining various outcomes. These structures include economic, political, and social systems, such as "zoning laws, economic policies, welfare bureaucracies, school systems, criminal law enforcement, and courts" (Metzl & Roberts, 2014, 674). This approach suggests that it is structure–and not individual choice–that explains many outcomes, including health disparities, the racial wealth gap, and other inequities. Although social structure is cited as the main cause of these outcomes, there is significant debate over what principled rationale (if any) justifies its explanatory power. These debates are further complicated by the fact that social structure is often viewed as "vague" and "mysterious," with explanatory influence that is "unclear" compared to individualist explanations (Little, 1991; Ayala-Lopez, 2018).

2.1 | Explanation examples

In examining these explanations, there are different types of social structure to consider. This analysis focuses on a type of explanation in which the relevant social structure includes resources or material conditions. Consider three examples of these structures and their role in explanation.

A first example is described by Haslanger (2015b). In this case, Jason has a factory job that starts at 6am and he commutes via a city bus. He takes the first available morning bus and manages the 45-minute commute to arrive on time. As Jason is poor, he lacks financial and other resources that would allow for alternative travel options. After financial changes, the city implements cutbacks which eliminate Jason's bus-route. The early route he usually takes is discontinued and there are no other routes to get him to work on time. After the manager states that no other shifts are available, Jason cannot arrive on time, and he loses his job. In this example, Jason's job loss is explained by social structure, in particular, the transportation resources that are no longer provided to him. Although Jason wants to arrive to work on time, the cancelled bus route makes this impossible.

In a second example, we are interested in explaining why some individuals eat "healthy" diets, while others do not (Metzl & Roberts, 2014). Some studies report a higher prevalence of less "healthy" diets in individuals from minority and lower socioeconomic groups and there is interest in explaining why this is the case (Satia, 2009). Common individualist explanations appeal to racial and ethnic preferences and, in medical contexts, a general choice to be "noncompliant" with medical advice. While food preferences are likely influenced by many considerations, these individualist explanations fail to appreciate structures that constrain an individual's ability to ever chose a "healthy" diet in the first place. For example, some impoverished US neighborhoods are considered "food deserts" in the sense that there are no close grocery stores selling fresh produce. These locations often lack bus routes to nearby stores and they contain barriers for walking options (such as three-hours walks, routes without sidewalks, and so on). In addition to this, many fast-food companies target their advertisements to these low-income areas (Metzl & Roberts, 2014). For individuals living in these areas, the lack of resources (including time and finances) makes "choosing" such a diet extremely difficult, if not impossible.

A third example concerns explanations of the Black-white wealth gap among Americans. A common social structural explanation of this racial wealth gap appeals to "historical and contemporary structural factors" (Herring & Henderson, 2016)–these include unequal home ownership opportunities, as home ownership is an important way of securing wealth and transmitting it to future generations. Not only have African American heirs been "excluded from inheriting the fruits of their enslaved ancestors' labor," but discriminatory policies have made home ownership nearly impossible in a way that has "generational consequences" (Craemer et al., 2020, 5) (Herring & Henderson, 2016, 6). Financial services were denied to Blacks through redlining practices and discriminatory covenants prevented them from owning, occupying, or leasing property, which excluded them from receiving Federal Housing Administration loans (Herring & Henderson, 2016). The systemic denial of resources to Blacks made home ownership–and the ensuing accumulation and transmission of wealth–exceedingly difficult, if not outright impossible.

In these explanations, social structure plays a larger explanatory role than individual agency. These are contrasted with individualist explanations, which Tilly refers to as "standard stories"–these are a common explanatory narrative and they focus on individual decision-making Tilly (1991). As Tilly states, structural explanations "differ from the conventional matter of storytelling because central cause-and-effect relations are indirect, incremental, interactive, unintended, collective, or mediated by the nonhuman environment rather than being direct, willed consequences of individual actions" (Tilly, 1991, 262). If social structure explains particular outcomes, how should we understand this structure and its role in explanation? Furthermore, what justifies the explanatory priority of structure over individual choice?

2.2 | Haslanger's account

In influential work, Haslanger (2016) provides a framework for understanding social structural explanations.[1] This framework argues that social structure is "network-like," in the sense that "social structures are best understood in terms of a network of practices" that connect individuals (Haslanger, 2015b, 3-4). These practices involve behaviors that are held to cultural standards and influenced by environmental and personal factors. These practices are involved in social structure, which influences the behavior of individuals.

Before examining this account in detail, it will help to identify a significant motivation behind it. According to Haslanger, social structure explains by acting as a "constraint," which limits or enables the behavior of individuals. The constraining feature of structure clarifies how it can be more explanatory than individual agency. This is because, if significantly constrained, the individual doesn't actually have a choice–a severe constraint can make only one behavior (or a few) an option and, in so doing, explain why this behavior is realized. For example, Jason's job loss is explained by social structure, because the lack of bus transportation (and other resources) gave him "no choice" and made attending work impossible. Given his eagerness to attend work, a different social structure would have allowed his travel and enabled him to keep his job. On this view "in order to play the right sort of role in structural explanation, social structures must impose constraints on our action"–it is their constraining influence on behavior that allows them to explain (Haslanger, 2016, 125). Although not explicit in Haslanger's work, this view of structure does not not eliminate the role of individual agency in explaining social outcomes. For example, if the

[1] For further discussion of this framework see: Haslanger (2012, 2015a, 2015b, 2018).

bus were available and Jason chose not to take it, the job loss would be caused and explained by his choice.

Given this motivation, how should social structural explanations be understood? If structure constrains, what exactly makes this explanatory? A central feature of Haslanger's account is that social structural explanations are best understood in terms of part-whole relationships. Haslanger compares these explanations to a dog-treat-ball example–in this example a dog treat is placed in a ball and tossed over a hill (Haslanger, 2016). The trajectory of the treat is explained, not by its individual features but, by the "whole" ball that it is "part" of, which guides its movement. In other words, "we explain the behavior of the treat by its being part of something larger whose behavior we explain" (Haslanger, 2016, 114). It is suggested that a similar explanatory pattern is found in the social sciences. In particular, the behavior of an individual can be explained by social structures, because these individuals are "parts" of a "whole" system, which has this constraining influence in virtue of its structure. In other words, "the behavior of…[the]…parts is constrained by their position in the whole" and "such constraints are relevant to explaining the behavior of the parts" (Haslanger, 2015a, 4).

This part-whole framework is illustrated with Haslanger's network-like picture of social structure. Social structure is the "whole" network of interrelated practices, while individuals are "parts" that occupy nodes in this structure. In this way, "structures are important to explanation because they constrain behavior of individual things insofar as they occupy nodes in the structure" (Haslanger, 2015b, 121). The constraint and part-whole elements of Haslanger's account are said to capture how social structure provides a "better explanation" of various outcomes than individualistic explanations, which cite individual agency (Haslanger, 2016, 114).

2.3 | Open questions for a part-whole framework

While this framework identifies important features of social structure, there remain open questions about how exactly structure explains. Many of these questions relate to the part-whole feature of this account and various challenges that this feature raises. Consider two main open questions for this framework.

One thing we want from an account of social structural explanation is to know when structure is the main factor that causes and is responsible for an outcome. One question–call it the causal question–concerns how a part-whole framework can capture this, because part-whole relations are not equivalent to and do not imply causality.[2] In considering this, suppose we have a whole system with parts and structure (Haslanger, 2016). On this view, the whole is said to constrain and explain the behavior of its parts in virtue of its structure. While the system certainly has part-whole relations, the explanatory power of structure seems more tied up with its

[2] These problems hinge on exactly how part-whole and causal relationships are understood. From the standpoint of causal experimentation and reasoning, it is a common requirement that causes are distinct from their effects such that it is possible to experimentally change (or conceive of changing) just the cause–without also changing the effect at the same time–in order to see what happens *later* to the effect (Woodward, 2003). It isn't clear how to meet this with part-whole relationships, because interventions on the whole (candidate cause) are also interventions on the parts (candidate effect). As an example, consider the dog-treat-ball case–it isn't clear how to intervene on the location of the dog ball, without also–simultaneously–intervening on the location of the treat. The failure of this requirement suggests that these factors don't stand in a causal relationship and, thus, can't provide causal explanations. These points are related to claims that part-whole relations are synchronic and, because of this, unable to capture the diachronic nature of causality (Sober, 1999; Woodward, 2008).

constraining influence, than with part-whole features. Indeed, Haslanger sometimes suggests that the individual-structure relationship is not part-whole: instead, the individuals are part of the whole *system*, while the system has both parts and structure. If this is the case, it isn't clear how part-whole relations capture the explanatory nature of structure since structure doesn't stand in this relationship to individuals (the "system" does). Furthermore, if we want to identify the causes of social outcomes, identifying part-whole relations is a poor guide because there are many wholes that do not cause the behavior of their parts and there are problems for interpreting causality with part-whole relationships. This is less of an issue for Haslanger's view if structure doesn't stand in a whole-part relation to individuals, but then it makes it unclear how these relations capture the explanatory role of social structures, as they don't participate in them to begin with.

Even setting these causal issues aside, this framework raises questions for attributing explanatory power to part-whole relations. A second question–call it the explanatory question–can be stated as follows. For any system of interest, numerous part-whole relations exist and most of them are unexplanatory. Jason stands in a part-whole relationship to many factors that are completely irrelevant to his job loss outcome. For example, Jason is "part" of his family, church community, individuals on planet Earth, and so on, but none of these explain his job loss. Of course, this doesn't demonstrate that part-whole relations cannot be or are never explanatory, just that we need something more to capture what is. If some factor is explanatory in virtue of standing in a part-whole relationship to the outcome, yet many irrelevant factors also have this feature, what distinguishes the relevant factors from the irrelevant ones? This is a question that any account of explanation needs to answer. This suggests that part-whole relationships alone are not a reliable guide to these social science explanations, as they fail to distinguish explanatorily relevant factors from irrelevant ones. If we want a principled answer and justification for what is (and is not) explanatory for an outcome, it isn't clear how part-whole relationships can provide this.

While this part-whole feature raises various puzzles, Haslanger's (2016) constraint component is an important insight for understanding common types of social structural explanation. This paper relies on this insight to provide a different framework for understanding these explanations.

3 | SOCIAL STRUCTURAL EXPLANATION: A CAUSAL ACCOUNT

We expect a causal account of social structural explanation to capture (i) how structure figures in causal explanation, (ii) when structure is (and is not) explanatory, and (iii) how structure and individuals are interdependent in producing outcomes.[3] This section outlines a framework that meets these standards. A main claim of this framework, is that social structure explains (and causes) outcomes through acting as a "causal constraint". Causal constraints have additional features that are not present in standard, run-of-the-mill causes. These constraints can interact with other causal factors and they exert influence on them–they guide, limit, and shape the outcomes produced by other causes.

To introduce this framework, consider an example discussed by Dretske (1988)–in this example a switch is electrically wired to either a light that shines or a bell that rings. Suppose you want to explain the behavior of this system–what explains why the light shines or the bell rings? In this case, there are two main causal factors: the (1) switch that is on/off and the (2) wire which

[3] This is not to say that all social structural explanations are causal. As mentioned later, it is important to consider whether there are forms of non-causal social structural explanation. The fact that various structural and constraint-based explanations are viewed as non-causal, lends support to this view (Lange, 2018; Huneman, 2018).

determines what downstream system the switch is connected to. These factors are both causes and they interact to produce the system's behavior–both need to be in a particular state for the system to exhibit a given behavior. However, while both causes are involved they play different causal and explanatory roles–this is captured with Dretske's distinction between *structuring causes* and *triggering causes* (Dretske, 1988). The wire is a structuring cause because it shapes, guides, and constrains the behavior of the system, namely, whether it is the light or bell that turns on. On the other hand, the switch is a triggering cause because it controls when the system's behavior is produced. These causes work together–in order for the light to shine, it is required that the wires are connected in a particular way and that the switch is turned on. However, while both are needed, they differ in important ways. The structuring cause constrains potential outputs of the system in a way that the triggering cause does not.[4] A similar causal arrangement is present in other ordinary life and scientific cases–these include a ball rolling through a pinball machine, a mouse crawling through a maze, a signal traveling along a neuron, and a person walking through a house (Ross, 2021). In each of these situations the behavior of an individual or object is constrained by a structural factor.

Dretske's electrical circuit constrains outcomes of the light-bell system in a similar way that social structure constrains the behavior of individuals. It is through this constraining relation that structure explains. If this constraining relation is central to these explanations, how do we capture how this works?

3.1 | Structure as causal

Social scientists and philosophers sometimes suggest that the causal nature of social structure is mysterious. This relates to challenges in defining social structures (e.g. laws, policies, etc.) as they are often viewed as harder to "see," as present at higher-scales, and as less "physical" than paradigmatic causes in other sciences. Thus, despite being a "central concept" in sociological theory, social structure is often considered a "vague" and "mysterious" factor that "lack[s] clear ontological status" (Haslanger, 2016; Ayala-Lopez, 2018). Even when sufficient definitions of structure are provided, it can still be unclear how it has causal power and exerts causal influence (Elder-Vass, 2010). This is related to assumptions that causality is best understood in terms of mechanisms that involve physical intermediates linking cause to effect.[5] As such physical intermediates are less obvious for structural factors, they are viewed as "unintuitive" causes because "the explanatory mechanism is…unclear" (Ayala-Lopez, 2018). Another reason for confusion is that social structure is sometimes associated with downward causation (as a higher-level cause influencing lower-level individuals), which is viewed by many as mysterious and problematic (Gehlert et al.,

[4] What about other features of the wiring system, such as whether it is made of copper or dental floss? In this analysis, specifying whether a factor is causal (or not) requires that it "makes a difference" to the explanatory target (Woodward, 2003). If our target is whether the light or bell turns on, connecting the wire to one system or another is causally relevant, because it makes a difference to this outcome. Changes in this connection control which outcome presents (either light on or bell on). Notice that we can change whether the wire is made out of copper or dental floss, but this doesn't give control over the explanatory target (it doesn't change whether it is the light or bell that is on). We need a conductive wire for the system to work (and for both values of the explanatory target), but changing from conductive to non-conductive doesn't control, "make a difference to," or causally explain this particular contrast. This framework, derived from Woodward's (2003) account of causal explanation, is specified in more detail in the following subsections.

[5] As Tilly states, one of the "great failures of systems theories" lies in the "absence of sturdy, well-documented causal mechanisms that actually are observable in operation" (Tilly, 1991, 264).

2008; Woodward, 2021). For these and other reasons, structural factors are described as "hidden forces" and "abstract causal forces" (Tilly, 1991, 259-60).

A helpful way to understand the causal and explanatory nature of social structure is with an interventionist account of causation (Woodward, 2003). This philosophical account is motivated by studies of causality in the social sciences, econometrics, and the life sciences (Pearl, 2001; Spirtes et al., 2000; Morgan & Winship, 2007). On this account, causes are factors that provide "control" over their effects–causes are similar to "switches" that can be manipulated to change outcomes. On this account, the relata of causal relationships are variables (X,Y, etc.) and these variables represent properties, such as the national poverty rate, food stamp policies, and so on. These variables can take on different values (binary or continuous), which represent different states of the property in question. For example, these variables can capture the presence (1) or absence (0) of a public policy (P), or the particular density (1, 2, 3…) of grocery stores (D) in a neighborhood.

On this interventionist framework, to say that X is a cause of Y means that an intervention that changes the values of X, in some background conditions B, will produce changes in the values of Y.[6] Determining which social structures meet this criterion–and count as causal–is determined by social science interventions, natural experiments, statistical methods, and observational data (Braveman & Gottlieb, 2014; Morgan & Winship, 2007; Pearl, 2001). Identifying causal relationships is relevant to explanation in the sense that causes *explain* their effects–providing a causal explanation of an outcome involves citing the causes that produce it. In addition to the "intervention" component of this account, it also has a "counterfactual" feature–causal claims convey that *if* X were manipulated, then this *would* be a way of changing Y. When scientists state that limited health insurance policies for some group cause (and explain) their worse health outcomes, this suggests that *if* these policies were different *then* health outcomes would improve. This is often how causal claims are used and understood–they identify causes as factors that can be targeted to change outcomes.

Social structures that are viewed as causal and explanatory meet this basic interventionist framework. Consider the first social structure example at the beginning of section two. In this case, the relevant structure is bus transit availability (T), which is either available (1) or not (0) in a given location. Within the interventionist framework, it makes perfect sense to say that this structure causes and explains the job loss (L) outcome. Given that Jason is willing to attend work, the absence of this resource prevents him from going, which causes the job loss. The operative counterfactual here is that *if* this resource were available, then the job loss *would not* have occurred. Changes to this structure–namely, the presence and absence of a resource–explain changes in the explanatory target. This structure provides causal control over the job loss and this outcome depends on this structural resource.

This suggests that there is nothing problematic with viewing social structure as causal, at least not in the structure-resource cases considered. Interventionism captures the utility of identifying causes for explanation, prediction, and control. It makes sense of the fact that we want to identify the causes of social outcomes so that we know what to target in order to change them or prevent negative results. This is much more useful than a mechanistic framework, because scientists

[6] This account does not require that causes are currently, easily, or actually manipulable–this would exclude many relationships that we consider legitimately causal. Instead, when causes cannot be easily experimentally manipulated (for technological, ethical, or other reasons), it involves considering how hypothetical changes to the cause, would produce changes to the effect of interest. These considerations are informed by social science interventions, natural experiments, statistical methods, and observational data (Braveman & Gottlieb, 2014; Morgan & Winship, 2007; Pearl, 2001).

frequently assess and identify cause-effect relationships without identifying mechanisms.[7] Another feature of interventionism that is consistent with social science reasoning is that you can know that a social structure causes an outcome without knowing the causal intermediates that span this connection.[8] In fact, this mechanistic view fails to capture scientists' claims that absent resources cause various outcomes, as there is no causal mechanism connecting an absent factor to a downstream effect. Interventionism captures this absence causation reasoning and it is able to capture diverse causal systems, in a way that may prove useful in extending this work to more complicated social structural cases.[9]

3.2 | The interdependency of structure and agents

Social structural explanations do not just involve structure, but also agents who make decisions given this structure. Scientists often suggest that social structure and individuals are interdependent in producing outcomes (Martin, 2003, 2009). How do we capture the role of both in an account of causal explanation?

The interdependence of structure and individuals is well-captured with the notion of "interacting causes" (Spirtes et al., 2000; Ross, 2018a). Consider a simple case in which two factors are interacting causes with respect to some effect. In this case, each factor has causal influence over the effect, but the causal influence of each factor *depends* on the other. For example, consider a flashlight with an on/off switch and a single battery. When the battery is in, manipulating the switch controls whether the flashlight bulb is on/off. Similarly, when the switch is on, removing and inserting the battery also controls the state of the bulb. In each case, the "manipulated" cause depends on the "fixed" cause being in a particular state–if the battery is out, no manipulation of the switch will control the state of the light bulb (and if the switch is off, inserting the battery is equally inert). To state this more positively, the causal control of each factor depends on the state of the other. This clarifies how two causes work together to produce an outcome, as opposed to having causal influence that is independent of each other.[10]

In social structural explanations, structure and individual agency are interacting causes with respect to some effect of interest. This framework captures that structure and agency are different properties, that they take on different values, and that they depend on each other in producing outcomes.[11] As structural resources come in degrees, they specify a set of alternatives that are available to the agent. The agent then exerts causal influence by selecting among these options.

[7] Of course this depends on how the "mechanism" concept is understood. For more on this see: (Ross, 2021; Woodward & Ross, Forthcoming ; Ross, 2023).

[8] This is characteristic of numerous causal relationships in science and methods used to establish causality. For example, it is seen in the first proof that bacteria cause disease and the methodology of randomized control trials (Ross & Woodward, 2016; Woodward, 2003).

[9] For example, the interventionist account can be applied to systems with non-linear relations, causal cycles and feedback, interacting cause relationships, redundancy relations, multicausal systems, causally heterogenous systems, and many others (Woodward, 2003, Forthcoming; Ross, 2018a, 2018b).

[10] This is contrasted with examples in which two causes can produce an outcome, but do not interact. For example, the on/off switch on a TV and the remote can each turn the TV on/off, but they do not interact–their causal influence works independent of each other.

[11] To illustrate this, consider an individual (I), some social structure such as health insurance options (S), and some health outcome (O). Suppose the insurance options available span no available insurance (0), one insurance plan (1), or two insurance plans (2). Once S is fixed at a particular value (0, 1, or 2), then the individual I can choose among them. In

The values of both structure and the agent interact in order to cause, explain, and determine some downstream outcome. This interacting cause framework captures how both structure and agency play some role in these explanations, even if one ultimately takes on more causal or explanatory power than the other.

One advantage of this framework is that it makes sense of "interdependent" causes, in a way that circumvents the puzzle of how "higher" level structure interacts with "lower" level individual agency. As Elder-Vass asks, "how can we reconcile claims for the causal effectiveness of social structure (the top level, in this case) with our belief that individual humans (the lower level, in this case) have the capacity of agency, the capacity to have causal influence of their own in the world?" (Elder-Vass, 2012, 82). The interventionist account allows for this by capturing causal relationships that span "levels"–so long as variables refer to discrete, changeable properties, nothing prevents them from causally influencing or interacting with variables at different levels. All that is needed is interventionist counterfactual dependency, which is not confined to properties at the same level. This captures claims that higher-level causes produce lower-level effects (racism causes stress-induced physiological changes) and that lower-level causes produce higher-level ones (genes can cause behavioral outcomes). Interventionism has the advantage of accommodating these level-spanning causal claims, while this is much less straightforward with part-whole, mechanism, and other frameworks.[12]

This interacting cause framework accommodates many other scientific and everyday life cases. These include multicausal disease explanations, regulatory factors involved in biological processes, and various electronic systems (such as the flashlight example) (Ross, 2018a, Forthcoming). This also captures other "structural" cases, such as the ball-pinball machine, the mouse-maze case, and the person-house example. While this clarifies how causes interact with each other to produce an outcome, we still want to know what makes a "structural" cause more (or less) explanatory than other factors.

3.3 | Causal constraints: The unique role of social structure

A main aim of this work is to provide a framework for assessing the degree to which social structure and individual agency explain a social outcome. In some cases, (such as those described in section two), social structure appears to play a larger explanatory role than individual agency. What rationale, if any, justifies this? On what basis is social structure more explanatory and causally responsible than individual choice?

Social structure is a causal factor with unique features that are not present in standard, run-of-the-mill causes. These unique features are common to factors that are "causal constraints" and they matter for understanding the explanatory power of social structure. What does it mean to say that social structure is a "causal constraint"? I am going to suggest that causal constraints are causes with four extra features: they are causes that (1) limit the values of the explanatory target of interest, (2) are often conceived of as separate from or external to the process they limit, (3)

this case, the health outcome is causally influenced by both the structure (S) and the individual (I), which are interacting causes. This is because the values of both S and I have causal influence over the outcome and their influence is dependent on each other. The individual has causal influence because when options are provided (S is 1 or 2) the individual chooses. Similarly, social structure has causal influence because if it is set to 0 it fully determines the outcome (as the individual has no choice).

[12] It is also worth considering how well-founded talk of "levels" in science is in the first place (Potochnik, 2021).

are considered relatively fixed compared to other explanatory factors, and (4) structure or guide the explanandum outcome, as opposed to triggering it. While social structure and individuals are both interacting causes, social structure plays the additional role of acting as a causal constraint and meeting these four features.

Before exploring this analysis in detail, it will help to discuss these four features. Social structure (1) limits values of an explanatory target by dictating which range of values of the explanandum are possible. An existing policy can provide nine different health care options to an individual or three. While the individual plays a role in choosing a particular policy, social structure limits the possibility space of the final outcome. In this manner, structure explains which outcomes are available versus those that are not. Second, social structure is often conceived of as (2) external to the process it limits. Economic policies, school systems, and criminal law enforcement are viewed as distinct from and often external to the individuals they constrain.[13] In fact, this is partly why social structures are more easily ignored–identifying them requires zooming out to witness the bigger-picture factors that impact individuals. Third, causal constraints are viewed as relatively fixed, compared to other explanatory factors. These factors change on longer-time scales compared to individual agency and they can be more difficult to change. Changing public policies can seem more difficult than an individual changing their mind about which option to select. Finally, causal constraints–as suggested by Dretske's analysis–structure, guide, and constrain the explanandum outcome, as opposed to triggering it. These structural causes always require individuals and some individual action, but instead of "triggering" this action, they structure its realization.

How do we use this analysis of causal constraints to understand these explanations? In social structural explanations, social structure operates as a "causal constraint" on the behavior of individuals. Social structure imposes limitations on which options are available to individuals, while their agency performs the selection. This is similar to examples of other causal constraints, which limit, structure, and guide the possible behaviors of individuals or objects. The electrical wire constrains the flow of electricity, the maze constrains the mouse's movement, the house's layout constrains how people walk through it, and so on. In all of these cases the structure is characterized as external to the individual or object. This involves characterizing the structure and individual (or object) as separate explanatory factors. Additionally, the structural factor is often viewed as more fixed and unchanging than the individual or object. This is because structure changes less often (or on longer-time scales) and it can be more difficult to change this factor relative to others.

This constraining relation captures an important difference between structure and individuals. For many social structures, especially material resources, structure acts as a causal constraint on individuals, while these individuals do not constrain structure in return.[14] They select among options made available by the structure in their environment. Part of what this suggests is that social structure and individual agency are tuned to different aspects of the explanatory target. Social structure explains which set of outcomes are available versus those that are not–in other words, the border that separates possible and impossible outcomes. This is associated with

[13] Here I am highlighting two points–(1) that structure and individuals are distinct causal variables and (2) that structure is "external" in being separate and less emphasized than the individual, which receives more attention in these cases.

[14] This is most evident in cases where the individuals in question do not have the ability to change social structure. Furthermore, even if they could, the relevant time-scale of interest is often shorter, than the longer time-scales needed for individuals to change these structures. Changing public policies, for example, takes much more time than an individual deciding among options allowed by such policies. In other words, while humans are an upstream cause of social structure, at the time-scale of interest, structure operates as an independent causal factor (Ayala-Lopez, 2018).

impossibility explanations, which explain why it is impossible for a system to present in a particular way (Lange, 2018). In Dretske's example, it is impossible for the switch to turn the light on if the electrical wire is connected to the bell. Similarly, it is impossible for Jason to arrive at work, if he lacks resources for personal transportation and no bus serves his area. On the other hand, individual agency plays a larger explanatory role if the agent has options and can chose freely. If an individual has sufficient resources, they may choose among different transportation options to arrive at work or choose not to go at all. When an individual is free to chose among options (without guiding or limiting pressures), individual choice plays a larger explanatory role than structure.[15]

Does this mean that individual agency explains which outcomes actually manifest, while structure only explains the potential outcomes for a system? No. Consider two main ways that social structure explains. First, structure can be so limiting that it affords agency no choice, as it solely determines the outcome. In these cases, social structure operates as an *extreme constraint* making it impossible for an agent to exhibit any other outcome. Social structure is the main explanatory factor because it explains why it is impossible for the outcome to be any other way. The individual's agency is not the main explanatory factor because, no matter what their preference would be, social structure gives no choice. Jason's interest in attending work is irrelevant in a context in which no structural resources facilitate transportation. A Black individual's interest in growing wealth through home ownership is irrelevant in a context where home loans aren't available to them. This captures one way that structure is more explanatory than individual agency–the structure is so constraining that it overrides decision-making, giving the agent no choice.

Second, structure can still be explanatory without limiting the agent to one outcome or making outcomes strictly impossible. Social structure can operate as a *strong constraint* in the sense that it makes some outcomes much easier, more favorable, or more rational than others. Consider an individual with limited resources (financial, time, transportation, etc.) that has to walk either 1, 3, or 5 miles to the nearest grocery store to purchase fresh produce. As the distance of the store increases–and other resources diminish–it becomes much more difficult to make the "healthy" decision, despite the fact that it is still "possible" in some sense. If a fast-food restaurant is closer, less expensive, and heavily advertised, there are factors guiding decision-making toward the "unhealthy" option. In these cases, agency does play a role, but when structure makes some outcomes much easier than others, it still significantly guides choices and determines which outcomes show up more often. In these cases, it can be helpful to compare the different social structures that distinct social groups experience–this can identify how differences in social structure explain different outcomes across groups.

Consider how this analysis relates to various societal patterns that call out for explanation. Suppose you want to explain the fact that in the United States, there is a Black-white wealth gap, fewer positive health outcomes in Latinos than whites, and a higher prevalence of "unhealthy" diets among those of low socioeconomic status. A key feature of these explanations is the fact that these social groups experience different social structures. These groups experience different amounts of available resources–and it is this difference in resources, which plays a main role in explaining and causing the difference in outcome. In this framework, what it means to say that social structure is a main explanatory factor for social outcomes is that it provides causal control over them. Social structure is causal in the sense that changes to it change the probability distribution of the outcome in the population. Consider a structural resource as a dial-like causal

[15] The explanatory relevance of these factors to different parts of explanatory target is also suggested and considered by Garfinkel (1981) and Dretske (1988).

variable, which can be set to different values (more or less of a resource). The suggestion here is that intervening on this variable, and changing its values, will make a difference to various outcomes. If the dial is set to an extreme constraint–in which resources are eliminated–structure will take on more explanatory weight as it more completely determines the outcome. If the dial is set as a strong constraint, structure will play a significant role in determining the outcome through guiding individual behaviors. While we sometimes think of agents as determining their behavior through autonomous choice, these cases involving social structure are different. Individual agency plays less of a role when interacting with extreme and strong constraints because there are fewer options to select from or there are overwhelming pressures to choose some over others.

This framework also captures why social structure is often overlooked and backgrounded in efforts to explain. Similar to the electrical circuit, walls of a house, and boundaries of a maze, structural factors are often assumed to be fixed, unchanging, and stable. This is partially because structural factors do not change as often as other variables–once a public policy is set in place, it usually remains so for a long time, relative to "micro" changes in individuals that interact with that structure. This partly reveals why structure matters so much, as it can have long-lasting effects (Haslanger, 2016). In addition to this, structural factors are often backgrounded because it is assumed that they are more difficult to change. We often feel as though we can more easily change our decision-making, than the structures that constrain it. Furthermore, the seemingly fixed, constraining, and external nature of social structure also makes sense of claims that it is a "large" or "bigger picture" factor, relative to individuals. Appreciating the role of structure requires taking a more comprehensive view of a system. This can be easier for physical structures that we can more easily "see," such as the electrical circuit, walls of a house, and boundaries of a maze, and more difficult for structures such as the availability of resources to different social groups.

4 | LOOKING FORWARD

This paper focuses on a particular type of social structure, namely, resources and material conditions. As many other types of social structures exist, it is worth considering whether this approach applies to other cases. Other examples of social structures include conventions and norms, which can limit the force of an individual's speech (Kukla, 2014). If the individual is located at a disadvantaged social position, they can be subject to conventions that constrain "the range of possible things this person can do with their words" (Ayala & Vasilyeva, 2015). While a causal constraint approach appears compatible with these descriptions of how norms constrain and explain various outcomes, it will help for future work to examine this further and explore other diverse cases.

It is also worth considering how this analysis relates to common "network" characterizations of social structure. While network characterizations are used to support part-whole accounts of social structural explanation, this is not the only explanatory model they can endorse. These approaches are also consistent with causal explanations in which networks capture "pathways" or "conduits" that constrain, guide, and channel some object's behavior. This is related to Dretske's notion of a "structuring cause," Richardson's characterization of "conduit-like" forms of causality, and Ross' discussion of "causal pathways" (Dretske, 1988, Richardson, 2015, Ross, 2021).[16] In these cases, a network with directed edges captures causal routes, along which some entity or information flows. The particular node–or social position–that an individual starts at

[16] As Richardson states, there are "forms of causality that are conduit-like rather than strictly cause-effect, directional rather than distinctly determinative, and relational rather than cleanly linear" (Richardson, 2015).

can dictate and explain which downstream possibilities are realized due to the connectivity of the network. For example, one node in the system can lead to outcomes A or B, while another node limits (and leads) to location C only.[17] This "pathway" or "conduit-like" view of network structure does not use a part-whole explanatory framework[18]–it can be captured with the causal constraint analysis articulated in this paper. On this interpretation, network structure captures causal constraints that shape, dictate, and guide the behavior of some entity of interest.

This causal constraint interpretation of network structure accommodates social structural explanation, but it also represents an explanatory pattern found in many scientific fields. This is seen in network explanations of the brain, molecular complexes, and ecosystems. In the brain and other nervous tissues, neurons and nerve tracts determine the fixed, anatomical connectivity of the system. This connectivity constrains the flow of signals and in so doing explains their movement through the network. Similar explanations are present in molecular biology and ecology, in which particular network structures constrain the behaviors of the system. For example, the bow-tie network configuration of immune system interactions renders it susceptible to collapse under particular attacks (Jones, 2014; Ross, 2020). Other cases involve ecosystems, which are represented with network models capturing prey-predator relationships. The directed edges in these networks reflect the conduit that constrains energy flow through the ecosystem. In some cases, accumulation of toxins in particular species is explained by their causal connections to others in the ecosystem (Ross, 2021). While these cases may not be exactly like social structural explanations, they have striking similarities. These network explanations highlight the importance of higher-level, external, conduit-like constraints in causal explanations. They resist a common reductive picture of explanation in revealing the importance of bigger-picture explanatory factors and how they interact with individuals, organisms, or entities, in accounting for their behavior.[19]

It is also worth exploring whether non-causal forms of social structural explanation exist. The network approach is intriguing here, because network models play a central role in many non-causal, mathematical forms of explanation. In fact, various accounts of social structural explanation cite mathematical notions of structure (Haslanger, 2016) and admit that such non-causal explanations are possible (Haslanger, 2018; Skow, 2018). One interpretation along these lines would be mathematical features of network structure (such as scale-free character) that explain the behavior of the system. In this case, the mathematical explanation can be considered non-causal, due to the mathematical dependency relation between the explanans (mathematical feature of system) and explanandum (system behavior) (Woodward, 2019). Causal explanation differs from this, in the sense that this explanatory relation is necessarily empirical–we must investigate, study, and intervene on the world to know if X causes Y. The growing literature on non-causal forms of explanation is likely to be fruitful in considering the diversity of social structural explanation.

Network characterizations of social structure can involve different commitments and claims. To say that social structure is network-like may be metaphorical–suggesting only loose similarity–or

[17] For examples of explanations that rely on the pathway concept, see: (Ross, 2018a, 2021).

[18] In fact, for the reasons mentioned in 2.3, a part-whole framework involves various challenges.

[19] These analyses focus on how to capture relevant causes in network and topological models and, similar to interventionist accounts of causal explanation, they can capture complex systems that are non-linear, dynamic, and complex in other ways (Ross, 2020, 2021). In future work, it will help to examine how the complex nature of various social structural cases are captured with interventionist (Woodward, 2019), network (Huneman, 2018), topological (Jones, 2014; Ross, 2020), constraint-based (Lange, 2018), and other forms of scientific explanation (Woodward & Ross, 2021).

more literal, to be understood in terms of mathematical and graph theoretical features. In moving forward it will be important to consider which use is intended and what this means for the explanatory nature of social structure. The notion of structure itself is complex and associated with many analogies–skeletal structure, web of connections, conduit, pathways, etc. (Martin, 2009). These analogies highlight important features of systems in the world, but they first need to be made sufficiently clear in order to properly inform explanatory reasoning.

5 | CONCLUSION

This paper provides an account of social structural explanation. On this account, both social structure and individual agency are explanatory factors, but this is not understood in a part-whole manner, as others have suggested (Haslanger, 2015a, 2015b, 2016). Instead, these factors are causes that are interdependent–they are "interacting causes" that work together in producing some outcome of interest. While these factors are both causal, they have important differences. Social structure is a causal constraint that guides, limits, and channels the cause it interacts with, namely the individual and their choices. When social structure operates as an extreme or strong constraint, it limits the individual's options so severely that it determines the outcome outright or it makes some outcomes much more likely. It is this constraining influence of social structure that renders it more explanatory than individual agency and provides the rationale behind viewing it as the main cause responsible for outcomes.

The philosophical literature on scientific explanation has paid little attention to explanations in the social sciences. Its paradigmatic examples tend to come from the physical sciences, the life sciences, and everyday life cases. This may be related to assumptions that explanatory reasoning is less rigorous in the social sciences compared to these other domains. A preference for reductive explanations may also bias against social science cases, in which higher-level social structure is said to carry explanatory weight. This paper suggests that these views are misguided. Not only are social structural explanations backed by a principle rationale, but they bear strong similarity to causal systems and explanations in other scientific domains. Furthermore, work in this area is not just important because it attends to explanation in a less studied area or because it identifies a unique explanatory pattern. Beyond the philosophical project of understanding how explanations work, this topic is important because it sheds light on injustice and, in many ways, it is difficult to find an explanatory target more important than this.

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