Perspectives on Behavior Science (2019) 42:751–771
https://doi.org/10.1007/s40614-019-00225-y

CULTURAL AND BEHAVIORAL SYSTEMS SCIENCE

Units of Analysis for Corruption Experiments: Operant, Culturobehavioral Lineage, Culturant, and Macrobehavior

Karoliny Lopes da Hora[1] · Angelo A. S. Sampaio[1]

Published online: 9 September 2019

Abstract

To comprehensively understand the processes involved in social issues such as corruption, a behavior science has to rely on rigorous experimentation, interdisciplinary dialogue, and the use of diverse units of analysis. The present article proposes a behavioral analysis of corruption, highlighting how different units of analysis (operant behavior, culturobehavioral lineage, culturant, and macrobehavior) account for different facets of this social phenomenon. We propose that corrupt behavior involves relations in which there is a conflict between consequences for the individual and effects for the group—a concept similar to that of an ethical self-controlled response. This response can occur independently or in coordination with responses by other individuals. In addition, verbal control, as well as social reinforcement and punishment, plays an important role in the maintenance and transmission of this behavioral pattern. After presenting examples of how the theme has been experimentally studied in recent years, we conclude by suggesting that experimental studies on ethical self-control may fruitfully contribute to a behavioral analysis of corruption in its multiple dimensions.

Keywords Behavioral economics · Metacontingency · Macrocontingency · Ethical self-control · Bribery · Embezzlement

Corruption has been present since ancient times in virtually all regions and political regimes. It is as diverse as the social systems in which it occurs and very dependent on the historical context (Von Alemann, 2004). The theme has received worldwide political and media attention, and its current visibility has had repercussions on the oversight and

✉ Angelo A. S. Sampaio
angelo.sampaio@univasf.edu.br

Karoliny Lopes da Hora
karolinydahora@gmail.com

[1] Colegiado de Pós-Graduação em Psicologia, Universidade Federal do Vale do São Francisco (Univasf), Av. José de Sá Maniçoba, s/n, Centro, Petrolina, PE 56304-205, Brazil

punishment of public and private agents (Vaz & Velasco, 2017). In 2015, for instance, the U.S. Environmental Protection Agency uncovered the Volkswagen "diesel dupe" (or "Dieselgate"): many of the company's cars had a software in diesel engines to detect when they were being tested, changing the performance accordingly to improve results (Hotten, 2015). After that, Volkswagen admitted cheating emissions tests in the United States and that about 11 million cars worldwide were fitted with the so-called "defeat device." As result of the scandal, the company started a recall of 8.5 million cars in Europe and 500,000 in the United States at an estimated cost of about €6.7 billion, the carmaker's shares have fallen, and the group's chief executive officer at the time resigned and was charged with fraud (Hotten, 2019). In the same year, the investigation codenamed Operation Car Wash (*Operação Lava Jato*) in Brazil began to unravel the biggest corruption scandal in history (Watts, 2017). This investigation uncovered a massive web of corruption involving some of Brazil's largest companies (e.g., Petrobras and Odebrecht) and prominent politicians, and recently led to the imprisonment of former presidents Luís Inácio Lula da Silva (Darlington, 2019) and Michel Temer (Londoño & Casado, 2019), among other politicians and businesspersons (Pressly, 2018).

Despite all the attention to the theme, there is no unified definition of corruption. The term has been employed in several fields, such as politics, philosophy, and law, and comprises various activities, such as bribery, extortion, fraud, appropriation of resources, patronage, nepotism, and vote buying (Liu, 2016; Serra & Wantchekon, 2012). These activities are usually defined based on the description of forms of responses. If, however, one focuses on human actions' functions rather than its topographies and assumes that they are not expressions of events occurring at some other level (e.g., in the "unconscious mind"), one must analyze the relations between responses and events that alter the probability of these responses (e.g., Baum, 2017; Skinner, 1965). In this sense, different topographies may have similar functions and very similar topographies may have different functions in varying contexts. Thus, behavior analytic studies investigate antecedent and consequent variables that affect the selection and maintenance of behaviors considered to be corrupt, and, at the cultural level, its cultural transmission and the environmental factors controlling corrupt practices (Agbota, Sandaker, Carvalho, & Couto, 2017; Carrara & Fernandes, 2018; Ferreira, 2017). Corruption is not treated as an entity, structure, or trait of personality, but is seen as a behavior or cultural practice resulting from the interaction among phylogenetic, ontogenetic, and cultural variables (Carrara & Fernandes, 2018).

Such a behavior-analytic perspective on corruption has generated few studies (Agbota et al., 2017) and little dialogue with other research fields such as the social sciences (see Sandaker, 2006; for an exception, see Carreiro & Oliveira-Castro, 2016). Nevertheless, behavior analysts have been contributing for decades to the understanding of social issues (e.g., Biglan, 1995; Lamal, 1991, 1997; Mattaini & Thyer, 1996; Skinner, 1978). For instance, Glenn et al. (2016) presented a terminology to deal with behavioral and sociocultural phenomena that articulate a set of principles and concepts consistent with an experimental analysis of behavior. Agbota et al. (2017) employed part of that terminology to analyze corruption. Inspired by the work of these behavior analysts and others, the present article suggests how four units of analysis distinguished by Glenn et al. (2016)—operant behavior, culturobehavioral lineage, culturant, and macrobehavior—can be applied to the phenomenon of corruption in its behavioral and sociocultural dimensions. To do that, the following section will discuss corruption at the individual level, corrupt cultures (the transmission of corrupt behaviors), corrupt

transactions among two or more individuals, and corruption as a social issue. Next, we will describe how some experiments on corruption conducted in different disciplines involve those units of analysis. Finally, we will highlight how the concept of and experiments on ethical self-control may contribute to the analysis of corruption.

Units of Analysis for Studying the Behavioral and Cultural Dimensions of Corruption

Corruption is a complex phenomenon, discussed with a lay vocabulary by public officials, journalists, and concerned citizens, as well as with technical jargon by scientists from different areas. A reductionist definition or one that does not take into account these varied usages of the term will be fruitless. In order to encompass different aspects of this phenomenon it is necessary to employ different units of analysis. Based on Glenn et al. (2016) and Agbota et al. (2017), we propose that at least four units of analysis are fundamental to properly deal with corruption: operant, culturobehavioral lineage, culturant, and macrobehavior.

Individual Corruption: Corrupt Operant

Throughout history, the definitions of corruption have involved an ethical or moral issue: an opposition to current norms or laws in favor of personal gains, producing some damage to the group. In its etymological origins, for instance, the term indicates a "rupture" (from the Latin *cum-rumpo*/*corruptio*), suggesting the idea of breaking a set of norms established by a community (Silva, 1999). Furthermore, classical scholars such as Aristotle have treated corruption as contrary to a fair organization of the collective milieu; during the Renaissance, it was considered as a decline of the virtues, a weakening of political values (Von Alemann, 2004). These uses of the term "corruption" as a loss of moral or political values are especially relevant to characterize the inadequate conduct of people who should be working for the common good, such as civil servants and politicians (Von Alemann, 2004).

More recent definitions of corruption likewise stress this ethical or moral issue. In a political context, corruption has been considered as the abuse of granted power to get private gains (Aidt, 2003; Rose-Ackerman, 2006; Silva, 1999; Tanzi, 1998; Transparency International, 2015); or as a behavior deviant from regulations (Von Alemann, 2004). In these cases, a corruption situation involves the breaking of a rule by a public official, which probably occurs in a secretive way (Serra & Wantchekon, 2012). In a legal context, governments establish set of formal rules (laws) that seek to restrict and punish corruption, for example, by regulating public administration processes and transactions between public and private agents (Agbota et al., 2017). In economics, Rose-Ackerman (2001) defined corruption as a rational and self-interested behavior in which the individual uses his discretionary power to allocate resources to himself or to others who favor him and thus to obtain an unlawful personal gain derived from public goods. The rational aspect of corrupt behavior may be interpreted as a comparison between costs and benefits involved in corrupt behavior and in honest behavior (Becker, 1968). Thus, the violation of moral standards, formal rules, or laws have always been involved in the definition of corruption.

Skinner (1971) discussed morals and ethics—in addition to their relationships with rules and laws—equating values to positive reinforcers. What people value and call good is what positively reinforces their behavior. Behaving "for the good of others" is behaving under the control of contingencies arranged and maintained by others who are reinforced by the behavior thus generated. Behaving "for the good of the culture" is behaving under the control of social contingencies that favor the survival of the culture. In this sense, to state that distinct groups or cultures adopt different values is to refer to the fact that the members of these groups or cultures are positively reinforced by different things or activities, that these specific reinforcers are customarily arranged in distinct contingencies and that the behaviors of these members favor in distinct degrees the survival of their own culture. Thus, for example, what is considered a corrupt act and is socially punished in one group, can be seen as an honest act and socially reinforced in another group.

The social contingencies arranged for individuals to act "for the good of others" or "for the good of the culture" may conflict with the production of individual reinforcers (Skinner, 1971). Thus, to a large extent to discuss ethics or morality is to discuss conflicts between personal consequences and consequences for the group, in the short and in the long term. Corrupt behavior can be called unethical or immoral precisely in the sense that it produces (short-term) positive reinforcers for the individual at the cost of (long-term) aversive consequences for others and damages to the survival of the culture. Anti-corruption practices establish contingencies aimed at weakening this behavior and/or strengthening incompatible honest behavior. These practices are often supplemented by verbal stimuli that describe the arranged contingencies: formal rules or laws. Anti-corruption government practices, for example, can arrange aversive consequences such as fines and imprisonment for corrupt behavior—and such contingencies can be described in laws and regulations (Skinner, 1965). It is no accident, therefore, that many definitions of corruption—including behavior-analytic ones—refer to the violation of formal rules or laws.

Ferreira (2017), for instance, proposed a behavior-analytic interpretation of a corrupt response as one maintained by "reinforcement contingencies that provide an unlawful gain of reinforcers derived from public goods" (p. 4). Agbota et al.'s (2017) definition of corrupt behavior encompasses an illegal behavior of a person who flouts administrative rules for personal or organizational gain. Both definitions highlighted the obtainment of individual gains—with Ferreira further specifying that this occurs to the detriment of the public good, i.e., that individual gains conflict with the "good for the group." Another common feature of these definitions is the illicit aspect of the corrupt response, corresponding to some probability of punishment arranged by a government or other organization for the benefit of a particular group. A law or regulation can act as a rule that signals a punitive consequence for the corrupt response; however, the corrupt operant response may not be under the control of this type of prescription (e.g., the individual may not be "aware" that a law is in effect).

In line with this, Carreiro and Oliveira-Castro (2016) considered corruption as a behavior of choice, where performing the illegal activity involves a lower response cost and more immediate access to reinforcing consequences than performing legal activities. Carrara and Fernandes (2018) also pointed out that illicit practices commonly involve lower response cost and greater magnitude of positive reinforcers in the short term, in addition to a low probability of punishment in the short and medium term. In

this sense, the delay discounting of consequences would lead to a failure to comply with norms of conduct that would benefit the public good (Agbota et al., 2017).

In sum, despite the numerous behavioral topographies that are considered corrupt, it is possible to identify common functional aspects of a *corrupt operant* (Agbota et al., 2017). A corrupt operant response is one emitted in a choice situation (concurrent schedule) in which: (1) the corrupt alternative produces immediate *higher*-magnitude reinforcing consequences plus some probability of punishment to the individual, and a delayed *smaller* benefit to the group; and (2) the honest alternative produces immediate *lower*-magnitude reinforcing consequences to the individual, and a delayed *larger* benefit to the group. The individual consequences can also be positive or negative punishers, in which case (1) the corrupt alternative produces immediate *lower*-magnitude punishing consequences and (2) the honest alternative produces immediate *higher*-magnitude punishing consequences to the individual. Effects that harm—instead of benefit—the group may also be involved, in which case (1) the corrupt alternative produces a delayed *larger* harm to the group and (2) the honest alternative produces a delayed *smaller* harm to the group. In all cases, the effect upon the group is frequently much delayed and dependent on large numbers of individuals to be noticed, usually not affecting the corrupt operant (i.e., it is a cumulative effect—see "Corruption as a Social Issue," below).

Antecedent variables are also important in controlling a corrupt operant. For example, corruption news reports may affect the "social perception" of corruption (Maia, 2008). The news stories may function as verbal stimuli relevant to the citizens' behavior of observing and describing corruption, and may signal the possibility of punishment for the corrupt operant. Moreover, stimuli such as these can contribute to the formation of symbolic relations. For instance, formulations such as "politicians are corrupt" and "corrupt people are thieves" may contribute to the formation of a class of equivalent stimuli involving "corrupt," "thieves," and "politicians," leading to the emergence of relations such as "politicians are thieves." Thus, antecedent verbal formulations may be extremely relevant in the control of corrupt operants.

So, our definition of a corrupt operant encompasses (1) the conflict between individual reinforcing consequences and the effect for the group, (2) the probability of punishment of the corrupt response, and (3) verbal and symbolic variables that may affect this operant. The behavior of diverting resources from a public agency, for example, involves the gain of immediate individual reinforcers (diverted money), impairing the services offered by this sector (harm to the group), but with a probability of punishment described in a law. Information about the level of surveillance exerted by the agency and about previous cases of detection would be important antecedent variables in the control of the diverting of resources.

Corrupt Cultures: Corrupt Culturobehavioral Lineage

For Agbota et al. (2017), the propagation of corrupt operants through different individual repertories, in the same generation or in different generations, indicates the existence of a corrupt culture. According to the terminology of Glenn et al. (2016), this would exemplify the transmission of operants between individuals called culturobehavioral lineages. This is a second unit of analysis for the interpretation and study of corruption. Whereas a corrupt operant refers to a class of responses of a *single*

individual, a *corrupt culturobehavioral lineage* refers to the existence of similar corrupt operants (e.g., paying bribes to transit agents) in the repertoires of *two or more* individuals *due to its social transmission*. In other words, one individual that emits the specified operant teaches, shapes, models, or instructs other(s) individual(s), leading the latter to start emitting a similar operant. The apprentice(s), by their turn, teaches, shapes, models, or instructs still other(s) individual(s), and so on. A corrupt culturobehavioral lineage comes into existence as a corrupt operant, and then "spread" from the repertoire of one individual to the next individual, and to the next one, and so forth. This and the following two units of analysis (corrupt culturants and corrupt macrobehavior), unlike corrupt operants, necessarily involve more than one individual—they refer to *sociocultural* phenomena.

Emitting rules (instructing) is one kind of social transmission mechanism that allows the propagation of corrupt operants in culturobehavioral lineages. However, specific rules can themselves be propagated in culturobehavioral lineages (see, e.g., Baum, Richerson, Efferson, & Paciotti, 2004, for an experimental analysis of the propagation of rule giving). Rules stating that exploiting public goods is an expected and natural thing can be propagated in certain cultures (Aidt, 2003). In some contexts, it is commonplace, for example, to hear that corruption speeds things up, overcomes useless bureaucratic obstacles or compensates unfair disadvantages. The propagation of such verbal culturobehavioral lineages can support the perpetuation of corrupt nonverbal culturobehavioral lineages. In Brazilian culture, for example, the social transmission of some nonverbal corrupt strategies is supported by the verbal description of a behavioral pattern that would be useful in adverse situations (the Brazilian "jeitinho"; Fernandes, Perallis, & Pezzato, 2015). Certain practices, although considered morally degrading through a set of informal norms, are accepted on a daily basis and can be favored by instructional control in a community (Filgueiras, 2009).

Corrupt Transactions: Corrupt Culturant

What is known as corrupt transactions (or exchanges) involve two or more actors providing services that should be provided for free or should not be granted at all (e.g., Treisman, 2007; Von Alemann, 2004). These situations involve (1) an individual (or group) who has power over a common good and should act according to a set of rules, but can emit a corrupt operant; and (2) an individual (or group) seeking to obtain a concession and/or get rid of some kind of punishment (Von Alemann, 2004). For instance, a citizen may offer bribe to a public agent so that the latter does not charge a mandatory fee. If the public agent accepts the bribe and does not collect the mandatory fee, a corrupt transaction has taken place. Thus, in addition to individual corruption, which does not require any coordination between persons, researchers have also referred to corrupt transactions, defined by Agbota et al. (2017) as a verbal or nonverbal interaction between two or more individuals that is contrary to the administration rules of goods or services. These transactions are maintained by the (tangible or intangible) results of the behaviors of those involved (Agbota et al., 2017). Thus, a unit of analysis to deal with corrupt transactions should focus on the recurring interactions between more than one individual.

As an example, the corruption scandal unraveled by Operation Car Wash in Brazil involved a scheme where former managers from state-owned oil-processing giant

Petrobras directed bids so that the contractors agreed which one would be hired, and afterwards overbilled the deployed service (Watts, 2017). The simulation of the provision of services by fake companies allowed the transfer of payments to public agents participating in the corrupt transaction. These interactions between public agents and businesspersons recurred in a coordinated way for years. In this case, the offering of a bribe by a businessperson act as a discriminative stimulus for the public agent's response to agree to the transaction. If the public agent accepts the bribe, this can work as a reinforcing consequence for the businessperson's corrupt response (offering bribes). Operant contingencies in which responses of some individuals (e.g., offering or accepting bribes) function simultaneously as parts of the environment for the responding of another person, constitute *interlocking behavioral contingencies* (IBCs; Glenn, 2004; Glenn et al., 2016). Therefore, in this example organized IBCs were set in place so that the bidding was fraudulent, and the diversion of public resources was accomplished and distributed among the transaction's participants. The rigged bidding can be interpreted as an *aggregate product*, that is, an outcome produced by the coordinated behaviors of the individuals involved, and the resources arising from the overpricing of the work done can be treated as a *cultural consequence*, an event that alters the probability of similar sets of coordinated responses occurring in the future (Glenn & Malott, 2004). Glenn et al. (2016) described the concept of *metacontingency* as the contingent relation between (1) recurrent IBCs having an aggregate product (i.e., a *culturant*) and (2) selecting environmental events or conditions (i.e., cultural consequences). So, what has been called corrupt transactions involves a third unit of analysis which we call corrupt culturant.

Thus, a *corrupt culturant* is one resulting in a cultural consequence (e.g., the diversion of resources for public health services) that implies a detrimental effect to the group (e.g., lower quality public health services). This effect may be delayed and may only become noticeable when occurring in conjunction with the production of similar effects by other corrupt operants or culturants (i.e., it is a cumulative effect—see next section). In addition, the occurrence of the culturant involves some likelihood of punishment signaled by a rule (e.g., a law). Finally, illicit reinforcers (e.g., money) related to the emission of the corrupt culturant are of greater magnitude than reinforcers contingent to other (honest) alternatives available.

Note that not all corrupt transactions are maintained by illicit, public-goods derived, *positive* reinforcers. It is possible to distinguish between *transactive corruption* (an agreement between parties) and *extortive corruption* (which involves forms of coercion); this distinction is similar to that between bribery with and without harassment (Bussell, 2015). In cases of extortive corruption, the citizen's corrupt operant may function to avoid or withdraw aversive consequences (damage to the subject or persons close to him), i.e., may involve *negative* reinforcers.

Corrupt culturants usually include verbal behaviors. Agbota, Sandaker, and Ree (2015), for example, investigated verbal interactions in offering and accepting bribes in Ghana by collecting responses to questionnaires, and pointed out that people who engage in acts of corruption tend to be discreet, using verbal metaphors to evade punishment. Although these verbal responses are topographically similar to other everyday expressions, they are functionally different (requiring or offering bribes). The verbal behavior of the corruptor has the effect of reinforcing the receipt of the requested resource or service, and the verbal behavior of the corrupt reinforces the

receipt of the bribe, although the monetary transaction itself may still signal punishment.

Therefore, the definition of corruption can be elaborated not only at the individual level, analyzing corrupt operants, but also at the group interaction level, analyzing corrupt culturants—and the metacontingencies that selects them. Examining corrupt transactions with the concepts of culturant and metacontingency facilitate the identification of variables that select these interactions, such as illicit or licit positive and/or negative reinforcers.

Corruption as a Social Issue: Corrupt Macrobehavior

When a large number of people emit responses that produce a significant detrimental effect to the group, a social issue arises (Malagodi & Jackson, 1989). For example, the emission of corrupt behavior by many individuals (such as diversion of public resources, bribe collection, and vote buying) has been correlated with inefficiency in the management of public health and education services (Lopes & Toyoshima, 2013). In addition, higher levels of corruption are related to lower economic growth trajectories (Rocha, 2018).

Corruption as a social issue is a product of both independent individual behaviors (corrupt operants such as embezzlement; see "Embezzlement Studies," below) and organized operations (corrupt culturants such as racketeering for public money laundering)—with different levels of complexity and magnitudes of the losses generated. These operants and culturants may recur on culturobehavioral lineages. Each emission of the relevant operants or culturants cumulatively adds—even if a little—to a final unwanted outcome, termed a *cumulative effect*. So, a large number of people rarely emitting corrupt operants can produce the same effect as a smaller number of people frequently emitting the same corrupt operants. Effects such as a change in the level of economic growth of a country or in the efficiency of public service management, for example, will not occur if just few individuals rarely act in a corrupt manner. The set of operant behaviors and/or culturants that produces a cumulative effect of social significance can be termed a *macrobehavior*, and the relation between the macrobehavior and the cumulative effect can be described with the concept of *macrocontingency* (Glenn et al., 2016). It is important to note that a macrocontingency is not a cohesive whole: operant behaviors are under the control of individual contingencies and culturants are under metacontingency control (Malott & Glenn, 2006). Corrupt agents may not be sensitive to the losses generated in society, that is, there is no actual contingency relation between the cumulative effect and the macrobehavior involved in producing this effect (Agbota et al., 2017). To avert such a misunderstanding, we will avoid using the term "macrocontingency" when possible, stick just to the term "macrobehavior," and directly describe the relations among macrobehavior and the cumulative effects involved when necessary.

In short, the phenomenon of corruption can be analyzed as operant behavior (individually), culturobehavioral lineage (socially transmitted corrupt behavior patterns), culturant (recurrent coordination between two or more individuals), as well as macrobehavior (when similar operants of several individuals or similar culturants of various organizations are observed). To comprehensively discuss and study corruption one must be mindful of all these behavioral and cultural dimensions of the

phenomenon. The use of different units of analysis could also facilitate an interdisciplinary dialogue. To move in this direction, in the next section we discuss some interdisciplinary experiments and, in the following section, behavior-analytic experimental preparations that employ diverse units of analysis and shed some light in the functional relations involved in corruption.

Interdisciplinary Experiments on Corruption

The cumulative effects of corrupt macrobehaviors have encouraged investigations on the installation and maintenance of corruption, and on the effectiveness of anticorruption policies. Different research methods have been employed for dealing with the topic. However, corruption is typically secretive and, therefore, difficult to observe and to measure. Laboratory experiments allow the direct observation of corrupt behavior in a controlled environment (Burguet, Ganuza, & Montalvo, 2016; Serra & Wantchekon, 2012). In this sense, several experiments recruiting concepts and methods from diverse disciplines (e.g., economics, political science, behavior analysis) simulated a corrupt environment, mainly in situations of embezzlement and bribery. Next, we present some experimental studies of corruption, describe its procedures and manipulated variables, and suggest how the four units of analysis previously presented are involved. Recent experiments that took some form of corruption as the dependent variable were chosen as examples.

Embezzlement Studies

The crime of embezzlement involves two main aspects: (1) a person who accepts a position of trust, and (2) the violation of that trust by the commission of a crime (Jacobs, 2010). It can be committed by public or private agents. In the Federal Bureau of Investigation's (FBI) *Uniform Crime Reports*, for instance, the crime of embezzlement is defined as "the unlawful misappropriation or misapplication by an offender to his/her own use or purpose of money, property, or some other thing of value entrusted to his/her care, custody, or control" (Part II Offenses; FBI, 2014). In the Brazilian Penal Code, on the other hand, this kind of crime is restricted to "a public official appropriating money, values or any other public or private asset, of which he has possession by reason of his position, or deviating it, for his own or others' benefit" (Decree of Law 2848, Article 312, 1940).

A behavioral analysis of embezzlement suggests its fundamental elements:

1. There must exist a set of (potential) reinforcers (e.g., money, property, or assets) and a rule (e.g., a norm or law) indicating that those reinforcers will be presented to a group of people.
2. An individual occupies a "position of trust," controlling these reinforcers, i.e., his/her responses may reduce the quantity or quality of the available reinforcers.
3. That individual subtracts a portion of these reinforcers for him/herself, thereby harming the group that would receive them.
4. Finally, there are rules (laws, regulations, etc.) that specify some contingent punishment for responses in 3.

Embezzlement may involve one single individual, but culturants with the participation of many people are possible and perhaps even more common. Large cases of political corruption such as the Operation Car Wash scandal, for example, commonly require the coordinated action of several people. In these latter cases, the cultural consequence is subtracted from a public good and divided among the participants involved in the culturant. In addition to these resources coming from a public good, the cultural consequence may involve the avoidance of punishment (i.e., to avoid detection of the corrupt transaction).

To simulate the crime of embezzlement in the lab, experimenters have created situations where one individual can subtract collective funds for her/himself—exemplifying the use of the operant as a unit of analysis. However, reproducing the complexity of these relationships in the laboratory brings theoretical and methodological challenges.

Ferreira (2017), for instance, proposed an experimental task to the study of embezzlement based on a public goods game. Six participants were told that they were playing together, contributing to a "shared investment fund," but actually each one of them played a public goods game with five fictitious computer-programmed "participants." Contributions could vary in quantity and the total sum was multiplied by a yield factor. The real participant then distributed the resources obtained in one of three ways: (1) egalitarian; (2) unequal, favoring others "participants"; or (3) unequal, favoring him/herself. The dependent variable was the distribution of resources, which was related to the number of resources the participant had to distribute and to the gains obtained from the distribution. Trials on which the participant distributed the major part of the resulting resources to him/herself were considered embezzlement. Participants who contributed with reduced shares to the public fund showed a higher frequency of unequal distributions.

Ferreira's (2017) experimental task presents some of the fundamental elements of embezzlement we suggested: there is a set of reinforcers that will be delivered to a group (the shared investment fund); and an individual (the participant) that controls it and can subtract a part of it to him/herself. There was no group actually affected by the participants choices, but they were led to believe that real people could be losing resources. One element of the definition of embezzlement not present refers to the illegality of the response, i.e., there are no rules specifying any punishment for corrupt acts.

The experimental situation of Boly, Gillanders, and Miettinen (2017) offers a methodological alternative presenting all the defining elements of embezzlement. There is a set of reinforcers available; an individual who controls such reinforcers and who can subtract them from themselves, harming a group of real people, as well as some probability of punishment for the corrupt response. Moreover, this experiment investigated, besides the corrupt operant, the beginning of a culturobehavioral lineage. Pairs of participants (called "public officials") had the possibility of taking varying amounts of points (exchanged for money) from separate "public funds" intended to be spent on (real) social projects of nongovernmental organizations or local charity funds. One of the participants observed the other choosing before making his own decision—to analyze the effects of modeling ("social contagion") in the choice for corruption. In addition, the first official could choose the probability of detection/punishment of the second, in order to evaluate the effects of probability of detection. Participants who

observed other participants acting in a corrupt way showed higher frequency of corrupt acts. Thus, the transmission of a corrupt operant seems to have occurred through a process of imitation. With respect to the analysis of corrupt operants, the higher the probability of detection the lower the frequency of embezzlement. When a noncorrupt official chose the probability of detection, it had a greater effect on reducing the corruption of the second official.

In these embezzlement studies, the dependent variable has been the response of unequal distribution of resources favoring the distributor. Thus, studies on embezzlement have allowed the analysis of individual contingencies relevant to corrupt operants and culturobehavioral lineages. However, we do not know of experiments dealing with embezzlement situations that depend on the joint action of several individuals (similar to a corrupt culturant), or that analyze the relation between corrupt actions of several individuals (macrobehavior) and the cumulative effect of these behaviors. Investigating units of analysis such as macrobehavior and culturant is crucial because these phenomena often occur outside the lab.

Bribery Studies

A large part of corruption experiments simulates *bribery transactions* in which one individual (the briber) offers or demands a reinforcer (a bribe) to some other individual (the bribee) who receive or provide it, resulting in the obtainment of illicit advantages, such as not charging taxes or granting licenses (e.g., Abbink & Hennig-Schmidt, 2006; Alatas, Cameron, Chaudhuri, Erkal & Gangadharan, 2009; Armantier & Boly, 2008; Lambsdorff & Frank, 2010; Van Veldhuizen, 2013). As with embezzlement, a bribery transaction involves an individual who controls reinforcers available to a group of people and subtracts them as well as a rule that signals punishment for corrupt responses (in this case, offering, demanding, receiving, or providing a bribe). Unlike embezzlement, bribery involves an exchange relationship between individuals or organizations. That is, the reinforcer for the public agent, for instance, is produced by the private citizen and consists of a private good. The reinforcer for the private citizen is subtracted from a public good by the public agent. In embezzlement, an individual or organization subtracts for him/her/itself public goods; in bribery, one of the reinforcers involved in the exchange is a public good. Another important difference between bribery and embezzlement relationships is that in bribery there are necessarily interlocked contingencies.

When participants agree on a bribery transaction, we may consider that the participants' coordination is maintained by the joint product of their behavior (i.e., the illicit advantage). In case of recurrence of these interactions, we can say that the functional relations involved comprise a corrupt culturant. This does not seem to be a frequently used unit of analysis in the study of bribery, however. The most commonly manipulated variables affect the behavior of individual participants; they are antecedent and/or consequent stimuli for the response of the individual rather than the group as a whole.

In a study by Salmon and Serra (2017), for instance, the unit of analysis consisted of the corrupt operant. Interactions between participants were not analyzed, only individual behavior. The experimental task involved groups of three participants: one appointed as a "private citizen," one as a "public official," and another as a "member of society." The citizen had the option of offering (or not) a bribe to the official.

Regardless of this, the official would choose whether to accept the bribe, if offered. If the transaction occurred, the member of society lost a corresponding value. The authors evaluated the effects of "social observability" and of "social judgment" on the choices for bribery. In the condition of social observability, the citizen and the official were informed that the member of society would be aware of the occurrence of corruption. In the condition of social judgment, the citizen and the official were informed that the member of society, in addition to observing their choices, could send messages in the form of a happy, indifferent, or frowning face. Only one trial was performed with each group. The authors argued that the choice of a single-trial procedure occurred so that one could analyze the effects of presenting to the participants the information that their actions were observed and judged by others. For Salmon and Serra, these variables are analogous to mechanisms of social control in a specific cultural context, and are related to the sociocultural norms that prevail in that population. From a behavior analytic perspective, information on observability and punishment can be considered antecedent verbal variables for the participants' operants. The instruction may have functioned as a verbal discriminative stimulus signaling punishment contingent on offering or accepting bribes. Both variables had a significant effect on the reduction of offering and accepting bribes.

In Salmon and Serra's (2017) experiment, all aspects highlighted in the definition of a bribery transaction were present. There was an exchange relationship between an individual that controls reinforcers from a public good (the "public official") and an individual capable of presenting reinforcers from a private good (the "private citizen"), and one member to be harmed with this relationship (the "member of society"). There was no possibility of monetary punishment (such as loss of points), but a rule specifying social punishment was manipulated (participants were informed that the member of society could send messages with a happy, indifferent, or frowning face). The focus of analysis, however, was still on individual behavior and not on the interactions per se (as is also the case in, e.g., Ryvkin, Serra, & Tremewan, 2017).

On the other hand, the main dependent variable of Abbink and Wu (2017) was the incidence of bribery transactions taken as a unit. As an anti-bribery policy assessment, Abbink and Wu investigated the effects of allowing the actors involved to report the bribery transaction (and of reinforcing such a response). The hypothesis of the study was that the report would destabilize the trust relationship required for the transaction to occur. The experimental task consisted of one participant attempting to "import goods" and another participant, the "public official," being responsible for registering and applying an "importation tax." A (nonfictional) charity institution received the amount collected through importation taxes. The "importer" could offer a bribe to the public official so that the importation tax was not charged. If there was a bribe offer, the official was informed of the corresponding amount and could accept or refuse it. After this, the official decided whether to ignore the goods. The participants could report the bribery transaction after it had taken place, producing a specific value to him/herself and a fine to the other participant. In the condition where both parties could report, there was a very low frequency of bribery; under conditions where only one party could report, there was no significant effect.

In Abbink and Wu's (2017) experiment, the operant is the unit of analysis appropriate to account for changes in the frequency of reporting. However, the main dependent variable was the incidence of bribery transactions, operationalized as the proportion of bribes

offered and accepted in relation to the total number of interactions. That is, a bribery transaction was registered only when both participants agreed; if one participant offered a bribe, but the other refused, it was not. Thus, this dependent variable involves coordinated interactions: the response of one participant follows and depends on the response of the other. In this sense, the control condition (without the possibility of reporting bribery) involved a culturant in which the importer offers a bribe and the public official accepts the bribe and does not charge the importation tax; this culturant produces—as a cultural consequence—the importer avoiding the loss of money (tax charges) and (as an additional effect) the charity institution receiving less money. Under experimental conditions (with the possibility of reporting bribery), there seems to be a competing metacontingency in force: now each participant could, under control of the other's choice (to offer or accept a bribe), file a complaint, producing as a cultural consequence a fine for the other and money for him/herself. Thus, the main focus of this study was on the modification of a bribery transaction through the strengthening of another culturant (reporting the offering or accepting of a bribe). So, this study manipulated cultural consequences, employing a task in which external losses were actually generated by the corrupt *transaction*. More research aimed at understanding bribery culturants is necessary. As so are bribery culturobehavioral lineages and macrobehaviors experiments. Future research might also continue investigating the effects of aversive control in the installation and maintenance of responses involved in bribery.

Perspectives on Embezzlement and Bribery Experiments

In addition to the variables just presented, experiments on embezzlement and bribery have manipulated monetary incentives such as fines and the probability of punishment (Basu, 2011), programs of ethical education (Banerjee & Mitra, 2018), or the use of neutral terms versus terms directly related to contexts of corruption (Abbink & Hennig-Schmidt, 2006), among others (Breit, Lennerfors, & Olaison, 2015; Köbis, Van Prooijen, Righetti, & Van Lange, 2016). These studies have involved contingencies in which the corrupt operants produce more immediate or greater magnitude reinforcing consequences than those that would be produced by the honest choice (e.g., to distribute in an equal way or to pay taxes owed to the government). These contingencies may also involve the production of aversive consequences for other members of the group and/or be linked to some risk of punishment to corrupt responses.

Few studies, however, used experimental situations such as these for the study of corrupt culturants, corrupt culturobehavioral lineages, and corrupt macrobehaviors. To remedy that, culturobehavioral lineages could be studied with experimental tasks that involve participant replacement (e.g., Baum et al., 2004), allowing the evaluation of if and how corrupt operants are transmitted to new members of a group. In relation to corrupt culturants, metacontingency studies could be taken as models (e.g., Ortu, Becker, Woelz, & Glenn, 2012), but one should use experimental tasks in which interlocking corrupt behaviors produce—besides a cultural consequence—a "collateral" effect harmful to external members. In addition, studies on ethical self-control have started to analyze macrocontingencies functionally similar to situations of corruption. New methodological possibilities arise from an approximation between the literature on corruption and the experimental studies of ethical self-control—as will be discussed in the following section.

Corruption, Behavior Analysis, and Ethical Self-Control

Interdisciplinary experiments on corruption deal with diverse units of analysis, but have rarely employed behavior-analytic principles and concepts. Behavior-analytic experiments, on the other hand, have rarely employed the term corruption (or similar ones). The recent line of research on ethical self-control (Borba, Silva et al., 2014; Borba, Tourinho, & Glenn, 2014, 2017; Tourinho & Vichi, 2012), however, has dealt with functional relations similar to those involved in corruption from a behavior-analytic perspective, suggesting how behavior analysts can study corruption in its multiple dimensions.

Whereas self-control involves the conflict between larger–later and smaller–sooner individual consequences, *ethical self-control* involves the conflict between individual and group consequences. According to Borba, Silva et al. (2014), in the latter case, one chooses between immediate higher magnitude reinforcers for oneself associated with aversive stimuli for the group and immediate lower magnitude reinforcers for oneself associated with delayed reinforcers for the group. In concurrent schedules such as these, the operant response producing delayed consequences favorable to the group has been termed *ethical self-control*, whereas the response that produces immediate consequences favorable to the individual has been called *impulsive* (Borba, Silva et al., 2014; Borba, Tourinho et al., 2014; Tourinho & Vichi, 2012). This is similar to Skinner's (1968/2003) concept of "ethical self-management" and to what Rachlin (2002) has called "altruism," in opposition to "selfish" responses. The concept of corrupt operant proposed in the first section, therefore, is functionally similar to a class of impulsive responses in relations of ethical self-control. We will present some experiments on ethical self-control to explore the units of analysis resorted to, and the similarities and differences in relation to the corruption experiments presented in the previous section.

Borba, Silva et al. (2014) inaugurated this series of experiments evaluating the effects of the presence of other group members, the access to other members' responses and the possibility of verbal interaction on the frequency of self-controlled responses. The experimental task involved participants, arranged in groups of four, individually choosing a row in a figure of an 8x8 matrix, and producing individual and group consequences. The individual consequences were values in the "individual bank" paid at the end of the session. The group consequences (or the cumulative effect) were values in the "collective bank" evenly distributed among the participants 7 days after the experiment. Choosing an odd row produced the deposit of R$0.40 in the "individual bank" but deducted R$0.10 from the "collective bank," thus being labeled the impulsive response; choosing an even row produced the deposit of R$0.20 in the individual bank and R$0.40 in the collective bank, thus been labeled the self-controlled response. Each group of participants was exposed to a single experimental condition. Under the two conditions in which participants could chat, the frequency of self-controlled responses was greater than 75%. In both conditions without verbal interactions, the frequency of these responses was less than 46%. The effects of access to other participants' choices and of group presence were not clearly distinguishable.

The experiment by Borba, Silva et al. (2014) modified operant contingencies (e.g., by adding verbal interactions) to assess its effects on a macrobehavior (i.e., the frequency of self-controlled choices by each four-person group), their focal unit of analysis. Despite the presence of a conflict between individual and group consequences, essential to the definition of a corrupt operant, their preparation did not program any punishment for the impulsive

response. One could say that the illegal aspect of the corrupt operant definition was not addressed. Likewise, all participants were directly and equally affected by the cumulative effect (i.e., in each trial, each participant was immediately informed of the money added to/subtracted from the collective bank), what is not usual in a corrupt macrobehavior. In sum, their task could be employed to the study of corruption, but some aspects of this phenomenon are missing in these experiments.

In a latter experiment, Borba, Tourinho et al. (2014) added a participants' replacement procedure to simulate cultural transmission: after every 20 trials, one member of each three-participant group was replaced. They also employed a cumulative effect whose nature differed from the individual consequences and that affected individuals outside the experimental setting: school supplies for donation. The experimental task was similar to Borba, Silva et al.'s (2014) and involved the impulsive choice producing three tokens (each one exchanged at the end of the session for R$0.05 for the participant). The self-controlled choice produced only one token for the participant, but also a stamp on a paper sheet, signaling one school supply for donation. The stamps were the cumulative effect of interest. Borba, Tourinho et al. employed an ABAB design alternating conditions with and without the production of the cumulative effect. Results demonstrated that the cumulative effect could select the macrobehavior of ethical self-control, but only after a long period of exposure. The authors suggested that the delay may have been due to the constant replacement of the participants.

This study focused on the analysis of macrobehaviors (as they could be affected by the cumulative effect) and culturobehavioral lineages (evaluating the propagation of impulsive behavior with the participants' replacement). Here, as in Borba, Silva et al. (2014), the impulsive choice was not punished and the whole group was directly and equally affected by the cumulative effect—missing some typical aspects of corrupt operants and macrobehaviors. Nevertheless, the participant replacement procedure introduced by Borba, Tourinho et al. (2014) is a promising strategy to the study of corrupt culturobehavioral lineages and should be explored further. In particular, the experimental study of the transmission of corrupt behaviors through verbal control seems especially relevant, given the conceptual discussion about the contribution of rules in the perpetuation of corruption patterns (Fernandes et al., 2015).

Borba, Tourinho et al.'s (2014) results suggested the control of group members behaviors by the cumulative effect, but the authors highlighted that if the effect was too delayed or if the individual contribution to this effect was too small, that would probably not be the case. This is precisely what typically happens with losses generated by corruption (e.g., changes in a country's economic development, inefficiency of public services): they are distant from the set of responses that produced them and are only noticeable with the participation of a large number of people. In this sense, effective interventions on corruption seem to require direct changes in the operant contingencies or metacontingencies (in the case of corrupt culturants) contributing to the cumulative effect that represents the social issue in question. Regarding operant contingencies, Borba, Silva et al. (2014) have already suggested that the presence of other participants and the access to the responses of the other members did not have a significant effect; verbal control, on the other hand, seems relevant when it comes to the addition of contingencies that favor honest (ethically self-controlled) behavior.

Regarding metacontingencies, none of the studies just presented explicitly used the culturant as a unit of analysis. However, we suppose that, in conditions with verbal

interactions, the increase in the cumulative effect (effectively functioning as a cultural consequence) selected recurring verbal IBCs—thus constituting a metacontingency. That is, when the experimental arrangement did not allow verbal interaction, participants' responses were independent, each individual's responses could only be affected by the others' responses through their changes in the cumulative effect (money in the collective bank or number of supplies for donation). When participants could chat, on the other hand, verbal rules and consequences could be presented by one participant to others, constituting interlocked contingencies. Given the results demonstrating a significant increase in self-controlled responses under these conditions with verbal interaction, the effect might have been due to the selection of these IBCs by the coordinated increase in the collective bank deposits or in the number of school supplies produced per trial. Without the direct measurement of these verbal interlockings and the manipulation of the cultural consequence, however, this hypothesis cannot be confirmed.

Borba et al. (2017) actually manipulated cultural consequences while measuring what was called ethical self-control responses. But the operant involved differed from that in other studies on ethical self-control, and the culturant involved differed from what we defined as a corrupt culturant. Borba et al. evaluated the effects of a cultural consequence (stamps signaling the donation of school supplies) contingent on culturants, in a condition of concurrence between metacontingencies and operant contingencies. They replaced participants every 20 trials and introduced and removed the metacontingency in an ABAB design, while maintaining the operant contingencies unaltered. The results suggested that the presentation of cultural consequences increased the frequency of so-called ethical self-control responses compared to conditions without them. The experimental task was similar to that by Borba, Silva et al. (2014) and Borba, Tourinho et al. (2014). Each participant, arranged in three-person groups, chose a row in a matrix. Throughout all the experiment, even-row choices (termed ethical self-controlled response) produced one token exchangeable for money, and odd-row choices (termed impulsive response) produced three tokens. In the metacontingency conditions, if *the three members* of the group chose even rows *with different colors*, a cultural consequence was produced. Borba et al. operationalization of ethical self-control, therefore, differs from those employed in previous studies where an individual response produced reinforcers (tokens or points exchangeable for money) *and* contributed to a cumulative effect relevant to a group (money in the collective bank or school supplies for donation).

Regarding the culturant measured by Borba et al. (2017), remember that we defined a corrupt culturant as a recurring social interaction whose cultural consequence implies some *harm* to a group. Borba et al., on the other hand, programmed cultural consequences that implied a *benefit* to a group (a school), i.e., they manipulated an "honest" (or self-controlled) culturant, instead of an impulsive ("corrupt") culturant. Besides that, there was no probability of punishment related to the occurrence of any culturant. That is, the study of corrupt culturants, as we defined in the first section, has not occurred yet in this line of research, despite this experimental task permitting it.

Perspectives on Ethical Self-Control Experiments

The concepts of ethical self-control and impulsive responses are clearly related to the topic of corruption. Experiments on ethical self-control started to investigate variables relevant to this phenomenon, such as the presence of others, access to their responses, replacement of

participants, production of the cumulative effect, and the presence of a metacontingency. Borba, Silva et al. (2014) pointed out the significant effect of verbal interactions on the frequency of ethical self-control. In cases where the cumulative effect does not control the relevant behavior, the immediate presentation of verbal stimuli may function as important antecedents or consequences for those who emit impulsive behaviors (Borba, Silva et al., 2014; Skinner, 1965). That is, some level of verbal control upon corrupt/honest behavior seems common in the lab (as outside it), either (1) by the presentation of verbal rules (e.g., participants instructing specifying aversive consequences for responses considered corrupt); and/or (2) by practices of verbal reinforcement and punishment of corrupt/honest behaviors arranged by the group.

The main differences between the interdisciplinary experiments on corruption and ethical self-control studies are that the former always involved the possibility of punishment, did not program a delay among individual and group effects, and arranged consequences favorable to oneself that were followed by effects unfavorable to others (e.g., less money donated to charities or to be shared among all participants; i.e., what Abbink & Serra [2011] termed "negative externalities"). In contrast, ethical self-control studies arranged the production of positive reinforcers as effects for others (e.g., school supplies for donation or money equally shared by all participants), i.e., there was no aversive control involved.

Thus, despite some particularities, the tasks employed in ethical self-control experiments can be adapted to the study of corrupt operants, culturobehavioral lineages, culturants, and macrobehavior—all the units of analysis capturing the multiple dimensions of corruption. Therefore, they can be an important contribution to the study of corruption from a behavior-analytic standpoint.

Conclusions

The concept of corruption encompasses topographically very different responses and diverse units of analysis. We suggested behavioral definitions and functional relations pertinent to the study of this social issue. As an operant behavior, the concept of corruption involves a response who produces immediate *higher*-magnitude reinforcing consequences plus some probability of punishment to the individual, and a delayed *lower*-magnitude benefit to the group. In addition, in communities where corruption is described as useful and acceptable for solving everyday problems, rule-governance may favor the propagation of a corrupt behavioral pattern in the repertoire of many individuals, characterizing a culturobehavioral lineage. The term corruption can also describe transactions that are only possible with the coordinated behaviors of two or more individuals. As for the recurrence of these interactions, relations of metacontingencies were discussed and the corrupt culturant was stressed as a unit of analysis. Another important unit of analysis for the study of the phenomenon is the corrupt macrobehavior, which describes corrupt operants and/or culturants emitted by a large number of individuals that generate significant detrimental effects for a community.

Employing these four units of analysis to understand corruption allows one to categorize the contingencies involved in this complex phenomenon and to not depend exclusively on its topographical aspects. Concepts such as operant, culturobehavioral lineage, culturant, and macrobehavior can facilitate an interdisciplinary and

multidimensional approach to social issues such as corruption. They cross through disciplines, overcoming the traditionally rigid boundary between psychological, sociological, anthropological, and economic phenomena, clarify aspects that require further investigation and contribute to the unification of the sciences that deal with human behavior in its various dimensions. This is one important way in which the concept of metacontingency and related concepts such as culturant can be useful. This was not mentioned by Zilio (2019), who recently questioned the utility of such concepts. Besides the huge amount of work (experimental, theoretical, and, to a lesser degree, applied) that employed it—as Zilio's review itself documented—one has to take into account the conceptual coherence of such a transdisciplinary perspective on behavior, society, and culture when evaluating its utility.

In that direction, future research could review and compare different existing theoretical models about corruption in order to integrate the four units of analysis and its interactions. Carreiro and Oliveira-Castro (2016), for instance, applied the Behavioral Perspective Model to corrupt operants. Works such as these can facilitate the integration of behavior analysis with different disciplines such as behavioral economics and political science.

Experimental studies on corruption have commonly investigated situations of embezzlement and bribery. We presented some examples and suggested functional definitions of embezzlement and bribery. Other studies may search for and investigate functionally different types of corruption (possible examples are patronage, nepotism, or vote buying). Furthermore, future research should thoroughly review the literature to evaluate underexplored areas, what seems to be the case of studies on corrupt culturants, corrupt culturobehavioral lineages, and corrupt macrobehaviors.

An approximation between self-control and corruption studies could also favor future research, providing new methodological alternatives. Future studies on ethical self-control may investigate important variables in the discussion of corruption as adding aversive consequences to the group (for corruption represents the production of problems for culture) and/or the addition of some probability of contingent punishment for the impulsive response. Furthermore, future studies could evaluate the transmission of ethical impulsive responses through verbal control and analyze interventions that use antecedent verbal control.

Finally, to apply the results of corruption lab experiments to real-world scenarios, one must be aware that they have been performed in extremely short timeframes, with weak programmed consequences and without considering a series of complex and interrelated contingencies that are typically relevant to corrupt real-life behaviors. This suggests pathways for researchers to explore. Although the focus of this article is on a conceptual discussion and tentative approximation between areas of experimental research, "real-world" studies can also employ and help us understand the different dimensions of corruption grasped by this four units of analysis. Given the complexity of corruption relations, it is extremely important to seek dialogue between experimental and nonexperimental studies (e.g., quasi-experiments, applied research, surveys).

Acknowledgements Karoliny Lopes da Hora was supported by a masters scholarship from the Social Welfare Program of the Coordination for the Improvement of Higher Education Personnel (CAPES)—Brazilian Federal Agency for Support and Evaluation of Graduate Education within the Ministry of Education of Brazil. The authors thank Roberta F. Lemos for her comments on a previous version of the manuscript.

References

Abbink, K., & Hennig-Schmidt, H. (2006). Neutral versus loaded instructions in a bribery experiment. *Experimental Economics, 9*(2), 103–121. https://doi.org/10.1007/s10683-006-5385-z.

Abbink, K., & Serra, D. (2011). Anti-corruption policies: Lessons from the lab. *SSRN Electronic Journal.* https://doi.org/10.2139/ssrn.1971779.

Abbink, K., & Wu, K. (2017). Reward self-reporting to deter corruption: An experiment on mitigating collusive bribery. *Journal of Economic Behavior & Organization, 133*(C), 256–272. https://doi.org/10.1016/j.jebo.2016.09.013.

Agbota, T. K., Sandaker, I., Carvalho, L. C., & Couto, K. (2017). Behavioral and cultural accounts of corruption in the interface between public officer and client. *Brazilian Journal of Behavior Analysis, 13*(1), 141–163. https://doi.org/10.18542/rebac.v13i1.5261.

Agbota, T. K., Sandaker, I., & Ree, G. (2015). Verbal operants of corruption: A study of avoidance in corruption behavior. *Behavior & Social Issues, 24*, 126–148. https://doi.org/10.5210/bsi.v24i0.5864.

Aidt, T. S. (2003). Economic analysis of corruption: A survey. *Economic Journal, 113*(491), F632–F652. https://doi.org/10.1046/j.0013-0133.2003.00171.x.

Alatas, V., Cameron, L., Chaudhuri, A., Erkal, N., & Gangadharan, L. (2009). Gender, culture, and corruption: insights from an experimental analysis. *Southern Economic Journal, 75*(3), 663–680 Retrieved from http://www.jstor.org/stable/27751409?origin=JSTOR-pdf.

Armantier, O., & Boly, A. (2008). *Can corruption be studied in the lab? Comparing a field and a lab experiment* (SSRN Scholarly Paper No. ID 1324120). Rochester, NY: Social Science Research Network. doi:https://doi.org/10.2139/ssrn.1324120

Banerjee, R., & Mitra, A. (2018). On monetary and non-monetary interventions to combat corruption. *Journal of Economic Behavior & Organization, 149*, 332–355. https://doi.org/10.1016/j.jebo.2018.01.004.

Basu, K. (2011). *Why, for a class of bribes, the act of giving a bribe should be treated as legal*. (Technical Report 172011). Delhi, India: Ministry of Finance, Government of India. Retrieved from http://mpra.ub.uni-muenchen.de/50335/

Baum, W. M. (2017). *Understanding behaviorism: Behavior, culture and evolution* (3rd ed.). Malden, MA: Wiley Blackwell.

Baum, W. M., Richerson, P. J., Efferson, C. M., & Paciotti, B. M. (2004). Cultural evolution in laboratory microsocieties including traditions of rule giving and rule following. *Evolution & Human Behavior, 25*, 305–326. https://doi.org/10.1016/j.evolhumbehav.2004.05.003.

Becker, G. (1968). Crime and punishment: An economic approach. *Journal of Political Economy, 76*(2), 169–217. https://doi.org/10.1086/259394.

Biglan, A. (1995). *Changing cultural practices: A contextualistic framework for intervention research*. Reno, NV: Context Press.

Boly, A., Gillanders, R., & Miettinen, T. (2017). *Deterrence and legitimacy in anti-corruption policymaking*. (Working Paper Series 277). Abidjan, Côte d'Ivoire: African Development Bank. Retrieved from https://www.afdb.org/fileadmin/uploads/afdb/Documents/Publications/WPS_No_277_Deterrence_and_Legitimacy_in_Anti-Corruption_Policymaking__.pdf

Borba, A., Silva, B. R., Cabral, P. A. A., Souza, L. B., Leite, F. L., & Tourinho, E. Z. (2014). Effects of the exposure to macrocontingencies in the production of ethical self-control responses. *Behavior & Social Issues, 23*, 5–19. https://doi.org/10.5210/bsi.v23i0.4237.

Borba, A., Tourinho, E. Z., & Glenn, S. S. (2014). Establishing the macrobehavior of ethical self-control in an arrangement of macrocontingencies in two microcultures. *Behavior & Social Issues, 23*, 68–86. https://doi.org/10.5210/bsi.v23i0.5354.

Borba, A., Tourinho, E. Z., & Glenn, S. S. (2017). Effects of cultural consequences on the interlocking behavioral contingencies of ethical self-control. *The Psychological Record, 67*(3), 399–411. https://doi.org/10.1007/s40732-017-0231-6.

Breit, E., Lennerfors, T. T., & Olaison, L. (2015). Critiquing corruption: A turn to theory. *Ephemera: Theory & Politics in Organization, 15*(2), 319–336 Retrieved from http://www.ephemerajournal.org/sites/default/files/pdfs/issue/15-2ephemera-May15.pdf.

Burguet, R., Ganuza, J.-J., & Montalvo, J. G. (2016). *The microeconomics of corruption. A review of thirty years of research.* (Economics Working Paper). Barcelona, Spain: Department of Economics and Business, Universitat Pompeu Fabra. Retrieved from https://econpapers.repec.org/paper/upfupfgen/1525.htm

Bussell, J. (2015). Typologies of corruption: a pragmatic approach. In S. Rose-Ackerman & P. Lagunes (Eds.), *Greed, corruption, and the modern state* (pp. 21–45). Cheltenham, UK: Edward Elgar. https://doi.org/10.4337/9781784714703.00007.

Carrara, K., & Fernandes, D. M. (2018). Corrupção e seleção por consequências: Uma análise comportamental [Corruption and selection by consequences: A behavioral analysis]. *Psicologia: Teoria e Pesquisa, 34*, e3423. https://doi.org/10.1590/0102.3772e3423.

Carreiro, P. L., & Oliveira-Castro, J. M. (2016). A functional analysis of corruption from a behavioral-economic perspective. In G. R. Foxall (Ed.), *The Routledge companion to consumer behavior analysis* (pp. 258–271). New York, NY: Routledge.

Darlington, S. (2019, February 6). Brazil's "Lula" convicted again of corruption, clouding his political future. *New York Times*. Retrieved from https://www.nytimes.com/2019/02/06/world/americas/brazil-lula-convict-corruption.html.

Decree of Law 2848, Article 312. (1940, December 7). Código Penal. Retrieved from https://www2.camara.leg.br/legin/fed/declei/1940-1949/decreto-lei-2848-7-dezembro-1940-412868-publicacaooriginal-1-pe.html

Federal Bureau of Investigation (FBI). (2014). *Uniform crime reports: Offense definitions*. Washington, DC: Author Retrieved from https://ucr.fbi.gov/crime-in-the-u.s/2014/crime-in-the-u.s.-2014/resource-pages/offense-definitions.

Fernandes, D. M., Perallis, C. G., & Pezzato, F. A. (2015). Creativity, Brazilian "jeitinho," and cultural practices: A behavioral analysis. *Behavior Analysis: Research & Practice, 15*(1), 28–35. https://doi.org/10.1037/h0101067.

Ferreira, A. L. (2017). *Contribuição e distribuição de recursos: Uma análise comportamental do Jogo dos Bens Públicos* [Contribution and distribution of resources: a behavioral analysis of the Public Goods Game] (Master's thesis, Federal University of São Carlos, São Carlos, Brazil). Retrieved from http://repositorio.ufscar.br

Filgueiras, F. (2009). A tolerância à corrupção no Brasil: Uma antinomia entre normas morais e prática social [Tolerance to corruption in Brazil: An antinomy between moral norms and social practice]. *Opinião Pública, 15*(2), 386–421. https://doi.org/10.1590/S0104-62762009000200005.

Glenn, S. S. (2004). Individual behavior, culture, and social change. *The Behavior Analyst, 27*, 133–151. https://doi.org/10.1007/bf03393175.

Glenn, S. S., & Malott, M. E. (2004). Complexity and selection: Implications for organizational change. *Behavior & Social Issues, 13*, 89–106. https://doi.org/10.5210/bsi.v13i2.378.

Glenn, S. S., Malott, M. E., Andery, M. A. P. A., Benvenuti, M., Houmanfar, R. A., Sandaker, I., & Vasconcelos, L. A. (2016). Toward consistent terminology in a behaviorist approach to cultural analysis. *Behavior & Social Issues, 25*, 11–27. https://doi.org/10.5210/bsi.v25i0.6634.

Hotten, R. (2015, December 10). Volkswagen: The scandal explained. *BBC News*. Retrieved from https://www.bbc.com/news/business-34324772

Hotten, R. (2019, April 15). Former VW boss charged over diesel emissions scandal. *BBC News*. Retrieved from https://www.bbc.com/news/47937141

Jacobs, B. A. (2010). Deterrence and deterrability. *Criminology, 48*(2), 417–441. https://doi.org/10.1111/j.1745-9125.2010.00191.x.

Köbis, N. C., Van Prooijen, J. W., Righetti, F., & Van Lange, P. A. (2016). Prospection in individual and interpersonal corruption dilemmas. *Review of General Psychology, 20*(1), 71. https://doi.org/10.1037/gpr0000069.

Lamal, P. A. (Ed.). (1991). *Behavioral analysis of societies and cultural practices*. New York, NY: Hemisphere.

Lamal, P. A. (Ed.). (1997). *Cultural contingencies: Behavior analytic perspectives on cultural practices*. Westport, CT: Praeger.

Lambsdorff, J. G., & Frank, B. (2010). Bribing versus gift-giving: An experiment. *Journal of Economic Psychology, 31*(3), 347–357. https://doi.org/10.1016/j.joep.2010.01.004.

Liu, X. (2016). Corruption culture and corporate misconduct. *Journal of Financial Economics, 122*(2), 307–327. https://doi.org/10.1016/j.jfineco.2016.06.005.

Londoño, E., & Casado, L. (2019, March 22). With a second president in jail, Brazil's Carwash Probe lives on. *New York Times*. Retrieved from https://www.nytimes.com/2019/03/22/world/americas/brazil-car-wash-corruption-temer.html

Lopes, L. S., & Toyoshima. (2013). Evidências do impacto da corrupção sobre a eficiência das políticas de saúde e educação nos estados brasileiros [Some evidence concerning the negative effect of corruption on the efficiency of health and education policies in the Brazilian states]. *Planejamento e Políticas Públicas*, *10*(41), 199–228. Retrieved from http://www.ipea.gov.br/ppp/index.php/PPP/article/view/265

Maia, A. J. (2008). *Corrupção: realidade e percepção—o papel da imprensa* [Corruption: reality and perception—the role of the press]. (Master's thesis, Higher Institute of Social and Political Sciences, Universidade Técnica de Lisboa, Lisbon, Portugal). Retrieved from http://www.bocc.ubi.pt

Malagodi, E. F., & Jackson, K. (1989). Behavior analysis and cultural analysis: Troubles and issues. *The Behavior Analyst, 12*(1), 17–33. https://doi.org/10.1007/BF03392474.

Malott, M. E., & Glenn, S. S. (2006). Targets of intervention in cultural and behavioral change. *Behavior & Social Issues, 15*(1), 31–56. https://doi.org/10.5210/bsi.v15i1.344.

Mattaini, M., & Thyer, B. (Eds.). (1996). *Finding solutions to social problems: Behavioral strategies for change*. Washington, DC: APA.

Ortu, D., Becker, A. M., Woelz, T. A. R., & Glenn, S. S. (2012). An iterated four-player Prisoner's Dilemma Game with an external selecting agent: A metacontingency experiment. *Revista Latinoamericana de Psicología, 44*, 111–120 Retrieved from http://www.redalyc.org/articulo.oa?id=80524017011.

Pressly, L. (2018, April 22). The largest foreign bribery case in history. *BBC World Service*. Retrieved from https://www.bbc.com/news/business-43825294

Rachlin, H. (2002). Altruism and selfishness. *Behavioral & Brain Sciences, 25*, 239–250. https://doi.org/10.1017/S0140525X02000055.

Rocha, A. B., Jr. (2018). *Efeitos da corrupção sobre a governança e o crescimento econômico em um modelo teórico de crescimento endógeno* [Effects of corruption on governance and economic growth on a theoretical model of endogenous growth]. (Master's dissertation, Federal University of Viçosa, Viçosa, Brazil). Retrieved from http://www.locus.ufv.br/handle/123456789/19964

Rose-Ackerman, S. (2001). Trust and honesty in post-socialist societies. *Kyklos, 54*(2–3), 415–443. https://doi.org/10.1111/1467-6435.00161.

Rose-Ackerman, S. (2006). *International handbook on the economics of corruption*. Cheltenham, UK: Edward Elgar.

Ryvkin, D., Serra, D., & Tremewan, J. (2017). I paid a bribe: An experiment on information sharing and extortionary corruption. *European Economic Review, 94*(C), 1–22. https://doi.org/10.1016/j.euroecorev.2017.02.003.

Salmon, T., & Serra, D. (2017). *Corruption, social judgment and culture: An experiment* (SSRN Scholarly Paper No. ID 2383903). Rochester, NY: Social Science Research Network. doi:https://doi.org/10.1016/j.jebo.2017.06.004

Sandaker, I. (2006). How should behavior analysis interact effectively with the social sciences? *Behavior & Social Issues, 15*, 81–92. https://doi.org/10.5210/bsi.v15i1.346.

Serra, D., & Wantchekon, L. (2012). *New advances in experimental research on corruption* (Research in Experimental Economics, Vol. 15). Bingley, UK: Emerald.

Silva, M. F. (1999). The political economy of corruption in Brazil. *Revista de Administração de Empresas, 39*(3), 26–41. https://doi.org/10.1590/S0034-75901999000300004.

Skinner, B. F. (1965). *Science and human behavior*. New York, NY: Free Press.

Skinner, B. F. (1971). *Beyond freedom and dignity*. Harmondsworth, UK: Penguin Books.

Skinner, B. F. (1978). *Reflections on behaviorism and society*. Englewood Cliffs, NJ: Prentice-Hall.

Skinner, B. F. (2003). *The technology of teaching*. Acton, MA: Copley (Originally published in 1968).

Tanzi, V. (1998). Corruption around the world: Causes, consequences, scope, and cures. *IMF Staff Papers, 45*(4), 559–594. https://doi.org/10.2307/3867585.

Tourinho, E. Z., & Vichi, C. (2012). Behavioral-analytic research of cultural selection and the complexity of cultural phenomena. *Revista Latinoamericana de Psicologia, 44*, 169–179 Retrieved from http://www.redalyc.org/articulo.oa?id=80524017016.

Transparency International. (2015). *Corruption perception index 2015*. Retrieved from https://www.transparency.org/cpi2015/

Treisman, D. (2007). What have we learned about the causes of corruption from ten years of cross-national empirical research? *Annual Review of Political Science, 10*, 211–244. https://doi.org/10.1146/annurev.polisci.10.081205.095418.

Van Veldhuizen, R. (2013). The influence of wages on public officials' corruptibility: A laboratory investigation. *Journal of Economic Psychology, 39*(C), 341–356. https://doi.org/10.1016/j.joep.2013.09.009.

Vaz, P., & Velasco, F. (2017). Corrupção: Problema e questão [Corruption: Problem and issue]. *Compolítica, 7*(2), 63–86. https://doi.org/10.21878/compolitica.2017.7.2.121.

Von Alemann, U. (2004). The unknown depths of political theory: The case for a multidimensional concept of corruption. *Crime, Law & Social Change, 42*(1), 25–34. https://doi.org/10.1023/B:CRIS.0000041035.21045.1d.

Watts, J. (2017, June 1). Operation Car Wash: Is this the biggest corruption scandal in history? *The Guardian*. Retrieved from https://www.theguardian.com/world/2017/jun/01/brazil-operation-car-wash-is-this-the-biggest-corruption-scandal-in-history

Zilio, D. (2019). On the function of science: An overview of 30 years of publications on metacontingency. *Behavior & Social Issues, 28*, 1–31. https://doi.org/10.1007/s42822-019-00006-x.