Stimulating Regulatory Compliance and Ethical Behavior of Organizations: A Review

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Abstract: *Regulators are responsible for overseeing organizations. Organizational behavior should be in line with laws and regulations. Therefore, regulators aim to influence behavior of regulatees, such as compliance (i.e., following rules and regulations), but also ethical behavior (i.e., doing the right thing, irrespective of the rules and regulations). However, little empirical evidence exists on the effectiveness of different types of regulatory actions. Also, most evidence focuses on compliance, despite an increasing demand for ethical behavior of organizations. A literature review was conducted to collect, summarize, and analyze empirical evidence on how regulators can stimulate regulatees' compliant and ethical behavior. This paper uniquely covers multiple types of regulatory actions and also multiple types of underlying factors. To illustrate this, a novel framework was introduced, in which it was proposed that regulatory actions influence compliant and ethical behavior through regulatees' capability, opportunity, and motivation. Combining the findings of 35 articles showed that studies on 'deterrence' and 'cooperation' demonstrated mixed results regarding their effectiveness, whereas 'inspections' were found more effective. Notably, psychological capability, social opportunity, and reflective motivation were more effective in stimulating behavior than physical capability, physical opportunity, and automatic motivation. A reflection on how regulators can use these unique insights to increase their effectiveness is given, as well as an aim to develop regulatory theory further.*

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INTRODUCTION

Regulators are pivotal in today's society. Their goals are to maintain market stability, safeguard public health and safety, and mitigate pollution, amongst other things. To achieve this, regulators ought to influence the behavior of regulatees. Specifically, regulators aim to stimulate regulatees to follow the rules and regulations, indicating compliance. Additionally, regulators can stimulate ethical behavior, which refers to doing the 'right' thing, irrespective of the rules and regulations. For example, in the Netherlands, some regulators consider 'good governance' in their risk assessment of regulatees, even though this topic may not always be reflected in specific legal norms (Bokhorst, 2019). Here, next to monitoring non-compliance, regulators keep an eye out for unethical and harmful behaviors to prevent public scandals (Van Steenbergen & Ellemers, 2020).

A regulator is an entity responsible for overseeing organizations (i.e., regulatees) in a certain sector or industry, which behaviors should align with laws and regulations. Regulators use certain 'regulatory actions' to stimulate compliant and ethical behavior. Regulatory actions can be of deterrent nature, such as sanctions, or can consist of inspections or cooperative actions, such as providing guidance. This raises the question of the extent to which different regulatory actions are effective in fostering compliant and ethical behavior. For example, are sanctions more effective in increasing compliance than providing guidance, or vice versa? In addition to exploring if certain regulatory actions are effective, knowing why regulatees might comply or behave ethically (or not) was of interest as well. Building on the work of Michie et al. (2011), it is argued that the impact of regulatory actions depends on the regulatee's capability, opportunity, and motivation as key drivers of behavior. For example, did a regulator increase compliance because they enhanced the regulatees' knowledge of the law, or because the regulator increased their motivation to comply? Providing answers to these types of questions will enable regulators to choose regulatory actions that are effective and target key drivers of compliant and ethical behavior.

This review paper aimed to collect, summarize, analyze, and review empirical evidence on how regulators can effectively stimulate compliant and ethical behavior of regulatees. This aim contributes to regulatory practice and existing literature in various ways. First, as explained above, not only compliance, but also ethical behavior was considered as a relevant outcome for regulators. Second, different regulatory actions were compared to gain more insight into their effectiveness, such as cooperative actions that are unfamiliar in the empirical literature. Third, various underlying factors were analyzed to understand why regulatees show (non)compliant and (un)ethical behavior. Underlying factors are specific variables (such as knowledge) that are studied in prior research, which were categorized as either capability, opportunity, or motivation. In previous literature, there was often a focus on different types of motivation (e.g., Nielsen & Parker, 2012). Still, in this paper, it is argued that other types of underlying factors are also in play. Fourth, the Regulatory Impact on Compliant and ethical behavior (RICE) framework was developed.

It provides insights into the relations between regulatory actions, underlying factors of regulatees, and their impact on compliant and ethical behavior. With the proposal of the RICE framework, the scope of prior review papers has been extended (Cohen, 1998; Gray & Shimshack, 2011; Simpson et al., 2014; Van der Heijden, 2021) that focused primarily on the relationship between certain regulatory actions and compliance, sometimes only in one particular sector. Based on empirical studies in different sectors, this review can help regulators become more effective by revealing influential underlying factors that do or do not increase compliance and ethical behavior of regulators. As Cohen (1998) already underscored: "we probably know the least about the most important and fundamental topic in regulation – why firms comply with the law".

Stimulating compliant and ethical behavior

The regulatory field is relatively new in applying empirical evidence to its decision-making regarding regulatees' behavior (Fiene, 2019). It is fundamental to understand what drives compliant and ethical behavior to effectively influence the behavior of regulatees (Nielsen & Parker, 2009). 'Compliance' is a state in which organizations adhere to laws and regulations (Hashmi et al., 2015). 'Voluntary compliance' (i.e., complying without the need for enforcement) was considered as part of the category 'compliance' as well. Additionally, 'ethical behavior' was defined as behavior that goes beyond compliance, or other desired behaviors. These desired behaviors can be considered 'ethical' when they align with widely accepted societal or moral norms, regardless of whether laws or regulations specify it (Van Steenbergen & Ellemers, 2020; cf. Kish-Gephart et al., 2010). Examples of ethical behavior of regulatees are sustainable behavior (such as less pollution) or promoting safety of employees (such as preventing injuries).

To the best of our knowledge, Malcom Sparrow was the first scholar to argue that regulators should shift their focus towards intervening on harmful behavior – such as unethical behavior – and not only focus

on behavior that is illegal or noncompliant. In The Regulatory Craft (2000), Sparrow proposed that it is not adequate to define the mission of regulators solely by laws and regulations. The work of regulators is not static, because issues come and go, while the law is not always up to speed. Sparrow illustrates this with an example of the Occupational Safety and Health Administration (OSHA), in which they pick a problem that they believe is important to tackle. Namely, the OSHA encouraged organizations to acquire ergonometric products for their employees to prevent or mitigate physical health issues, even though the law does not require organizations to purchase ergonometric products (Sparrow, 2000).

In his most recent book, Sparrow (2020) has visualized the difference and overlap between illegal and harmful behavior in a Venn diagram. In the current review paper, positive counterparts of illegal and harmful behavior were used, namely 'compliant and ethical behavior'. This adaptation of Sparrow's figure can be found in Figure 1. In this paper, either the yellow area (i.e., compliance, which could also be ethical behavior) or the blue area (i.e., ethical behavior, which is not required by laws or regulations) was described.
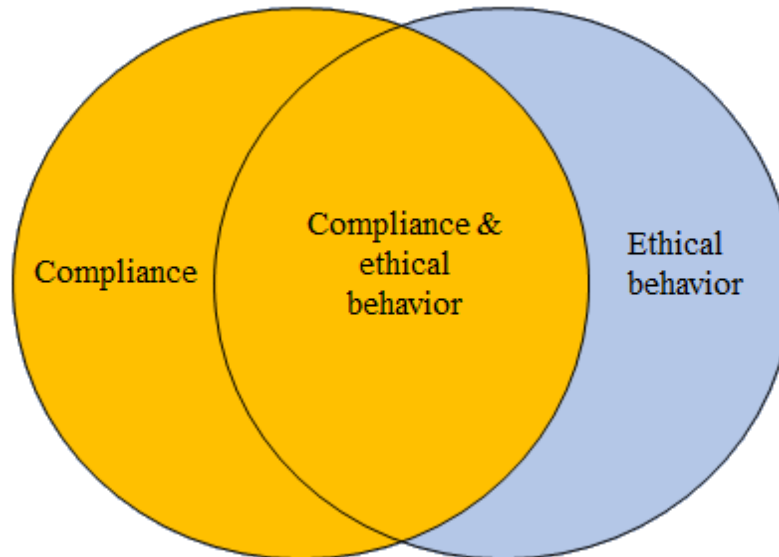

Figure 1. Venn Diagram of Compliance and/or Ethical Behavior

Source: Adapted from Sparrow (2020)

There are several theories – such as deterrence theory and responsive regulation theory – that aim to explain interactions between regulators and regulatees. These are valuable for regulators to consider how they can improve their effectiveness when influencing regulatees. Deterrence theory can be helpful in explaining whether a sanction will have a deterrent effect on regulatees, considering the costs and benefits for them to comply or not (Scholz, 1984). Nonetheless, this theory particularly focuses on the effect of deterrence, whereas regulators also use less coercive strategies to influence compliance or ethical behavior, such as cooperation. Responsive regulation theory – including its regulatory pyramid – proposes a hierarchy of regulatory actions, ranging from education and persuasion to penalties and court actions (Ayres & Braithwaite, 1992). This theory supports regulators in making a deliberative choice between regulatory actions, in which they are encouraged to first consider less intrusive or costly actions, by using persuasion or cooperation, before moving to deterrent actions, such as sanctions. Thus, responsive regulation theory poses that compliance or other desired behaviors can be achieved by strategically choosing whether to use cooperation or deterrence (Ayres & Braithwaite, 1992). Therefore, the current paper will not only review evidence of studies on deterrent actions but also cooperative actions, in which persuasion is applied rather than coercion. To illustrate: in this paper it is argued that cooperation entails providing regulatees with technical assistance (Stafford, 2012), giving regulatees second chances to comply (Scholz, 1984), or providing regulatees with extra information regarding laws and regulations (Shimshack & Ward, 2005).

RICE: an explanatory behavioral framework

A novel explanatory behavioral framework is proposed: the RICE framework (see Figure 2). With this framework, the goal is not only to examine if certain regulatory actions are effective but also to gain insight into underlying factors that potentially explain why compliant and ethical behavior are (not) influenced by regulatory actions. The RICE framework builds on the Capability-Opportunity-Motivation-Behavior (COM-

B) model (Michie et al., 2011). Michie et al. (2011) already proposed that the COM-B model could be useful for application to regulation.

The RICE framework illustrates that regulatees need the capability, opportunity, and/or the motivation to comply and behave ethically. Each COM-B component can be divided into two subcomponents. Capability consists of physical capability (e.g., relevant skills) and psychological capability (e.g., knowledge of regulations). Opportunity consists of physical opportunity (e.g., number of personnel) and social opportunity (e.g., social norms). Motivation consists of reflective motivation (e.g., intrinsic motivation) and automatic motivation (e.g., fear of punishment). To give an example of applying the framework: when a financial regulator provides guidance (i.e., cooperation) to banks regarding a particular financial risk, individuals of the regulated bank may now have more knowledge (i.e., psychological capability) regarding this financial risk. In turn, this increased knowledge can lead employees to give accurate financial advice to consumers, and act thus more in line with laws and regulations (i.e., compliance).

The COM-B model is seen as a powerful model to identify predictors of desired behaviors, such as pro-environmental behavior (Perros et al., 2022), and to develop effective interventions or communication messages (Krusche et al., 2022). As regulators aim to influence the behavior of regulatees, a behavioral framework seems useful.

Specifically, a behavioral framework seems fitting for two major reasons. First, a behavioral framework can support in categorizing underlying factors so that an overview can be created of factors that have been studied more or less extensively. Second, a behavioral framework could lead to the identification of underlying factors that are potentially more effective in stimulating compliant and ethical behavior. With this, regulators can become more aware of how their actions can influence the behaviors of regulatees, and which underlying factors are most important to target when undertaking action.
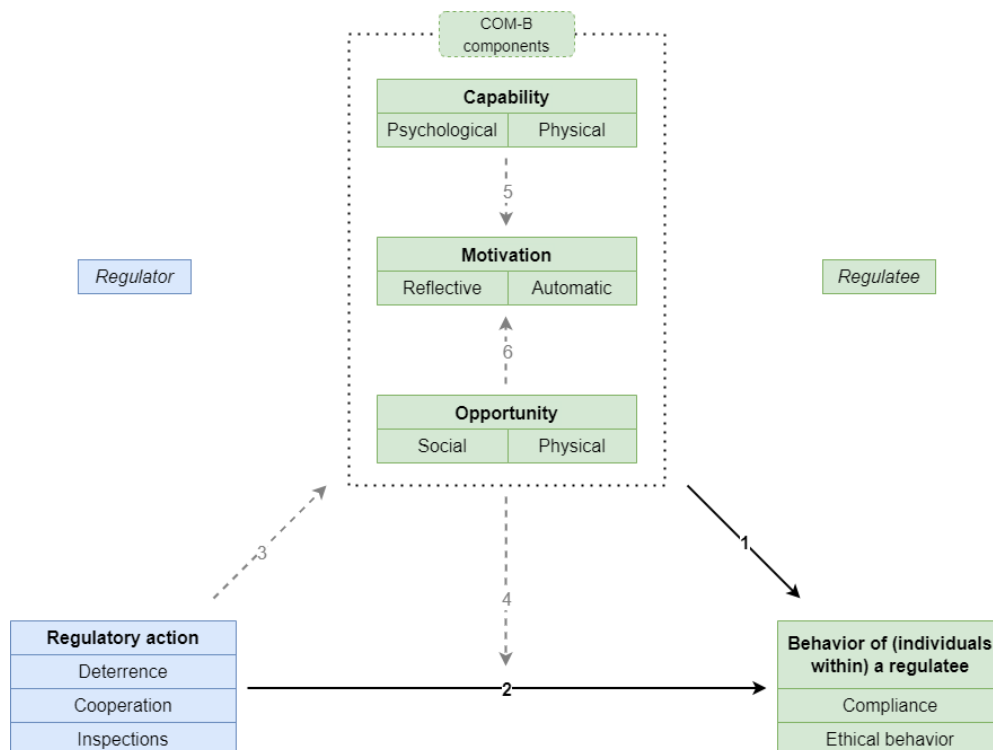
Figure 2. The RICE Framework

Note: The arrowed numbers indicate the six different ways that parts of the framework influence each other; COM-B=Capability-Opportunity-Motivation-Behavior

Source: Adapted from Michie et al., 2011

Even though Michie et al. (2011) argued that the COM-B model can also be used in the context of regulation, so far this is only done to limited extend. For instance, one study found that physical opportunity (i.e., having sufficient time) and reflective motivation (i.e., the belief that compliance is important) were associated with healthcare workers' compliance with hand hygiene standards (Van Dijk et al., 2023). Another study investigated farmers' responsible behavior (i.e., ethical behavior) regarding their livestock's medicine intake. It was found that psychological capability (i.e., knowledge of the consequences of unethical behavior), social opportunity (i.e., social pressure), reflective motivation (i.e., professional identity) and automatic

motivation (i.e., positive emotions regarding ethical behavior) predicted ethical behavior of farmers (Farrell et al., 2023). These recent studies illustrate that further investigation into the COM-B components and their predictive relation with compliant and ethical behavior seems useful.

The RICE framework proposes six different ways in which elements within the model are influenced, as indicated by the six arrows in Figure 2. In this review paper, arrow one and two are the main focus, which are related to the research question (i.e., how regulatory actions and underlying factors influence compliant and ethical behavior). For instance, deterrence might trigger a 'legal mindset', undermining ethical reasoning (Moore, 2015).

Therefore, deterrence might be related to compliance but not ethical behavior. Furthermore, arrows three and four indicate moderation or mediation effects, which are not the main focus of this review paper but are included when investigated in the included studies.

For example, when a cooperative regulatory action increases psychological capability (arrow three), this could in turn increase ethical behavior (arrow one). Arrows five and six are included because Michie et al. (2011) argued that motivation is influenced by capability and opportunity. Again, these relations are not the main focus of this review paper but are included when investigated in the included studies.

It is acknowledged that there can be other possibilities next to the six relations portrayed in Figure 2. For instance, when regulatees comply more, regulators become more cooperative (i.e., arrow two reversed). However, there was a focus on prior research in which compliant and ethical behavior of the regulated was the central outcome variable since the current review paper aims to better understand the underlying factors that interact with regulatory actions and in turn, explain the behavior.

The empirical papers that are included in the current review paper will be discussed alongside the RICE framework. This provides novel insights into the impact on compliant and ethical behavior by regulatory actions and underlying factors.

ANALYTICS, THEORETICAL AND CONCEPTUAL FRAMEWORK

Method

Review type

A nonsystematic review was conducted due to the broad research question (as opposed to a narrow question that is typical for a systematic review). The aim is to paint the 'bigger picture': understanding not only if certain actions lead to compliant and ethical behavior, but also why regulatees may (not) comply or behave (un)ethically. Cook (2019) suggests that a nonsystematic review is more appropriate when seeking "why" something does (not) work.

Advantages of conducting a nonsystematic review include greater flexibility in search terms and the ability to adjust the search method midway, particularly when evidence (unexpectedly) spans across various disciplines.

Additionally, it allows for comparing different research methods (i.e., quantitative and qualitative designs). A disadvantage may be a potential unbalanced perspective, which are addressed in the discussion. Also, it is acknowledged that there is a possibility of overlooked articles. However, the objective was not to present a complete overview of all relevant literature but to provide a broader perspective on regulatory actions and underlying factors that may be crucial in promoting compliant and ethical behavior.

Selection criteria and included studies

Google Scholar was used to search for articles related to stimulating regulatory compliance and ethical behavior. Search terms included the words 'regulation' (and synonyms, e.g., enforcement), 'regulator', 'regulatory', '(non-)compliance' (and synonyms, e.g., violations) and/or '(un)ethical behavior' (and synonyms, e.g., (im)moral behavior).

Articles from 2000 up until 2023 were taken into consideration since Sparrow called for more focus on research that studies behavior beyond compliance in 2000.

Potentially relevant articles that were found were assessed on whether they were in line with four inclusion criteria:

➢ The article describes an empirical study.
➢ The article focuses on behavior of organizations, or individuals imagining they are responsible for an organization.
➢ The outcome variable is compliance, ethical behavior or a similar behavior or intention that falls under the regulation of an external regulator.
➢ Potential predictors of the outcome variables are researched, which can be regulatory actions and/or underlying factors.

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In total, this has led to the inclusion of 35 articles. The findings of these articles have been analyzed, compared to each other, and were categorized according to the RICE framework by the first author. The second author checked the argumentation and categorization, while both the second and third authors checked the conclusions of the first author.

To assess which sectors were investigated in the studies, the sectors were identified through information in the articles or information on the website of the International Labour Organisation (ILO, n.d.)

Findings

First, the context of the 35 articles is described, such as the studied countries and the way behavior is measured. Second, the relations between regulatory actions and compliant and ethical behavior are addressed. Finally, the underlying factors are discussed according to the COM-B model (Michie et al., 2011), just as their relation with compliant and ethical behavior. For illustration purposes, the most important findings are discussed. See Table A1 in the Appendix for a summary of all articles.

Countries and sectors

Before the findings are discussed, it is important to describe the context of the articles included. Only then the findings, conclusion and implications can be seen in a fitting context. Almost all studies are conducted in Western countries, making the distribution of countries not diverse. Also, most studies are conducted in the United States of America (USA). The distribution of sectors is more diverse.

For example, the financial sector, manufacturing, and agriculture are covered. Also, it is common for studies to include multiple sectors. See the Appendix for full list of studies and corresponding countries and sectors.

Assessment of compliant and ethical behavior

As can be expected, most studies measured compliance. However, ethical behavior was also measured in about one-third of the articles. Overall, 'registered behavior' (e.g., data from a database managed by the regulator) was a common data source for the included articles, followed by self-reported behavior (mainly through surveys and interviews). Intention to behave was only measured a couple of times.

Regulatory actions and their interconnections with compliant and ethical behavior

Of the 35 studies, 27 (77%) investigated a regulatory action and its links with compliance and/or ethical behavior. To structure and categorize the results, a distinction was made between studies that investigated inspections, deterrence, and cooperation and studies that investigated both deterrence and cooperation.

The findings below show that most studies found that inspections are related to more compliance. The evidence on the effect of sanctions on compliance is mixed, while naming and shaming evidence is limited but promising. Results of cooperation are mixed as well.

Inspections are often beneficial

Studies found that inspections are generally related to more compliance and/or ethical behavior. For instance, more frequently inspected organizations were more compliant with air pollution regulations (Gray & Shadbegian, 2007). Two other studies found that inspections were related to more ethical behavior, operationalized as voluntarily joining a regulatory program to pledge overcompliance with environmental regulations (Innes & Sam, 2008; Khanna & Anton, 2002).

In a survey study, 71% of farmers, 100% of homebuilders, and 91% of boatyard operators indicated that being inspected within the past five years motivated them to comply (May, 2005a). Regarding the physical safety of workers, some regulations aim to prevent injuries. In two studies, the effect of inspections on injuries was studied. In one study, the outcome variable was operationalized as the number of workdays that were lost due to an injury. More inspections were associated with less workdays lost by injuries (Mendeloff & Gray, 2005).

Interestingly, this effect also occurred in parts of the organization that were not inspected, indicating a spillover effect. However, some studies find that inspections are not related to more compliance. For instance, a study compared a 'formal' style (e.g., more threatening) to a 'facilitative' style (e.g., more helpful). However, neither inspection style did predict compliance (May & Wood, 2003). Another study found that more inspections were even related to less compliance (Stafford, 2002).

Deterrent actions: mixed results

Of the 27 included studies that researched regulatory actions, 15 studied deterrence. Deterrence is often operationalized as imposing a sanction (Desai, 2016; Khanna & Anton, 2022; Shimshack & Ward, 2008).

However, other forms such as naming and shaming (Foulon et al., 2022; Khanna & Anton, 2022; Van Erp, 2011) and lawsuits (Keohane et al., 2009) have also been studied.

The findings show that sanctions are related to more compliance and/or ethical behavior in some studies, but in others not. Naming and shaming do seem effective, but evidence is limited.

Effects of sanctions differ

The evidence of sanctions being related to more compliance or ethical behavior is mixed. For example, Shimshack and Ward (2008) measured both compliant and ethical behavior in the the context of water pollution and found that organizations comply and go beyond compliance after receiving a sanction.

Moreover, when a sanction was given to one organization, other organizations were also more inclined to comply, which decreased pollution by 7% within the US state of the sanctioned organization. This effect of a sanction is called general deterrence, which is the deterrent 'message' sent when another organization is punished. This is opposed to specific deterrence, which only refers to the deterrent effect on the sanctioned organization (Gunningham et al., 2005).

Similarly, another study found that general and specific deterrence can increase compliance. In this study, the effect of general deterrence only reached organizations in the same US state where the sanction was given, indicating that general deterrence has boundaries (Gray & Shadbegian, 2007).

Mixed and null results were found as well. An interview study found that general deterrence was only partially functional, as communicating sanctions could also normalize the violation or lead to defiance instead of compliance (Van Erp, 2011). Two studies in which managers of regulatees were interviewed concluded that sanctions against their organization (i.e., specific deterrence) or sanctions against another organization (i.e., general deterrence) did not contribute to more compliance. General deterrence did, however, serve as a reminder of rules and regulations and led to reassurance that non-compliant competitors were punished (Gunningham et al., 2005; Van Wingerde, 2012). In one of these studies, managers mentioned that regulations already motivated them to comply (Gunningham et al., 2005). Another study found that sanctions were only related to more compliance when the regulatee collaborated with the regulator while giving a sanction (Desai, 2016). In terms of ethical behavior, a study by Khanna and Anton (2002) found that previous sanctions were not related to voluntarily adopting a program that would stimulate pro-environmental behavior.

Naming and shaming seem promising

Naming and shaming entails publicly communicating the names of offenders, for instance, in the form of blacklists or press releases (Yadin, 2019). General deterrence has some similarities to naming and shaming. However, the general deterrence is different because of merely 'naming' or communicating a regulatory action, not actually 'shaming' the regulatee (Van Erp, 2011). Two studies that examined naming and shaming found that it increased compliant and ethical behavior. Naming and shaming were related to regulatees voluntarily adopting an environmental program (Khanna & Anton, 2002).

Another study used registered data to investigate the effect of a published public list of polluters. They concluded that publishing this list predicted compliance, notably even more than a sanction (Foulon et al., 2002).

Cooperation: limited studies

Of the 27 included studies that investigated a regulatory action, only two studies solely examined a cooperative action. Both studies found that cooperation was associated with more compliant and ethical behavior. An ethnographic study investigated collaboration between health regulators and regulated HIV clinics, which consisted of deciding how rules were applied and working together on reports. This type of collaboration was associated with more compliance and ethical behavior, supposedly because the close collaboration provided the regulator with an opportunity to evoke 'a deeper conformity' to portray the desired behavior (Heimer & Gazley, 2012).

Furthermore, a field experiment found that a letter in which a regulator showed support, signaling a cooperative attitude, led to more ethical behavior (i.e., voluntary high-quality reporting) than a letter that did not show support. This effect only occurred for organizations that expected themselves to grow in terms of employees and/or sales (Van Duin et al., 2018).

Comparing deterrence and cooperation: mixed results

Of the 27 studies that researched regulatory action, seven articles measured the effect of both deterrence and cooperation. When comparing deterrence and cooperation, the evidence is mixed on what is more effective. For instance, similar effects were found in a study that compared regulators that are known for their deterrent style versus regulators that are known for their cooperative style (Kagan et al., 2003).

Another type of cooperative regulation is 'compliance assistance', which consists of regulators providing technical assistance with the goal to help regulatees understand compliance, show compliance, and go beyond compliance. A study compared compliance assistance to inspections and sanctions. It was found that both compliance assistance and inspections had similar effects for small and medium sized organizations. Sanctions were less effective than compliance assistance, since small-sized organizations did not show more compliance; this was only the case for medium-sized organizations (Stafford, 2012).

A few articles found that deterrence was more effective than cooperation. For example, sanctions were related to a two-thirds reduction of violations in other organizations (i.e., general deterrence), similar to the decrease in violations in the sanctioned organization. However, providing information was not related to compliance (Shimshack & Ward, 2005).

Another study compared two types of responsive regulation: tit-for-tat and restorative justice. Tit-for-tat was defined as 'original' responsive regulation, in which a regulator responds cooperatively if the regulatee cooperates, but in a deterrent way if the regulatee behaves undesirably. Six stages of interactions between the regulator and regulatee were studied.

The results showed that tit-for-tat regulation predicted more compliance in only two of the six stages. Restorative justice, a style of responsive regulation in which the regulator acts informally and does not use coercion when communicating with regulatees, predicted a stronger positive attitude of regulatees towards the regulator.

However, it did not predict more compliance. Overall, this indicates that both tit-for-tat and restorative justice have a limited impact on compliance (Nielsen & Parker, 2009). The one study that found that cooperation was more effective than deterrence was conducted in the USA, where hazardous waste regulators from different states use different regulatory styles. A cooperative style (i.e., education and guidance) was associated with fewer minor violations, but not with fewer major violations. A deterrent style (e.g., higher chance of enforcement) was not related to fewer violations (Stafford, 2003).

Regulatory actions and the difference between compliant and ethical behavior

A comparison between the effects of regulatory actions on either compliance or ethical behavior was not a focus of the current review, but some insights can be derived. Almost all studies on ethical behavior found that a regulatory action can increase ethical behavior. Additionally, the findings indicate that ethical behavior might best be stimulated with cooperative actions or with inspections, but less effective when using sanctions.

To illustrate, both studies that only focused on cooperation also measured ethical behavior, and both found that cooperation increased ethical behavior (Heimer & Gazley, 2012; Van Duin et al., 2018). Additionally, two inspection studies measured ethical behavior, and both found that inspections increase ethical behavior (Innes & Sam, 2008; Khanna & Anton, 2002).

Four studies examined the effect of deterrence on ethical behavior, but these studies demonstrated mixed findings (Gunningham et al., 2005; Kagan et al., 2003; Khanna & Anton, 2002; May, 2005b; Shimshack & Ward, 2008). Thus, there are some indications that cooperation and inspections are better suited than deterrence to stimulate ethical behavior. However, this indication warrants further research.

Regulatory actions: conclusion

Overall, more inspections seem to be related to more compliant and ethical behavior in most studies. In terms of deterrence, studies on the relation of sanctions with compliant and ethical behavior provided mixed results. This applies to both specific and general deterrent effects of sanctions.

Furthermore, the few studies on naming and shaming found that it increased compliant and ethical behavior. In terms of cooperation, evidence was mixed.

It seemed that cooperation only worked if effort is put in the interaction between regulator and regulatee to establish a good working relationship, versus merely providing extra information. Finally, there are some indications that cooperation and inspections are more effective in increasing ethical behavior than sanctions.

COM-B components and their interconnection with compliant and ethical behavior

Of the 35 studies in total, 23 studies (64%) investigated an underlying factor and its relations with compliance and/or ethical behavior. Of these 23 studies, 16 works also investigated the effect of a regulatory action.

All underlying factors were categorized in one of the six subcomponents of the COM-B model, which will be discussed below in their corresponding order (i.e., capability, opportunity, motivation).

The findings below show that the subcomponents psychological capability, social opportunity, and reflective motivation were most effective in stimulating compliant and ethical behavior.

Psychological capability: promising effects

Psychological capability includes knowledge, memory, attention, decision processes, and self-control (McDonagh et al., 2018) but was measured only as knowledge in the studies that were reviewed. Almost all articles that assessed psychological capability found it related to more compliance. For instance, multiple studies found that knowledge of laws and regulations and knowledge about enforcement actions against other firms were related to more compliance (May, 2005a; May & Wood, 2003; Van Stekelenburg et al., 2022; Winter & May, 2001). A mixed result was also found since knowledge of specific, detailed enforcement cases did predict compliance, but general knowledge (i.e., remembering multiple cases superficially) did not predict compliance (Thornton et al., 2005). In summary, the results of the interconnection between psychological capability (i.e., knowledge) and compliance seems promising. The mixed result suggests that having superficial knowledge is not sufficient to increase compliance.

Physical capability: mixed and limited evidence

Physical capability includes skills, abilities or proficiencies acquired through practice (McDonagh et al., 2018). Only two of the included studies measured physical capability, of which one found a relation with more compliance, while the other found mixed results. The first study investigated the ability of the regulatee to collaborate with the regulator and found that sanctions led to more compliance if the regulatee had to ability to initiate a collaboration (Desai, 2016).

The second study measured capability in the form of work experience of homebuilders. Interestingly, total work experience did not predict compliance, but recent experience (i.e., the number of homes built in the past two years) did predict higher compliance (May & Wood, 2003). Thus, studies on the effect of physical capability yielded mixed results, but this is based on limited evidence.

Social opportunity: promising results

Social opportunity refers to social influences, such as social pressure, social norms, and social comparisons (McDonagh et al., 2018). All eight studies that measured social opportunity found that it increased compliance and/or ethical behavior. One study found that regulatees with social motivations to comply (i.e., the need to earn the approval and respect of other people or organizations) demonstrated more compliance (Winter & May, 2001).

Regarding norms, it was found that a positive social norm (i.e., compliance of other regulatees in the vicinity) was related to more compliance (Gray & Shadbegian, 2007). Regulatees were also less likely to comply if the perception is that others do not comply (i.e., negative social norm; Van Stekelenburg et al., 2022).

Furthermore, the 'need for a positive reputation' is considered as social opportunity. In one study, 35% of Danish farmers, 78% of USA homebuilders and 87% of USA boatyards indicated that reputation motivates them to comply (May, 2005a). Similarly, wanting to retain a good reputation was also related to more ethical behavior (Kagan et al., 2003).

At last, if employees experienced constraints to comply (e.g., less social support), less compliance occurred (May & Wood, 2003). In sum, all studies on social norms, social support, reputation, and social motivation were related to more compliance and/or ethical behavior, indicating the importance of social opportunity.

Physical opportunity: often studied, but not always beneficial

Physical opportunity includes the environmental context and resources (McDonagh et al., 2018). It was assessed in 11 studies, making physical opportunity the most-researched underlying factor of the included articles.

Only a few articles found that more physical opportunity (e.g., larger organization) is related to more compliance and/or ethical behavior. Most articles found mixed or null results or concluded that more physical opportunity was related to less compliance and/or ethical behavior.

For instance, most studies on organizational size found that larger organizations were less likely to comply. For instance, two studies found that both deterrence and cooperation were less effective in stimulating compliance in larger organizations as compared to smaller or medium-sized organizations (Stafford, 2012; Gray & Mendeloff, 2005).

Conversely, two studies found that larger organizations were more likely to comply (Thornton et al., 2005) or to behave ethically (Van Duin et al., 2018). One study reported no effect of organizational size on compliance (Kagan et al., 2003).

Financial resources form another underlying factor that is part of the physical opportunity studied. In terms of financial loss, lower expected costs of complying (i.e., more physical opportunity) were associated with more compliance in one study (May & Wood, 2003) but less ethical behavior in another (Khanna &

Anton, 2002). Regarding financial gain, firm profit was unrelated to compliance in one study (Gray & Shadbegian, 2005), while another study found that profit slightly increased compliant and ethical behavior (Kagan et al., 2003).

In sum, the findings showed some signs that a larger organization is less likely comply, but there is an inconsistent pattern. Additionally, mixed results for financial opportunity are found, as more resources are not always related to better behavior.

Reflective motivation: important factor

Reflective motivation includes personal beliefs about one's capabilities, roles, identity, intentions, and goals (McDonagh et al., 2018), which is similar to the more intrinsic types of motivation (Ryan & Deci, 2017). All eight studies that investigated reflective motivation found that it is related to more compliance and/or ethical behavior.

Regarding intentions and goals, experiencing a 'civic duty to comply' is a sense of moral obligation to comply with rules and regulations. A civic duty to comply motivated 80% of farmers and homebuilders, and 60% of boatyard operators (May, 2005a). Compliance officers from multiple sectors underscored this, indicating in interviews that they complied because it is 'the right thing' to do (Gunningham et al., 2005).

A survey study also found that a stronger duty to comply was related to more compliance (May, 2005b). This is even the case when awareness of rules and regulations is low (Winter & May, 2001). Moreover, personal norms about compliance were found to be the strongest predictor of compliance in the study in which knowledge, negative social norms and having social ties with competitors were also included (Van Stekelenburg et al., 2022).

Identity is another part of reflective motivation, which two studies investigated in the form of management style. It was found that a stronger pro-environmental management style was related to more compliant and ethical behavior (Kagan et al., 2003). Similarly, managers in an interview study indicated that they are especially stimulated by regulatory actions that would support 'their intrinsic motivation to comply' (Van Wingerde, 2012).

In sum, it is essential to have a civic duty to comply, personal norms and a management style that aligns with rules and regulations. Since all studies found positive effects, reflective motivation can be considered an important factor.

Automatic motivation: mixed results

Automatic motivation refers to feeling incentivized by rewards or punishment to act in a certain way (McDonagh et al., 2018), which is related to extrinsic motivation (Ryan & Deci, 2017). Automatic motivation has some overlap with physical opportunity (especially financial gain and loss), but a differentiation was made between the perception of gains and costs (automatic motivation) and actual gains and costs (physical opportunity). Similarly, the effect of deterrence has been described as a regulatory action, but some studies measure the perception of deterrence, which is related to automatic motivation (i.e., experiencing fear).

The studies that investigate the relation of automatic motivation and compliance or ethical behavior conclude mixed results overall. Two studies found that economic incentives were influential drivers of compliant and ethical behavior. Economic incentives existed when regulatees wanted to minimize regulatory costs or to gain an economic benefit (Gunningham et al., 2005; Winter & May, 2001).

However, in one of the studies it was a weaker predictor than being motivated by social or personal norms (Winter & May, 2001). Regarding deterrent fears, mixed effects were found. Two studies on deterrent fears found that it increased compliance, namely that the perceived threat of a regulatory action was associated with less emissions (i.e., more compliance; Keohane et al., 2009). However, only, 29% of US homebuilders, 40% of Danish farmers, and 65% of US boatyard operators indicated that these fears are related to more compliance (May, 2005a).

A study on fear found that fearing enforcement was related to more motivation to comply, while fearing (embarrassing) media coverage was not (May, 2005b). Another study found that a higher perceived risk of facility closure was related to more compliance, but perceived probability of detection and perceived probable level of a sanction were unrelated to compliance (Thornton et al., 2005). In summary, the perception of higher gains or lower costs seemed to motivate regulatees to comply, while studies on deterrent fears yielded mixed results.

COM-B mechanisms: conclusion

Three COM-B subcomponents provided promising results to stimulate compliant and ethical behavior: psychological capability, social opportunity, and reflective motivation. Conversely, the results of the physical capability, physical opportunity, and automatic motivation subcomponents were mixed.

A summary of the findings of regulatory actions and COM-B subcomponents are visualized in an adapted version of the RICE framework (see Figure 3).
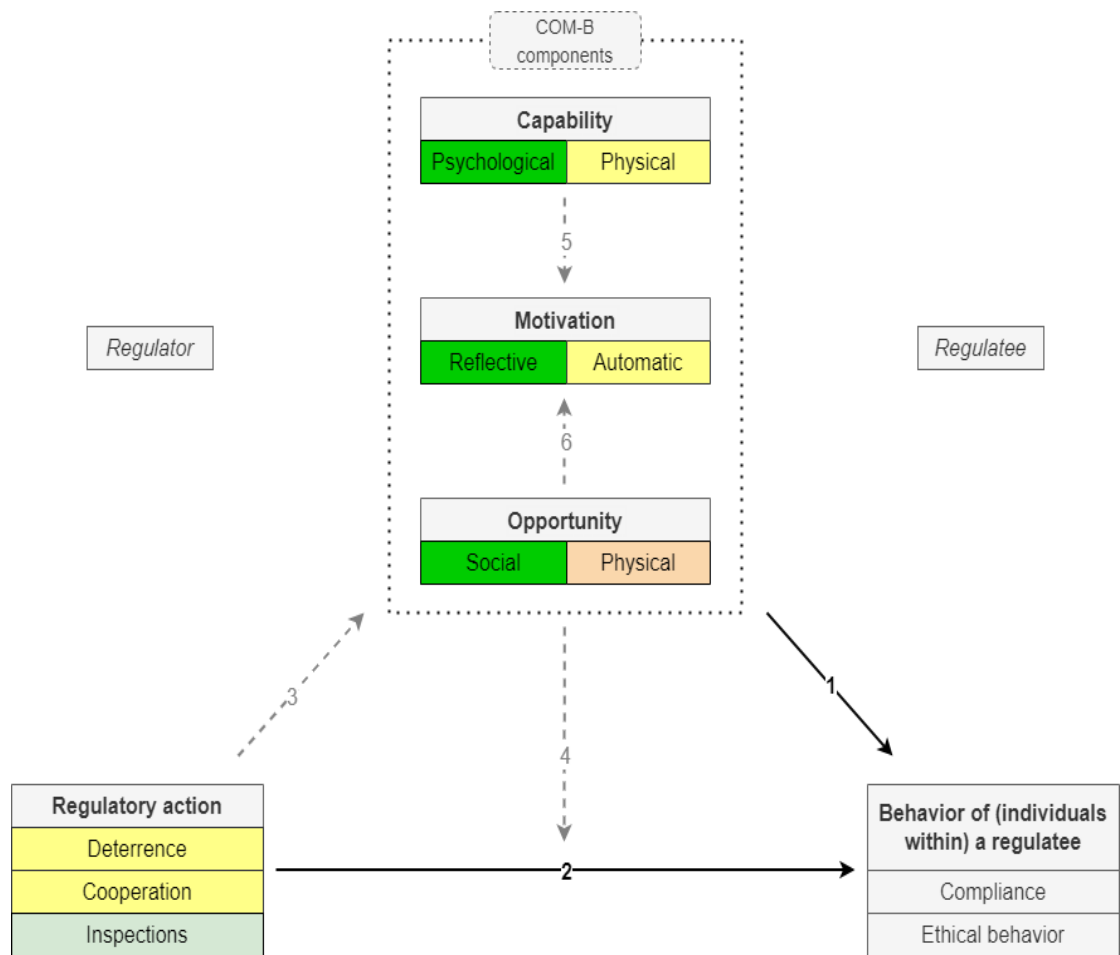
Figure 3. Effectiveness of Predictors of Compliant and Ethical Behavior Visualized in the RICE Framework

Note: COM-B = Capability-Opportunity-Motivation-Behavior

The colors indicate the extent to which the regulatory action or COM-B subcomponent is related to an increase or decrease in compliant and ethical behavior. Dark green indicates that (almost) all studies find an increase. Light green indicates that a majority all studies find an increase. Yellow indicates that studies find mixed evidence. Orange indicates that most studies find a decrease in compliant and ethical behavior.

Source: Compiled by the authors

CONCLUSIONS

This review paper aimed to collect, summarize, analyze, and review empirical evidence on how regulators can stimulate compliant and ethical behavior of regulatees. First, it was investigated *if* and to what extend certain regulatory actions are effective. Second, it was investigated why regulatees do (not) comply or behave (un)ethically through the examination of underlying factors. The RICE framework was introduced to create an integrative picture of the literature to date and gain a deeper understanding of the most promising pathways that lead to compliant and ethical behavior.

In this behavioral framework, regulatory actions are included as predictors and categorized as deterrence, cooperation, or inspections. Underlying factors as key drivers of compliant and ethical behavior were also included, which were categorized according to the COM-B model: differentiating between capability, opportunity, and motivation (Michie et al., 2011).

The findings are based on various sectors, providing insights gained from a diverse pool of organizations. Conversely, almost all samples included Western countries, indicating less generalizability to non-western countries. In terms of regulatory actions, our analysis of 35 articles showed that inspections seem somewhat more effective in stimulating compliant and ethical behavior than deterrence and cooperation. Unfortunately, empirical evidence cannot give a conclusive answer to whether deterrence or cooperation is more effective.

Interestingly, zooming in on deterrence, evidence on sanctions was mixed, while naming and shaming effectively raised compliant and ethical behavior in both studies that investigated it. The findings on inspections and deterrence are similar to findings from earlier review papers on environmental regulation (Cohen, 1998; Gray & Shimshack, 2011), and to the more general review paper of Simpson et al. (2014), which also concluded that inspection results are more promising than deterrence. What's more, evidence on cooperation suggests that close collaboration or providing guidance is needed to establish impact (Heimer & Gazley, 2012), rather than just giving (extra) information to the regulatee (Shimshack & Ward, 2005).

Although most studies examined compliance, one third of the studies also assessed ethical behavior. This indicates that research on ethical behavior becomes more prevalent in a regulatory context. Seven of the nine studies that examined the effect of regulatory actions on ethical behavior found an increase in ethical behavior. Cooperation and inspections seem more suited than deterrence to stimulate ethical behavior, but more evidence is needed to strengthen this finding.

Studying underlying factors as COM-B components (Michie et al., 2011) revealed important results. Notably, almost all studies investigating psychological capability, social opportunity, or reflective motivation found an increase in compliant and ethical behavior. This indicates that when (individuals within) regulated organizations are knowledgeable about the law, experience an encouraging social environment (e.g., social norms towards compliance) or are intrinsically motivated to comply (e.g., because it matches their identity or beliefs), there is a substantial chance of complying or behaving ethically.

Conversely, research on physical capability (e.g., abilities), physical opportunity (e.g., financial resources), and automatic motivation (e.g., incentives) found that these underlying factors are less effective in stimulating compliant and ethical behavior. Furthermore, limited studies examining underlying factors and ethical behavior can provide no insights on which underlying factors are more or less effective in increasing ethical behavior. Overall, the findings highlight the importance of developing regulatory actions that enhance compliance or ethical behavior by targeting underlying factors that are related to psychological capability, social opportunity, or reflective motivation.

Theoretical implications

The findings of the current review paper offer insights that may help reflecting on existing regulatory theories, such as deterrence theory and responsive regulation theory. Even though deterrence theory primarily focuses on the effect of deterrence on regulatees' behavior (Scholz, 1984), the current review paper shows that using deterrence is not always effective in increasing compliance or ethical behavior. This suggests that expanding deterrence theory might be desirable.

Indeed, a study on the deterrence of cartels concluded that an expanded version of the deterrence model – including personal norms, social norms, social ties, and knowledge of the law – substantially increased its explanatory power (Van Stekelenburg et al., 2023). This finding matches the conclusions of the current review paper. Namely, personal norms (i.e., reflective motivation), knowledge (i.e., psychological capability), and social norms and social ties (i.e., social opportunity) were found to be important drivers of compliance (Van Stekelenburg et al., 2023).

Responsive regulation theory and its regulatory pyramid build on the assumption that regulators should apply persuasive or cooperative actions first, and only escalate to more deterrent or coercive actions when regulatees do not show the desired behavior (Ayres & Braithwaite, 1992). Even though the current review paper did not particularly investigate responsive regulation, mixed evidence regarding both deterrence and cooperation was found.

This finding indicates that there might not be a consistent, predictable effect of either type of regulatory action. Rather, theory could be further developed by insights regarding which regulatory action is effective in which situation. For example, does the 'responsiveness' of regulatory actions matter differently for certain types of regulatees? Also, the effect of responsive regulation may depend on which underlying factors are involved.

Therefore, just as was done by Stekelenburg et al. (2023) for deterrence theory, responsive regulation theory could benefit from incorporating underlying factors in its reasoning. For example, in a particular situation, cooperation might be useful if intrinsic motivation is a key driver of the desired behavior, while deterrence might be more useful if extrinsic motivation is a key driver.

Practical implications

Conducting inspections was found effective in most cases. Furthermore, findings showed that for cooperation to work, there is a need for close collaboration or guidance, not just providing information to the regulatee. Taking together, perhaps showing presence as a regulator, and establishing personal contact with

regulatees, is more effective than more 'distant' actions, such as sanctions, although this conclusion warrants further research.

More importantly, it would be wise to design regulatory actions that strive to increase psychological capability, social opportunity, and/or reflective motivation of regulatees to enhance compliant and ethical behavior. To increase psychological capability, regulators could provide 'best practices' and give information and guidance on complying with law and regulations, for instance, by engaging in collaboration with regulatees. To enhance social opportunity, regulators could create a positive social norm regarding compliant and ethical behavior, for instance, by highlighting that other regulatees show desired behavior (Gray & Shadbegian, 2007). Additionally, regulatees are strongly motivated to comply and behave ethically when they do not want to lose a good reputation or want to conform to societal norms (e.g., Kagan et al., 2003). Therefore, regulators could emphasize prevalent societal norms or use naming and shaming to indicate the risk of losing a good reputation (e.g., Foulon et al., 2002). To increase reflective motivation, regulators could design interventions that increase intrinsic motivation or create a professional identity. No specific interventions on reflective motivation were conducted as part of the studies in scope. However, a study that compared letters of a financial regulator found that a cooperative style increased intrinsic motivation more than a deterrent style (Ishwardat et al., in prep.).

The underlying factors related to physical capability, physical opportunity, and automatic motivation seemed to be less effective in stimulating compliant and ethical behavior. This indicates that regulatory actions that focus on these factors possibly deserve a less dominant role regulators' arsenal. In practice, regulators often seem to value sanctions as an impactful regulatory action.

However, sanctions presumably increase one's automatic motivation (e.g., fear), which is found to be less effective. Also, sanctions can undermine one's intrinsic motivation (Bear et al., 2017; Deci & Cascio, 1972), so regulators are advised carefully consider the effects they aim to achieve with imposing sanctions. Furthermore, the other underlying factors that were found to be less effective – physical capability and physical opportunity – are challenging for a regulator to influence, such as ensuring that staff at regulated organizations have sufficient personnel (i.e., physical opportunity) with sufficient work experience (i.e., physical capability).

Thus, it is recommended to focus less on interventions that seek to enhance physical capability or physical opportunity. Regulators can use the RICE framework (as shown in Figure 3) to choose components that may be more promising to target interventions on.

Limitations of included articles and directions of future research

Multiple limitations can be found throughout the 35 included studies. In terms of methods, only three of the 35 studies used an experimental design. Notably, two of these three experimental studies focused on ethical behavior (67%), while only 31% of all studies measured ethical behavior. This indicates that a disproportionate number of ethical behavior studies used an experimental design, while almost no compliance studies used an experimental design. Possibly, conducting (field)experiments is challenging when researching compliance in practice.

Nonetheless, this remains unfortunate since causal relations cannot be determined. Future research could conduct experiments or quasi-experiments, such randomized controlled trials or field experiments. In terms of sample characteristics, all but one study was fully conducted in Western countries, limiting the generalizability of the findings to regulators operating in certain countries. Future research is advised to be conducted in non-western countries as well.

Regarding underlying factors, there were limited studies that ran mediation or moderation analyses. None of the 35 studies tested mediators. For example, there is no study that investigated if sanctions lead to a feeling of fear, which in turn increases compliance. Additionally, only eight of the 35 studies tested moderators to investigate whether the effect of regulatory actions on compliance or ethical behavior was influenced by underlying factors. However, most of the analyses included organizational size as a moderator, for instance, to check whether smaller organizations are more likely to comply after an inspection than larger organizations (e.g., Gray & Shadbegian, 2007).

In summary, there is a lack of conclusive evidence on which specific regulatory actions influence which specific underlying factors (mediation), and how underlying factors influence the effect of regulatory actions (moderation). This hinders regulators from gaining knowledge on processes their actions evoke.

Future studies are advised to research potential mediating and moderating underlying factors, for which the RICE framework offers a useful overview.

Limitations of the current review paper and directions for future research

Conducting a nonsystematic review best fitted our research question. Nevertheless, the nonsystematic nature of this review also is a limitation. Some relevant articles might have been missed due to the manual search, which can lead to an unbalanced perspective (Cook, 2019).

Furthermore, some (sub)conclusions are based on only a few studies (e.g., physical capability), so they should be interpreted cautiously. Nonetheless, it is believed that the findings are of added value since a first image is portrayed of different disciplines and research questions. Also, the findings on regulatory actions are consistent with an earlier systematic review (Simpson et al., 2014), so there is an indication that the current paper does provide a rather balanced perspective. Another potential downside is that there was a focus on statistical differences to assess the outcomes of studies. This is called 'vote counting' and is not ideal, since the effect size is ignored (Cook, 2019). However, it was opted to do this, since this method enables to include both quantitative and qualitative studies, which you cannot compare through effect size.

Second, only studies with compliance and/or ethical behavior as outcome variables were included, which were done to focus on the effect of regulatory actions on behavior. Therefore, some studies were excluded, such as studies that only investigate the effect of regulatory action on underlying factors. For example, a study showing that regulatory actions influence trust of the regulatee (Hamm et al., 2013), was not included. Also, studies that examine how underlying factors influence regulatory actions, or how compliant and ethical behavior influence regulatory actions were excluded. For example, it could be the case that more noncompliance predicts more inspections, which was out of the scope of the current review (Stafford, 2002). To further understand the behavioral processes that exist in the regulatory context, future research should study the relations of the RICE framework.

Third, the current review paper did not explicitly focus on the differences between stimulating compliance and stimulating ethical behavior. Relevant for future research is to examine which regulatory actions influence ethical behavior specifically, and which underlying factors play a role. As mentioned before, there is an indication that inspections and cooperation are more suitable than deterrence to stimulate ethical behavior, while there is limited evidence on which specific underlying factors influence ethical behavior. Therefore, more research is needed to further develop insight into this question.

Final conclusion

To stimulate regulatory compliant and ethical behavior, regulators' proactive involvement appears essential, since inspections as a regulatory action seem promising. Evidence on the effectiveness of deterrence was mixed and there was only limited information available on the effectiveness of cooperative regulatory actions. Crucially, this review paper shows not only if regulatees comply or behave ethically because of a regulatory action, but also provides more insight into the processes that explain why they do. Regulators have the greatest potential for effectiveness when targeting psychological capability, social opportunity, and/or reflective motivation. This knowledge provides regulators with essential insights to further develop their interventions and thereby expand the impact they have on people, organizations, and the environment.

Author Contributions

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Conflicts of Interest

Authors declare no conflict of interest.

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Appendix

Table A1. All Included Articles and Relevant Information

Citation	Specific regulatory action	Regulatory action (deterrence/cooperation/inspection/other)	COM-B sub-component	Under-lying factors	Behavior of regulatee	Specific behavior of regulatee (level)	Measurement of dependent variable	Research method	N + type of sample	Sector	Country	Core findings
De Waal et al. (2015)	Presence of internal vs external supervision	Other	-	-	Ethical behavior	Self-serving decisions, i.e., allocation of money (individual level)	Intention to behave	Experimental	63 managers who imagined being responsible for an organization	Financial services	European countries	Internal supervisors influence the extent to which employees make self-serving decisions more strongly because employees believe that internal supervisors can instantly reward or punish them for their behavior
Desai (2016)	Monetary fines	Deterrence	Physical capability	Regulatory collaboration (moderator), predicted by regulatory and social visibility, and political engagement	Compliance	Pipeline assessments (organizational level)	Registered behavior	Existing data analysis	944 natural gas-transmission pipeline operators	Transport	USA	Sanctions lead to more compliance if regulatee involves itself in regulatory collaboration, which in turn is predicted by regulatory and social visibility, but not by political engagement
Foulon et al. (2002)	Naming and shaming, fines, prosecutions	Deterrence	-	-	Compliance	Compliance with emission standards	Registered behavior	Existing data analysis	15 pulp and paper plants	Pulp and paper	USA	Naming and shaming and sanctions both predict more compliance but naming and shaming stronger.
Gara et al. (2024)	Anti-money-laundering inspections	Inspections	Physical capability	Ability to identify suspicious transactions	Compliance	Reporting suspicious transactions	Registered behavior	Existing data analysis	736 banks	Financial services	Italy	Inspections increase both ability to comply and actual compliance
Glicksman and Earnhart (2007)	Inspections, fines, injunctive relief, supplemental environmental projects	Deterrence and inspections	-	-	Compliance	Compliance through specific deterrence and compliance through general deterrence	Registered behavior, self-reported behavior	Existing data analysis, survey	499 chemical facilities (registered behavior), 267 chemical facilities (self-reported behavior)	Chemical industry	USA	Fines are more effective general deterrence than injunctions or SEPs, but not as specific deterrent.
Gray & Mendeloff (2005)	Types of inspections	Deterrence and inspections	Physical Opportunity	Firm size	Compliance	Lost-workday injuries as outcome of compliance (organizational level)	Registered behavior	Existing data analysis	Between 6,842 plants and, 16,036 plants, depending on studied period	Manufacturing	USA	Inspections with penalty reduced lost-workday injuries by, 19% in the early 80's, but this fell to, 1% in the 90's. Inspections are more effective with a penalty, and on smaller plants
Gray & Shadbegian (2005)	Enforcement; inspections with penalty	Deterrence	Physical Opportunity	Age, firm size, profit	Compliance	Compliance with air pollution regulations (organizational level)	Registered behavior	Existing data analysis	116 pulp and paper plants	Pulp and paper	USA	Enforcement is associated with more compliance. Older and larger plants are less likely to comply
Gray & Shadbegian (2007)	Inspections; specific and general deterrence	Deterrence and inspections	Physical Opportunity, Social Opportunity	Age, size in terms of production, compliance of plants closeby	Compliance	Compliance with air pollution regulations (organizational level)	Registered behavior	Existing data analysis	521 manufacturing plants	Manufacturing	USA	Specific and general deterrence, and compliance of plants closeby are associated with more compliance. Older and larger plants are less likely to comply

Table A1 (cont.). All Included Articles and Relevant Information

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Gunningham et al. (2004)	-	-	Social Opportunity	Social license	Ethical behavior	Pro-environmental behaviors that are not mandatory and not always profitable (organizational level)	Intention to behave	Interviews	14 paper mills	Pulp and paper	USA, Canada, Australia, New-Zealand	Social license can induce firms to go beyond compliance, because increased regulation and more costs are feared
Gunningham et al. (2005)	Specific deterrence, implicit general deterrence	Deterrence	Automatic Motivation, Reflective Motivation, Social Opportunity, Physical Opportunity	Explicit general deterrence, normative factors, social pressure, economic pressure, company size	Compliant and ethical behavior	Environmental behavior (organizational level)	Self-reported behavior	Interviews	35 compliance officers of electroplaters and chemical companies	Multiple sectors	USA	Implicit general deterrence was most influential type of deterrence, especially for small and medium sized companies
Hamm et al. (2013)	-	-	Reflective Motivation	Dispositional trust, institutional trust, procedural fairness	Compliance	Compliance with water regulations (organizational level)	Intention to behave (in scenario)	Survey and experi-mental	86 students	Agriculture	USA	In limited information condition, dispositional trust predicts higher intention to comply but mediated by institutional trust. Procedural fairness is highly predictive of intention to comply when regulatory decision is inconsistent with information.
Heimer and Gazley (2012)	Collaboration	Cooperation	-	-	Compliant and ethical behavior	Meeting technical requirements, and going beyond that (organizational level)	Ethno-graphic data	Ethnography	5 HIV clinics	Health services	USA, South Africa, Thailand, Uganda	Collaboration is associated with more compliance and more behavior beyond compliance
Innes and Sam (2008)	Inspections, enforcement actions	Inspections	Automatic Motivation	Wanting green-marketing advantage, forestall potential boycotts, preempt lobbying for tighter regulation and enforcement	Ethical behavior	Voluntarily joining regulatory program to pledge overcompliance (organizational level)	Registered behavior	Existing data analysis	319 firms and, 1257 facilities	Manufacturing	USA	Earlier regulatory actions were related to joining program, which was in turn related to less regulatory actions. Forestalling boycotts and lobbying were associated with more ethical behavior. Marketing advantage was not.
Kagan et al. (2003)	Deterrence and cooperation	Deterrence vs cooperation	Reflective Motivation, Social Opportunity, Physical Opportunity	Environmen-tal management style, social license, company size, financial gain	Compliant and ethical behavior	Water pollution (organizational level)	Self-reported behavior; registered behavior	Interviews; existing data analysis	14 pulp and paper mills	Pulp and paper	Australia, New Zealand, Canada, and USA	No difference between deterrence and cooperation. Pro-environmental management style and social license were related to less pollution. No effect of company size on pollution. Some effect of more financial gain and less pollution
Keohane et al. (2009)	Lawsuits	Deterrence	Automatic Motivation	Perceived threat of regulatory action	Compliance	Violations with emission limitations (organizational level)	Registered behavior	Existing data analysis	46 power plants	Utility	USA	Perceived threat is associated with less emissions, which was in turn related to less regulatory actions

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Khanna & Anton (2002)	Inspections, penalties, naming and shaming	Deterrence and inspections	Physical Opportunity	High costs of compliance	Ethical behavior	Adoption of environmental management practices	Self-reported behavior	Survey	176 S and P 500 firms	Multiple sectors	USA	Inspections, naming and shaming, and high costs of compliance were related to more environmental management practices, but penalties were not.
May & Wood (2003)	Enforcement style: facilitative vs formalism; inspection thoroughness	Deterrence vs cooperation	Psychological Capability, Physical Opportunity, Physical Capability	Knowledge, perceived cooperation, experience, perceived constraints	Compliance	Voluntary compliance with building codes (organizational level)	Self-reported behavior	Survey	260 homebuilders	Construction	USA	No difference between styles on compliance. Thoroughness, costs, and constraints predict less compliance. knowledge predicts more compliance. Perceived cooperation does not predict compliance. Recent high experience predicts more compliance, but experience overall does not predict compliance.
May (2005a)	Traditional vs voluntary regulation	Deterrence vs cooperation	Automatic motivation, Reflective Motivation,	Deterrent fears, duty to comply, peer reputation (moderator) and attitude towards government (moderator)	Compliance	Actions to address water quality	Self-reported behavior	Survey	205 marinas and boatyards	Transport	USA	Traditional regulation, deterrence, and duty to comply predict more compliance.
May (2005b)	Inspections, sanctions	Deterrence and inspections	Automatic Motivation, Reflective Motivation, Social Opportunity, Psychological Capability	Deterrent calculations, norms and attitudes, social and peer influences, knowledge	Compliant and ethical behavior	Compliance or beyond compliance with practice guidelines (organizational level)	Self-reported behavior	Survey	1562 farmers, 260 contractor, 59 boatyard operators	Multiple sectors	Denmark, USA	Different findings between the different types of regulatees and between different countries. Context seems very dependent.
Mendeloff and Gray (2005)	Inspections	Inspections	-	-	Compliance	Workplace injuries (organizational level)	Registered behavior	Existing data analysis	16036 establishments	Multiple sectors	USA	Inspections lead to less injuries, including injuries in areas that are not inspected
Mendoza et al. (2016)	-	-	Physical Opportunity, Psychological Capability	Perceived fairness of regulatory complexity, knowledge	Compliance	Compliance with financial regulations (organizational level)	Self-reported behavior	Survey	602 financial inter-mediaries	Financial services	The Netherlands	Effect of perceived fairness on compliance is mediated by knowledge
Mendoza et al. (2020)	-	-	Physical Opportunity	Being affiliated to certain associations	Compliant and ethical behavior	Compliance with financial regulations; Taking voluntary actions to better assure compliance (organizational level)	Self-reported behavior	Survey	8655 financial inter-mediaries	Financial services	The Netherlands	Being affiliated with an association is related to more compliance. However, being affiliated with an association that is less influenced by the regulator is related to more compliance, only because this is more strongly mediated by ethical behavior
Miller (2005)	civil vs criminal lawsuits	Deterrence	-	-	Compliance	Violations with environmental regulations (organizational level)	Registered behavior	Existing data analysis	11864 firms	Multiple sectors	USA	Criminal lawsuits are associated with decreased violations. Civil lawsuits are not more effective than less-costly administrative actions

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Shimshack and Ward (2005)	Fines, inspections, informational enforcement	Deterrence and cooperation	-	-	Compliance	Violations with water pollution standards (organizationel level)	Registered behavior	Existing data analysis	217 major pulp and paper mills	Pulp and paper	USA	Fine is related to a two-third reduction of violation in other plants, almost as strong as reduction of fined plant. Giving information is not related to compliance.
Shimshack and Ward (2008)	Fines	Deterrence	-	-	Compliant and ethical behavior	Water pollution (organizational level)	Registered behavior	Existing data analysis	251 major pulp and paper mills	Pulp and paper	USA	Plants overcomply when receiving fine. Pollution decreases with 7% within state if a fine is given on other plant.
Short and Toffel (2008)	Enforcement actions, giving community, audit privilege	Deterrence and cooperation	-	-	Compliance	Self-disclosed violations (organizational level)	Self-reported behavior	Existing data analysis	17464 chemical facilities	Chemical industry	USA	Enforcement actions and giving immunity lead to more compliance. Deterrence does not lead to less compliance.
Stafford (2002)	Inspections, penalties	Deterrence and inspections	-	-	Compliance	Violations with hazardous waste regulations (organizational level)	Registered behavior	Existing data analysis	8411 facilities	Multiple sectors	USA	Penalties are associated with more compliance
Stafford (2003)	Strict liability regime, voluntary pollution prevent program, mandatory pollution prevention program	Deterrence and cooperation	Physical Opportunity	Age	Compliance	Violations with hazardous waste regulations (organizational level)	Registered behavior	Existing data analysis	8216 large quantity generator facilities	Multiple sectors	USA	Weak evidence of strict liability. Voluntary pollution prevention program is associated with less minor violations, but not major violations. Mandatory programs do not affect compliance, albeit small sample size.
Stafford (2012)	Compliance Assistance, inspections, penalties	Deterrence and cooperation	Physical Opportunity	LQG, SQG, CEG	Compliance	Violations with environmental regulations (organizational level)	Registered behavior	Existing data analysis	More than 350.000 hazardous generators	Multiple sectors	USA	Compliance assistance is associated with less violations in medium and small organizations, but not in large organizations
Thornton et al. (2005)	-	-	Psychological Capability, Automatic Motivation, Physical Opportunity	Knowledge, perceived risk of facility closure, perceived risk of detection and fine, perceived magnitude of fine, company size, professionalization	Compliance	Environmental protection actions	Self-reported behavior	Survey	233 firms	Multiple sectors	USA	Recall of enforcement actions and perceived risk of facility close were related to more compliance decisions
Van Duin et al. (2018)	High vs low support letter	Cooperation	Physical Opportunity	Company size, time horizon	Ethical behavior	Reporting quality (organizational level)	Registered behavior	Experimental	4577 financial inter-mediaries	Financial services	The Netherlands	High-support letter leads to more compliance if firm has long-term orientation. Bigger company size is associated with more compliance.
Van Erp (2011)	Deterrence: naming and shaming vs sanctions	Deterrence	-	-	Compliance	Compliance with financial regulations (organizational level)	Intention to behave	Interviews	40 compliance professional and representatives	Financial services	The Netherlands	Deterrence through sanctions is related to less compliance. Naming and shaming is related to more compliance.

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Van Stekelenburg et al. (2023)	-	-	Psychological Capability, Reflective Motivation, Social Opportunity, Physical Opportunity	Knowledge, personal norm, negative social norm, social ties	Compliance	No cartel behavior (organizational level)	Intention to behave	Survey	2125 organizations	Multiple sectors	The Netherlands	All independent variables predict more compliance. Personal norm is the strongest predictor.
Van Wingerde (2012)	Sanctions	Deterrence	-	-	Compliance	Compliance with environmental regulations (organizational level)	Self-reported behavior	Interview	40 waste companies	Public service	The Netherlands	Deterrence is reported to be not related to compliance
Winter and May (2001)	-	-	Reflective Motivation, Social Opportunity, Automatic Motivation, Psychological Capability	Normative, social, and calculative motivation; awareness	Compliance	Compliance with agro-environmental regulations (organizational level)	Self-reported behavior	Survey	2265 farmers	Agriculture	Denmark	Awareness strongly associated with compliance, and positively moderates effects of motivations on compliance.

Source: Compiled by the authors