Behavioral Reluctance in Adopting Open Access Publishing: Insights From a Goal-Directed Perspective

Massimo Köster[1,2], Agnes Moors[1,2], Jan De Houwer[3], Tony Ross-Hellauer[4], & Frederick Verbruggen[5]

1. Research Group of Quantitative Psychology and Individual Differences, KU Leuven, Leuven, Belgium

2. Center for Social and Cultural Psychology, KU Leuven, Leuven, Belgium

3. Department of Experimental Clinical and Health Psychology, Ghent University, Ghent, Belgium

4. Open and Reproducible Research Group, Graz University of Technology, Austria

5. Department of Experimental Psychology Ghent University, Ghent , Belgium

Abstract

Despite growing awareness of the benefits of large-scale open access publishing, individual researchers seem reluctant to adopt this behavior, thereby slowing down the evolution towards a new scientific culture. We apply the goal-directed framework of Moors and colleagues (Moors, 2019; Moors, Boddez, & De Houwer, 2017) to shed light on this type of behavioral reluctance and to organize and suggest possible interventions. This framework explains behavior as the result of a cycle of events starting with the detection of a discrepancy between a goal and a status quo and the selection of behavior to reduce this discrepancy. We list various factors that may hinder this cycle and thus contribute to behavioral reluctance. After that, we highlight potential remedies to address each of the identified barriers. We thereby hope to point out new ways to think about behavioral reluctances in general, and in relation to open access publishing in particular.

Keywords: behavioral reluctance, open access publishing, goal-directed

Behavioral reluctance in adopting open access publishing: Insights from a goal-directed perspective

We often seem to know that we should change our behavior, but often we don't. Such behavioral reluctance is impeding much needed change in various types of behavior. One such type of behavior is academic publishing. Open access journals receive more and more attention because there is a growing awareness of drawbacks associated with traditional, non-open access journals (e.g., copyright issues, high subscription costs for libraries, inefficient use of taxpayer's money), while good reasons to adopt open access journals are being brought forward (e.g., more citations, increased media coverage, retaining author rights, …; for a review of such benefits, see e.g., McKiernan, et al., 2016). However, despite endorsing the benefits, many scholars seem hesitant to reorient and publish their own works in open access journals (Edwards, 2016; Johnson, 2018; Nelson 2009). In this paper we will use a goal-directed framework of behavior causation proposed by Moors, Boddez, and De Houwer (2017; Moors, 2019) to shed light on this issue. We think this framework proves particularly useful to understand the underlying causes of behavior and can thereby help clarify why behavior change can go wrong.

In a first section, we describe how the sequence of events in the goal-directed framework (which is discussed in greater detail in Box 1) can be applied to open access publishing. In a second section, we discuss various factors that may impede the behavioral cycle and how these factors may contribute to a reluctance to submit papers to open access journals. The discussion of each factor will be followed by a proposal of intervention strategies. We thereby hope to provide theoretical insights into behavioral reluctances in general and in relation to open access publishing in particular as well as to offer new potential avenues for more effective behavior change to promote open access publishing.

Box 1: The goal-directed framework

The goal-directed framework proposes that most behavior can be explained by the following cycle of events (see Figure 1, adapted from Moors et al., 2019): A perceived status quo (i.e., the representation of a stimulus) is compared to a first goal (i.e., the representation of a valued outcome). When a discrepancy between the stimulus and the first goal is perceived, a second goal arises, which is to reduce the discrepancy. This can be achieved with one of the following three strategies. The person might act to change the stimulus itself (i.e., assimilation), change the first goal (i.e., accommodation), or change the interpretation of the stimulus (i.e., immunization). Which of these three strategies is chosen likely depends on their respective expected utilities to reduce the discrepancy. The expected utility of a strategy depends on the value of the outcome of having the discrepancy reduced and the expectancy that the strategy will indeed lead to such a reduction. If the person chooses to act (i.e., assimilation), she still needs to choose a specific action option from her action repertoire. If the action repertoire contains more than one action option, the expected utilities of these options are compared and the option with the highest expected utility should be chosen. Again, the expected utility of one action option depends on the value of the outcome and the person's expectancy that the action will indeed lead to this outcome. Once a specific action option has been chosen, the corresponding intention to engage in the action (i.e., action tendency) is activated. This intention can be considered as a third goal and will translate into an overt action. Once the action is performed, it is followed by an actual outcome, which may or may not constitute a change in the status quo (i.e., the stimulus). This outcome is then fed back as the input to a new cycle. The cycle is repeated until the discrepancy is effectively removed.

The goal-directed model further assumes that organisms have multiple goals and that these are organized in a goal hierarchy. This entails that cycles for subordinate goals are

embedded into cycles for superordinate goals. The same principles that guide the selection of an intention to act in order to reach a subordinate goal also guide the selection of a subordinate goal in order to reach a superordinate goal. A person chooses a subordinate goal because it has a high expected utility to satisfy a superordinate goal. Accordingly, the value of a subordinate goal reflects its expected utility to satisfy one or more superordinate goals.

The goal-directed framework applied to open access publishing

Applying the goal-directed framework outlined in Box 1 to the case of open access publishing (for an illustration see Figure 1), the perceived status quo might be that research is not accessible to the public but rather hidden behind a paywall by private publishers. Researchers may hold a number of different reasons for open access publishing. Each of them could be taken as the first goal that starts off the cycle. For the sake of clarity, we will start from the goal to make research more accessible to the public. However, the same exercise could be repeated with other goals in mind (e.g., the goal to change the traditional publication model to give researchers more control over the publication process or to make research accessible to academics from less wealthy universities without certain journal subscriptions). As long as researchers perceive a discrepancy between the status quo and the first goal to make research accessible to the public, they develop the second goal to reduce this discrepancy, either by (a) taking overt action to make research accessible to the public (i.e., assimilation), (b) changing this goal or reducing its value (i.e., accommodation), or (c) ignoring that research is not accessible to the public or by reassuring themselves that the media will communicate research findings from closed journals to the public (i.e., immunization). Which of these three strategies is chosen likely depends on respective expected utilities of these strategies for reducing the discrepancy. If researchers choose to engage in overt action (i.e., assimilation), they still need to select the action option from their action repertoire with the highest expected utility. Once researchers have chosen the action

option they deem most effective to make their research accessible to the public, the corresponding intention is activated and is then translated into an overt action. If researchers, for instance, estimate that publishing in open access journals has a higher expectancy of making their work accessible than writing a blog post, the intention to publish in open access journals is activated. After this intention is translated in the actual publishing in open access journals, it is followed by an outcome. The outcome is fed back as the input to a new cycle and this cycle is repeated until the discrepancy is effectively removed. Researchers may thus continue to publish in open access journals until their research is sufficiently accessible to the public. Furthermore, as discussed in Box 1, our framework postulates a hierarchical goal structure. This implies that the value of the goal to make one's research accessible to the public corresponds to the expected utility that fulfilment of the goal will be conducive to a number of superordinate goals such as the goals to increase the visibility of one's research or to have impact on societal debates.

From this perspective it becomes clear that an attempt to find an explanation for the occurrence of the behavior of open access publishing is an attempt to explain the result of a complex chain of events. Understanding why there is a reluctance to engage open access publishing then comes down to understanding how and why the sequence leading up to this behavior might be hindered. As the reluctance to publish in open access journals impedes an important change in the transition towards more accessible and transparent research practices, there is a growing interest in understanding the potential barriers as well as avenues for a large-scale adoption of open access publishing (e.g., Björk, 2004). We will therefore move on to consider factors that may hamper the goal-directed cycle that should give way to open access publishing and thereby hope to offer new insights into why the reluctance among researchers to embrace open access publishing is so tenacious.

Factors that may impede the goal-directed cycle in the context of open access publishing

Values of Goals

A first factor is the value of goals relative to that of other goals. Researchers may be reluctant to adopt a behavior that can reduce the discrepancy between the status quo and one goal because they expect the behavior will itself be discrepant with another goal that has a higher value. It is therefore important to consider the values that researchers ascribe to certain goals relative to those of other goals. Researchers may, for instance, not submit their paper to an open access journal, despite the fact that this is instrumental for their goal to make their research accessible to the public, if doing so also constitutes a discrepancy with or has a low expectancy to reach the more important goal to collect publications in prestigious journals marked by high impact factors.

In this case, at least three types of interventions can be suggested. One might try to (a) increase the value researchers ascribe to the goal of making research accessible to the public, (b) decrease the value of other, competing goals such as collecting publications in prestigious journals, or (c) change the environment so that these goals no longer conflict with each other, for instance, by creating prestigious (high-quality) open access journals. We discuss these options in turn alongside an exemplary goal-hierarchy involved in open access (see Figure 2).

Increasing the value of the goal to make research accessible to the public may be done by directly underscoring the importance of this goal, or indirectly, by pointing out that this goal is instrumental for superordinate goals such as increased visibility of the researcher to the public and increased impact on societal debates and policy making. In addition to pointing out *existing* links between the subordinate goal to make research publicly accessible and superordinate goals, one might also create *novel* links between this subordinate goal and superordinate goals (i.e., add further benefits) by implementing changes in the reward structure of the environment. To stimulate researchers to endorse the goal of public accessibility, universities could, for instance, lend accessibility awards to researchers who

make significant efforts to promote the accessibility of their research. Another option could be to make accessibility an important quality criterion for the allocation of research grants (an option that is already taken by certain funding agencies). In both cases, accessibility of research would become instrumental to superordinate goals (gaining awards and research grants).

An alternative strategy is to decrease the value of goals that hinder adopting open access publishing, such as the goal to collect publications in prestigious journals and the goal to save publishing expenses for the individual researcher. This can also be done by minimizing the values of these other goals directly, or indirectly by pointing out or making sure that these other goals are no longer instrumental for other superordinate goals. To illustrate the indirect pathways, researchers could be convinced that publications in prestigious journals alone do not reflect the quality of one's work, but better still, universities and funding agencies could attach less weight to publications in such prestigious journals.

As it may be difficult to convince researchers of the relativity of publications in prestigious journals and even to fully justify it, the best solution may be to change the reward structure of the environment in such a way that the goals of public accessibility and of publications in prestigious journals no longer conflict with one another. This can be done by creating (or facilitating the emergence of) prestigious open access journals. Note, moreover, that the prestige or quality of journals may better be captured by other metrics than impact factors, a suggestion that received support in the Declaration on Research Assessment (DORA, sfdora.org). In a similar vein, to reduce the value of the goal to save on individual publishing expenses, universities could offer to pay the fees for open access publishing (a measure already adopted by several universities). Another solution might be to establish more open access journals that do not charge authors processing fees, so-called diamond or platinum open access journals.

Considering that the intention to engage in a behavior is also a goal, one can also use the aforementioned strategies to increase the value of the behavior to publish in open access journals itself and to decrease the value of alternative behaviors. Increasing the value of open access publishing could be done directly by communicating about the importance of open access publishing. In a more indirect way, one could also point out *existing* benefits of open access publishing besides increased public accessibility (and not mediated by increased public access). For instance, one could point out that open access publishing helps researchers take back control over the publication process, attracts more potential academic collaborators, increases citations, and does already lead to increased job and funding opportunities in some universities (see McKiernan, et al., 2016). One could also indicate that the goal to publish in open access journals is instrumental to the goal of gaining approval amongst peers. This comes close to an effective intervention strategy termed the provision of injunctive norms (Farrow, Grolleau, & Ibanez, 2017). Such a norm informs people about the things others expect them to do and hence what will gain their approval. Another option would be to create *novel* benefits of the behavior of publishing in open access journals (again, not mediated by the goal to increase public access) by implementing changes in the reward structure of the environment. For instance, universities can list open access publishing as a criterion for excellence.

Reducing the value of alternative behaviors can likewise be done in direct and indirect ways. For instance, researchers may have selected the behavior to publish in a closed access journal but to make a post-print available (i.e., the "green-route") because it is instrumental for the goal of public access and at the same time, avoids publication fees for individual researchers. In addition to directly communicating a low value of this alternative behavior, one can indirectly influence its value by pointing out that the green route does not contribute

to other goals (e.g., giving researchers control over the publication process or making research accessible to academics without subscriptions) in the way that open access publishing does.

Discrepancy Detection

A second factor that might impede behavior is when a person fails to detect a discrepancy between the status quo and her goal or when she underestimates the magnitude of this discrepancy. For instance, researchers may be aware that traditional journals can only be accessed by a paid subscription and may have the goal to make research accessible to the public, but fail to realize that the paywall is discrepant with accessibility to the public and hence fail to activate the goal to do something about it. A potential solution could be to point out the discrepancy explicitly. This could be done by illustrating how restricted the access to traditional journals is (e.g., how immense the costs are that libraries have to pay for subscriptions to traditional journals) and how serious the consequences are for various groups of potential readers (e.g., how much personal salary scholars in developing countries spend on average to access research in traditional journals).

Action Repertoire

A third factor that may account for behavioral reluctance is a lack of suitable response options in a person's action repertoire. Researchers may detect a discrepancy between publishing in traditional, closed access journals and their goal to make research accessible to the public, but the response option to publish in open access journals might not come to mind. With the majority of research still being published in traditional closed access journals, it can be assumed that there is not yet a culture of considering open access journals. The perceived lack of this response option may result in a low expected utility of assimilation relative to accommodation and immunization. As the latter two strategies do not involve personal actions to reach the goal of making research more accessible, choosing to engage in these strategies amounts to surrendering oneself to behavioral reluctance and thus to the continuation of

publishing in closed access journals. To facilitate behavior in these cases, one could try to extend a person's action repertoire by teaching them about the option of open access publishing, for instance, via online directories that index and provide access to high quality, peer-reviewed open access journals (e.g., doaj.org) or via open access platforms at universities that provide researchers with practical information (e.g., see recently established *Open Science Platform*, KU Leuven, 2020). For researchers who are already informed about the option of open access publishing, the option may still need to be made salient in the appropriate contexts. This could be done, for instance, with behavioral prompts (Sussman, et al., 2013).

It is of course still possible that open access publishing is hindered by an actual lack of concrete response options to implement the intention to publish in open access journals. It is therefore also important to consider the affordances of an environment with regard to the behavior in question. If the environment does not afford researchers to publish their work in open access journals despite the intention to do so, a structural change of the environment may be necessary. For instance, researchers might have the intention to publish in open access journals, but be confronted with a lack of open access journals that are suitable for their research domain (Kling, & McKim 2000). Addressing such barriers would require structural changes, such as an extension of the range of open access journals to cater for all research domains.

Expectancies

A fourth factor that may lead to behavioral reluctance is that people's expectancies are not always accurate. Researchers might, for instance, have a low expectancy that publishing in open access journals will increase the public accessibility of their research, making assimilation less likely. They might even estimate the impact of publishing in open access journals to be so negligible in reaching their goal to make research accessible to the public,

that they give up this goal (i.e., accommodation). They might also reassure themselves that the media will communicate the findings of their research to the public and that this is more effective than publishing in open access journals (i.e., immunization)

Open access publishing can be considered as a collective action, in which the actions of many are required to achieve a large-scale outcome (Biel, & Thøgersen, 2007). To archive a transition towards publically accessible science, a behavior change by a large collective of researchers is required. In such situations a single person might feel incapable to reach the outcome with her own actions (i.e., low expectancy in assimilation) and thus refrain from engaging in the behavior. An intervention to facilitate behavior change in these cases might be to change expectancies directly, for example, by setting up a campaign to stress that every single publication in an open access journal compared to a publication in a closed journal makes a meaningful difference in making research accessible to the public. More indirect ways to change expectancies are to alter the framing of the goal so that it seems more achievable by a single individual. One could, for example, reframe the goal from making science accessible to the public to making research in a certain domain, such as neuroscience, accessible to the public. Alternatively, one could reframe the goal from making science accessible to the public in general to making it accessible to a specific group, such as researchers in developing countries, alumni, or professionals. By framing the goal with regard to one's own domain and/or with regard to a certain group, it may appear more achievable. Another indirect way to change expectancies would be to stress how many others are already publishing in open access journals, thereby increasing the expectancy that an individual researcher's work will make a difference in the transition towards more accessible research. The latter strategy has already been shown to be effective across many behavioral domains and is referred to as the provision of descriptive norms (Cialdini, 2007; Farrow, Grolleau, & Ibanez, 2017).

Representational Quality

A factor that runs through all previous ones is the quality of the representations involved in the goal-directed cycle (Moors, 2016). If one or more of these representations is not sufficiently activated, they cannot play their role, and the cycle may not be initiated, may be aborted, or may be altered. For instance, the representations of stimuli and valued outcomes will not enter in comparison as long as one or both of them lack sufficient representational quality. Researchers may fail to notice that a large part of society has no access to their research if it is published in a traditional journal. They may also not always consider their goal to make research publicly accessible. This helps to explain why, in some instances, researchers may fail to notice a discrepancy between a stimulus and a goal (see Factor 2). Similarly, the representational quality of a specific action option, such as to publish in open access journals, may be too weak to be considered in the action repertoire. Researchers may have knowledge that publishing in open access journals has a high expectancy to lead to the valued outcome of making their research accessible to the public, but if the option to publish in an open action journal is not on their mind (i.e., the representation of the action option lacks sufficient activation), they are unlikely to select it.

To facilitate behavior change at this level requires facilitating the processing of the relevant stimuli, goals, and/ or action options. This can be achieved, for instance, by increasing the frequency (e.g., via repetition) or recency (e.g., via priming) of the relevant representations or by drawing attention to them. To foster open access publishing, one could, for instance, repeatedly expose researchers to current accessibility restrictions or increase the recency of exposure to the goal to make research accessible. In particular, one could expose researchers regularly to illustrations of limited access and prompt them with the goal to make research accessible prior to an upcoming publication. This is in line with the intervention strategy of mental contrasting, suggested by the model of fantasy realization (Oettingen,

2000). Mental contrasting also involves directing attention to the status quo and the goal, and is considered the best way to increase salience of the discrepancy between these two elements and to mobilize a person to take action. Finally, if an action option is not sufficiently activated to be accessible for being chosen, the representation of the desired action option (i.e., publishing in open access journals) may be facilitated via behavioral prompts (e.g., Sussman, et al., 2013).

Conclusion

Many scholars seem reluctant to publish in open access journals despite recognizing that it is an indispensable way to make their research more broadly accessible. In this paper, we explained this behavioral reluctance making use of the goal-directed framework by Moors et al. (2017; Moors, 2019). In this framework, behavioral reluctance can be understood as the result of problems in a cycle of events in which the detection of a discrepancy between a status quo and a goal is alternated with the selection of strategies to resolve this discrepancy. We identified problems related to values of goals, discrepancy detection, action repertoire, expectancies, and representational quality. For each of the problems discussed, we also discussed various openings for behavior facilitation. Among the potential interventions that we listed, some were situated at the level of the individual whereas others were more structural in nature. On the individual level, we clarified how the values of people's goals, their beliefs, and the quality of certain representations can be targeted to remedy for behavioral reluctances. On the structural level, we highlighted the need to change the reward structure of the environment so that it is less likely to probe conflicting goals as well as the need to change the affordances of the environment to facilitate behavior once the intention to engage in the behavior has been formed.

Overall, we hope that following these different pathways would not only serve as immediate remedies to resolve individual reluctances, but that they can help to establish and

solidify a stable behavioral culture. If certain behaviors become part of a culture, it is likely that a self-perpetuating effect occurs because most of the highlighted pathways should be naturally fostered in such a culture. If open access publishing, for example, becomes an integral part of the culture in universities, research domains, or research groups, its members would be more likely to be exposed to the importance of the goals of open access publishing (e.g., the accessibility of research) as well as of different superordinate goals that favor open access publishing (e.g., that others approve of open access publishing or that it can help to increase visibility and inform societal debates). In addition to getting acquainted with an injunctive norm that favors open access publishing, they would also be more likely to be exposed to a descriptive norm that favors such a practice because if more scholars in their immediate surroundings already publish in open access journals, engaging in the same behavior would appear more effective to each individual researcher as a means to make research accessible. Finally, in a culture that endorses open access publishing, researchers might be exposed regularly to the issue of restricted accessibility, to the goal to make research accessible, and to the action option to publish in open access journals.

We also hope to have illustrated the general usefulness of this framework in explaining reluctances and in pointing out potential remedies. This exercise may pave the way for other researchers to explain further facets of the reluctance to publish in open access journals, (e.g., by exploring the role of specific goals), to explain related reluctances (e.g., the reluctance to adopt open access repositories), as well as to explain reluctances in completely different domains (e.g., the reluctance to adopt pro-environmental behaviors).

References

Björk, B. C. (2004). Open access to scientific publications–an analysis of the barriers to change?.

Edwards, A. (2016). Perspective: Science is still too closed. *Nature*, *533*(7602), S70-S70.

Farrow, K., Grolleau, G., & Ibanez, L. (2017). Social norms and pro-environmental behavior: A review of the evidence. *Ecological Economics*, *140*, 1-13.

Johnson, G. J. (2018). Cultural, ideological and practical barriers to open access adoption within the UK Academy: an ethnographically framed examination. *Insights*, *31*.

Kling, R. & McKim G. (2000). Not just a matter of time: field difference and the shaping of electronic media in supporting scientific communication, Paper accepted for publication in Journal of the American Society for Information Science

KU Leuven. (2020, June 16). *Open Science at KU Leuven*. Katholieke Universiteit Leuven. https://www.kuleuven.be/open-science/open-science-at-ku-leuven

McKiernan, E. C., Bourne, P. E., Brown, C. T., Buck, S., Kenall, A., Lin, J., McDougall, D., Nosek, B. A., Ram, K., Soderberg, C. K., Spies, J. R., Thaney, K., Updegrove, A., Woo, K. H., & Yarkoni, T. (2016). Point of view: How open science helps researchers succeed. *elife*, *5*, e16800.

Moors, A. (2015). Automaticity: Componential, Causal, and Mechanistic Explanations. https://doi.org/10.1146/annurev-psych-122414-033550

Moors, A. (2019, January 7). Towards a goal-directed account of weak-willed behavior [Blog post]. Retrieved from http://philosophyofbrains.com/2019/01/07/empirically-informed-

approaches-to- weakness-of-will-a-brains-blog-

roundtable.aspx?fbclid=IwAR1UL5uejWUnUttIuAm4dpV3ghkC4i1Xn4x0xQVlxnLU4j

DOu6iREiBwxgI

Moors, A., Boddez, Y., & De Houwer, J. (2017). The power of goal-directed processes in the

causation of emotional and other actions. Emotion Review, 9(4), 310-318.

Moors, A., Fini, C., Everaert, T., Bardi, L., Bossuyt, E., Kuppens, P., & Brass, M. (2019). The

role of stimulus-driven versus goal-directed processes in fight and flight tendencies

measured with motor evoked potentials induced by transcranial magnetic

stimulation. *PLoS ONE*, *14*, e0217266, 1-22.

https://doi.org/10.1371/journal.pone.0217266

Nelson, B. (2009). Data sharing: Empty archives. Published online 9 September 2009| Nature

461, 160-163.

Sussman, R., Greeno, M., Gifford, R., & Scannell, L. (2013). The effectiveness of models and

prompts on waste diversion: A field experiment on composting by cafeteria

patrons. *Journal of Applied Social Psychology*, *43*(1), 24-34.

Figure 1

*The Goal-directed Cycle: Problems and Interventions in Open Access Publishing*
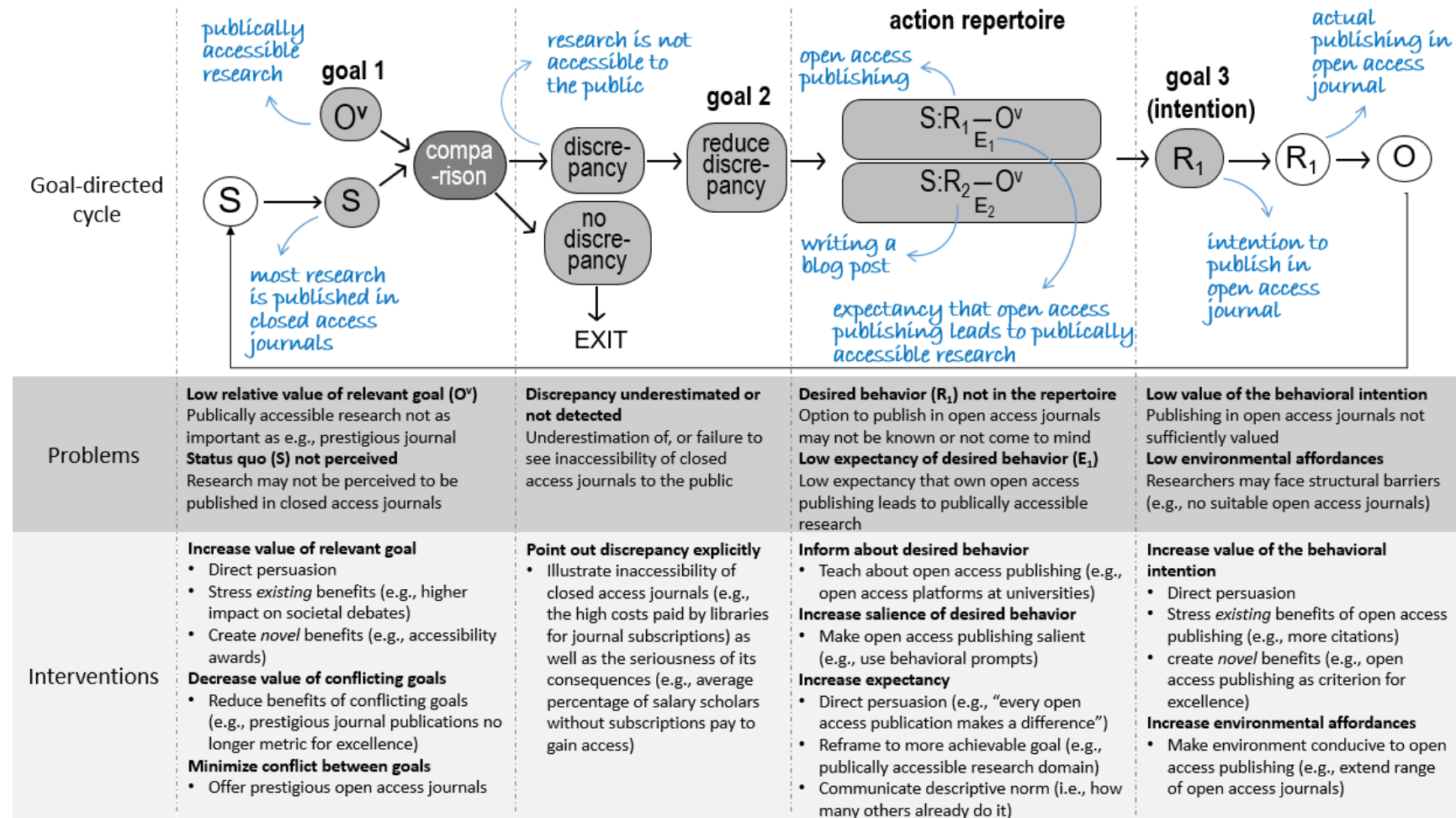
Note. The general goal-directed cycle is depicted with white bubbles as observable factors; grey bubbles with black letters as mental

representations; grey bubble with white letters as a mental operation. S = status quo (or stimulus), O^v = valued outcome (V = value), O = actual

outcome, E = expectancy, R = response or behavior. The application of the goal-directed cycle to open access publishing is depicted in blue

handwriting. Problems and intervention strategies are located underneath the goal-directed cycle according to where they become relevant in the

cycle. Figure adapted from Moors et al. (2019)

Figure 2

Exemplary Goal-Hierarchy Involved in Open Access Publishing
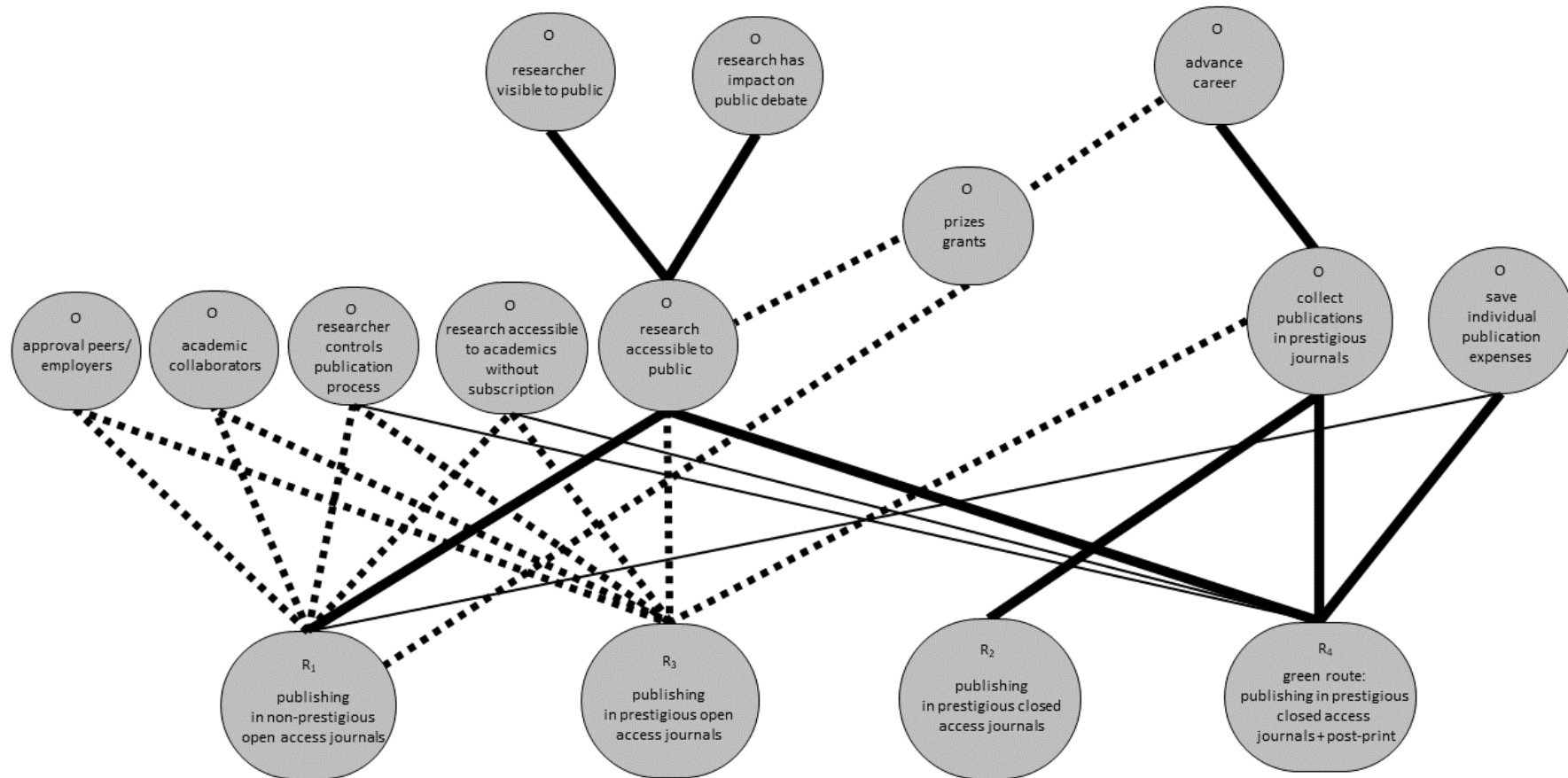
Note. Thick full lines represent high expectancies of subordinate goals to superordinate goals. Thin full lines represent weak or negative

expectancies of subordinate goals to superordinate goals. Thick dotted lines represent interventions that might establish high expectancies

of subordinate goals to superordinate goals.

R = response or behavior, O^v = valued outcome (V = value), FO^v = further valued outcome