



Cultural Milieu and Group-Rules in an Elaborated Account of Metacontingencies: Conceptual Analysis and an Illustration in a COVID-19 Psychological Support Project

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Abstract

The elaborated account of the metacontingency explicitly incorporated the role of antecedent events (with the concept of cultural milieu or cultural-organizational milieu) and verbal behavior (clearly related to what was termed group-rule generation). We argue that the cultural milieu encompasses two functionally distinct entities: antecedent environmental variables affecting the culturant (the organization members' activities)—what we termed cultural antecedents; and variables affecting the selecting environment or the consumer practices (members external to the organization responsible for producing cultural consequences)—what we termed selecting environment variables. Besides that, we propose that group-rule generation is not an element of a metacontingency distinct from the culturant, but that it describes verbal components of the interlocking behavioral contingencies; and that these verbal components are not present in all culturants but are especially important in more complex ones. We illustrate this conceptual analysis with reference to a COVID-19 psychological support project undertaken at a public university in Brazil and conclude by suggesting theoretical and methodological implications.

Keywords Cultural antecedents · Metacontingency · Macrocontingency · Rule-governed behavior · Verbal behavior

Different human groups present specific ways of producing food and other resources, arranging institutions, dealing with everyday business, living, sex, death, and other

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aspects of life; they show diverse cultures, inevitably changing over time. This *cultural evolution* is a fundamental subject matter of anthropology and has interested scholars in other fields, such as behavior analysis. B. F. Skinner, for instance, discussed cultural evolution frequently and at length (e.g., Skinner, 1948, 1953 [Sections IV, V and VI], Skinner, 1971, 1978, 1981). In his 1981 article *Selection by Consequences*, Skinner suggested that cultural evolution would account for a third level of selection by consequences, analogous to natural and operant selection. Behaviors of a group would be selected by the effects of these practices on the group, similarly to how reproductive success and reinforcing consequences act upon species and operants, respectively.

Inspired by Skinner's work, Glenn (1986) proposed the concept of *metacontingency* to account in a more detailed and explicit way for some processes of cultural evolution, maintaining consistency with how behavior scientists talk about individual behavior. Since, the concept has been extensively debated, researched, and refined (e.g., Glenn, 1988, 2003, 2004; Glenn & Malagodi, 1991; Glenn & Malott, 2004; Krispin, 2016; Todorov, 2006; Tourinho & Vichi, 2012; for a review of the experimental literature, see Cihon et al., 2020). In that context, Glenn et al. (2016) proposed a minimal consensual definition of the concept as “a contingent relation between (1) recurring interlocking behavioral contingencies having an aggregate product and (2) selecting environmental events or conditions” (p. 13). *Interlocking behavioral contingencies* (IBCs) refer to recurring interactions among individuals. At least one response of Individual A functions as a stimulus for Individual B, who can then emit a response that functions as a stimulus for Individual A or Individual C, and so on. IBCs can produce a specific environmental change termed an *aggregate product* (AP), which can be used to measure IBCs themselves, like a switch closure can be used to measure a lever press by a rat. The unit of analysis encompassing IBCs and AP has been termed a *culturant* (Glenn et al., 2016; Hunter, 2012; see also Baia & Sampaio, 2019).

The primary variable responsible for maintaining the culturant is a selecting environmental change or condition, sometimes called a *cultural consequence* (CC; e.g., Vichi et al., 2009), which usually is contingent on the AP. This two-term metacontingency (culturant \rightarrow CC) is analogous to the two-term operant contingency (operant \rightarrow consequence), begging the question of something analogous to the three- or four-term operant contingency at the cultural level. Glenn et al. (2016) emphasized that the two-term metacontingency was proposed “without denying that metacontingencies could be expanded to three or more terms” (p. 13) and specifically referred to the elaborated account of the concept advanced by Houmanfar and colleagues (Houmanfar et al., 2010; Houmanfar & Rodrigues, 2006). This elaborated account explicitly incorporated two aspects to the concept of metacontingency: the role of antecedent events (with the concept of *cultural milieu* or *cultural-organizational milieu*) and the role of verbal behavior (explicitly related to what was termed *group-rule generation*). The present article will analyze these two aspects of the elaborated account of the metacontingency, illustrating some of its conclusions describing a COVID-19 Psychological Support Project undertaken at a public university in Brazil and suggesting theoretical and methodological implications.

Before addressing each of these aspects, however, we should mention that Houmanfar and colleagues employ a terminology somewhat different from the one used by, for example, Glenn et al. (2016). That jargon difference is probably related to Houmanfar and colleagues' intellectual debt to Kantor, and primary interest in complex metacontingencies such as those involved in organizations (e.g., Alavosius & Houmanfar, 2020; Houmanfar et al., 2009; Houmanfar & Szarko, 2021), governments, and societies (e.g., Ardila-Sánchez et al., 2019).¹ For instance, Houmanfar and colleagues avoid employing the term IBCs, arguing that it fails to differentiate the psychological and sociological levels of analysis and that a contingency describes the selective process and not the selection outcome (Houmanfar et al., 2010). Instead, they suggest the terms *interlocked behaviors* (IBs) and *socio-interlocked behaviors* (socio-IBs). They also do not employ the more general terms CCs or selecting environmental conditions to refer to the effects of culturants that increase or decrease its probability. They prefer *consumer practices*, which describe more directly the main effects produced by organizations and would clarify that the selecting environmental condition comprises individuals behaving in relation to those involved in the IBCs. Those different terminologies can involve subtle conceptual or operational differences (see the discussion about consumer practices in the following section), but they do not seem especially relevant to our general purposes. Thus, we will stick to the more established and traditional terminology presented by Glenn et al. (e.g., IBCs and CCs).

Antecedent Events in Metacontingencies and the Cultural Milieu

Houmanfar and Rodrigues (2006) introduced the cultural milieu as an antecedent element in metacontingencies, but Houmanfar et al. (2010) renamed it as cultural-organizational milieu, specifying that “The change in term more explicitly notes the interactive relationship between the resources, practices, and infrastructure of the larger society with those within an organization or an organized cultural group (e.g., a couple making dinner)” (p. 89). Still, considering the conceptual similarities between cultural milieu and cultural-organizational milieu, as well as changes in the use of the terms by the authors themselves (e.g., Houmanfar et al., 2020), we will treat them together, always referring to the more general term *cultural milieu*. In this section, we will argue that the cultural milieu encompasses two functionally distinct entities: (1) antecedent environmental variables affecting the culturant (the organization members' activities)—what we termed *cultural antecedents*; and (2) variables affecting the selecting environment or the consumer practices (members external to the organization responsible for producing CCs)—what we termed *selecting environment variables*.

Houmanfar and colleagues' (2010) definition of cultural milieu refers to “all of the antecedent factors such as resources, cultural practices, and societal infrastructure

¹ Even the laboratory studies of this research group have a strong applied vein (e.g., Smith et al., 2011, 2012).

that *occasion or allow for* certain socio-IBs [i.e., IBCs] or aggregate product” (p. 89, italics added). This definition emphasizes an antecedent role analogous to the one played by a discriminative stimulus or a motivating operation in operant behavior. Sticking to this analogy, we suggest that a first role of the cultural milieu would encompass environmental events or alterations that set the occasion for modification in the frequency, magnitude, topography, or other dimensions of the culturant.

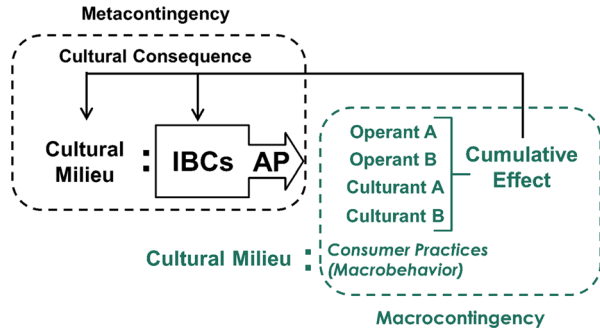
Importantly, Houmanfar and colleagues (2010, 2020) suggested a kind of reciprocal relation between CCs and the cultural milieu: consumer purchases of goods (i.e., CCs) often alter the organization’s prevailing “beliefs” and “predictions” regarding the market (i.e., cultural milieu), resulting in changed culturants. In this sense, the selective action of the CCs would occur because of changes in antecedents rather than directly altering the culturant. For instance, an increase in consumer purchases of digital art items (CC) might strengthen the belief of an art gallery sales representative in the future of digital art, leading her to suggest to the directors a larger investment in the gallery’s website and digital art marketing (cultural milieu). This, in turn, could lead to a change in the art gallery’s marketing strategy (culturant). Processes such as these could be considered analogous to the exposure to operant contingencies generating self-rules, which can function as antecedent events for subsequent operant behavior.² Recognizing that the cultural milieu can be affected by CCs—and describing how that happens—is essential. This use of the concept of cultural milieu points to one of its components: the altered beliefs or predictions regarding the production of CCs of an individual participating in the culturant. In other words, the contextual role of antecedent events in metacontingencies when these events are related to the behavior of the consumers: stimuli related to how often, with what magnitude, and under what conditions a particular CC (e.g., consumer purchases of goods) is produced.

Recently, however, Houmanfar et al. (2020) presented (or at least clarified) a different role of the cultural milieu, defining it as “the collection of stimulus functions influencing the acquisition and maintenance of interlocked behaviors [i.e., IBCs] and the behavior of individuals interacting with the associated aggregate products” (p. 154, italics added). This last statement suggests that the cultural milieu encompasses variables affecting the selecting environment, i.e., the consumers—individuals external to the organization responsible for producing CCs. These variables would affect how the APs are consumed and the production of CCs that establish, maintain, or weaken the culturant. One example could be advocacy organizations’ public interventions to offset tobacco companies’ deceptive marketing and expose tobacco-related health costs, altering consumer purchases of cigarettes. According to Houmanfar et al.’s (2020) formulation, the advocacy organizations would be a part of the tobacco companies’ cultural milieu, even if they do not directly affect the culturants emitted by the tobacco companies, but only the consumer practices of cigarette smokers.

Consumer practices can be conceptualized as similar behavior emitted by many individuals and/or organizations, i.e., a *macrobehavior* (Glenn et al., 2016). Thus, in

² See also the discussion about group-rules in the following section.

Fig. 1 The two roles of the cultural milieu, and consumer practices as a macrobehavior. *Note.* Consumer practices are depicted as part of a macrocontingency and as participating in the production of a cultural consequence in a complex metacontingency



complex metacontingencies there is an interaction between an organization emitting a culturant and a macrobehavior producing a cumulative effect that acts as CC for the organization’s culturant (Fig. 1). Analyzing the macrobehavior can be important, but such an analysis would focus on an interrelated yet distinct phenomenon (i.e., macrocontingency), possibly involving a different group of people. To analyze the macrobehavior constituting the consumer practice is to go beyond the culturant which is being examined; the macrobehavior is not part of the metacontingency per se—only its cumulative effect is (as the CC). It would be imprecise to include this macrobehavior as *an element of* the organization’s metacontingency. Variables affecting the consumers’ macrobehavior would only be relevant if leading to changes in the cumulative effect that functions as CC for the target culturant. In that case, however, why not just directly describe those changes in the CC, the effective element of the metacontingency encompassing the target culturant?

Analyzing the consumers’ macrobehavior relevant to a culturant is basically a way of describing the schedule of occurrence of CCs. We can investigate and influence variables that affect these practices, but to do so is to go “outside” the metacontingency under investigation and explore a different phenomenon. In the experimental analysis of behavior, this would be like investigating *the experimenter’s* behavior of scheduling reinforcement for the rat’s lever pressing. This can be important, but we would not specify the experimenter’s behavior as part of the contingency of reinforcement arranged for the rat’s lever pressing. To say that variables controlling the consumers’ macrobehavior are not an integral part of a metacontingency, however, is not to dismiss them as irrelevant. Actually, the elaborated account of metacontingency underscores the need to consider the schedules of CC presentations and how they come to be due to consumer practices. However, for the sake of clarity, it is paramount that we distinguish the separate roles of the cultural milieu and how they relate to the metacontingency.

In sum, what is referred to as cultural milieu encompasses at least two functionally distinct classes of events: (a) antecedent variables affecting the culturant (the organization members’ activities), and (b) variables affecting the selecting environment or the consumer practices (members external to the organization responsible for producing CCs) (Fig. 1). Important to note: these two classes of events can affect two completely distinct groups of people. For instance, in a laboratory metacontingency experiment, the stimulus functions related to the experimental task work

differently for participants (responsible for culturants) and researchers (responsible for the delivery of CCs). The experiment by Smith et al. (2011) manipulated part of the cultural milieu as an independent variable. Specifically, they investigated the effects of two kinds of rules presented to dyads on the IBCs emitted by these dyads in response to different CCs. As a result, a condition with explicit, accurate instructions presented by the software produced higher rates of IBCs than conditions with implicit, inaccurate instructions or a condition without instructions. This experiment's independent variable does not relate to the arrangement of CCs, it only involves antecedent events relevant to the organization members (i.e., the dyad of participants).

We must clearly distinguish events affecting the behaviors involved in culturants from those relevant to the behaviors producing the CCs. Even if the events are identical and their functions are similar (e.g., motivating operations, rules), given they affect different behaviors, they are part of distinct behavioral relations and affect different elements of a metacontingency. Because of that, we should more explicitly distinguish them. We can do so by coining specific terms. We propose *cultural antecedents* and *selecting environment variables*, respectively. The term cultural antecedent is similar to the term CC, but specifies that it encompasses previous events or events present when the culturant is emitted. The expression selecting environment variables identifies events related to the selecting environment³ without specifying a temporal relation with the macrobehavior. Both elements could be further subdivided considering their functions on specific “parts” of the culturant and specific “parts” of the selecting environment. Still, we think that just distinguishing the two can be a valuable first step.

Verbal Behavior in Metacontingencies and Group-Rule Generation

Verbal behavior and rule-governed behavior are crucial elements of the concept of cultural milieu—and, therefore, to what we have called cultural antecedents and selecting environment variables in the previous section. The concept of *group-rule generation*, however, captures another role of verbal behavior in the dynamics of metacontingencies. The concept was first presented by Housmanfar et al. (2010) and then defined by Housmanfar et al. (2020) as “the cultural entity’s (e.g., organization) response to the practices of consumers, typically in the form of verbal rules crafted by those in power that may alter the cultural milieu and the socio-IBs” (p. 35). In this section, we will argue that: (a) group-rule generation is not an element of a metacontingency distinct from the culturant, but that it describes verbal components of the IBCs; and that (b) these verbal components are not present in all culturants but are especially important in more complex ones.

First, as suggested by the definition of Housmanfar et al. (2020), group-rule generation refers to activities produced *in/by the organization itself*, i.e., to the inner

³ We could have used the term consumer practices, but preferred to stick to the more consensual and broad term employed by Glenn et al. (2016).

workings of the culturant. Despite Houmanfar et al. treating group-rules as antecedents for the culturants, they are generated by the organization's members, thus being part of the culturant itself. Group-rules are verbal stimuli produced by individuals participating in the relevant IBCs and may be particularly relevant to explaining new variations of IBCs. Stimuli produced by some individuals' responses affect some other individuals' responses—the very definition of IBCs. When IBCs are composed of these critical verbal stimuli, IBCs cannot be appropriately characterized without them. In sum, group-rules are not another term in a metacontingency, as the culturant and the CC. They specify *parts of* IBCs. The main theoretical and practical benefit of the group-rule generation concept is to highlight the importance of *verbal components of IBCs* in the installation and especially the modification of cultural entities by some metacontingencies. However, for parsimony's sake and to maintain coherence with the terminology proposed by Glenn et al. (2016), we propose avoiding a new term that implies a necessary element of a metacontingency.

Our second point is that group-rule generation or—as we propose—the verbal components of IBCs are not present in all metacontingencies but seem especially significant when dealing with complex phenomena (cf. Sampaio & Andery, 2010; Tourinho & Vichi, 2012). Verbal interactions are not necessary for the selection of culturants by CCs (L. C. de Carvalho et al., 2018, 2019, 2020; Sampaio et al., 2013; Velasco et al., 2017). However, in metacontingencies involving many individuals and non-coincident AP and CC, it becomes crucial for the group to generate rules fostering the necessary adjustments in the IBCs. This idea has been put forward by different authors. Houmanfar et al. (2010), for instance, suggested that IBCs can be selected in two ways: (a) directly—when members of the organization have direct contact with the consumers (i.e., when IBCs directly contact the CC when AP and CC coincide) or (b) indirectly—when consumers only have contact with the AP, and not with members of the organization. In the latter situation, the selecting environment would affect the IBCs by way of group-rules that simultaneously alter the cultural milieu and the IBCs: “The consumer response to the [aggregate] product is then assessed by the organization and *rules (or policies) are generated about whether the [IBC]s ought to continue or not.*” (p. 93, italics added).

Similarly, Sampaio and Andery (2010) distinguished metacontingencies in which the CC affects IBCs *without* the mediation of other events—when AP and CC coincide—from metacontingencies in which the CC affects IBCs *with* the mediation of other events—when AP and CCs differ. In the latter case, the mediation can involve one individual participating in the IBCs describing the relations among IBCs, AP, and CC. For example, “a factory's environmental engineer could notice the damage caused to the environment [by the factory] and propose changes in production” (Sampaio & Andery, 2010, p. 188). Glenn et al. (2016) also explicitly discussed types of metacontingency in which AP was or was not redundant with CC. All these authors stressed the distinctions and peculiar dynamics involved in metacontingencies in which AP and CC coincide and in metacontingencies where they do not.

Regardless of the complexity of the metacontingency, if verbal interactions are part of the IBCs, they should be carefully and thoroughly analyzed. A few experiments already highlighted the fundamental role verbal interactions play in cultural selection, even in simple experimental arrangements (e.g., Ardila-Sánchez et al.,

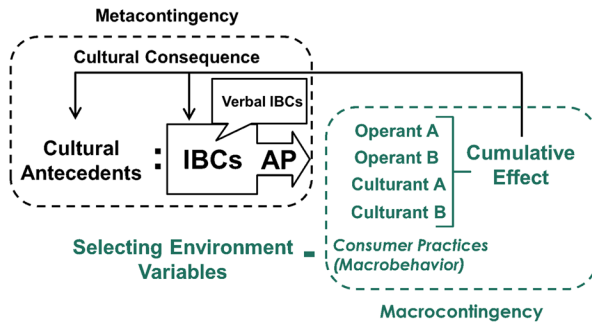


Fig. 2 The revised version of the elaborated account of metacontingency. *Note.* The cultural milieu is differentiated into cultural antecedents and selecting environment variables. Consumer practices are presented as a macrobehavior, the cumulative effect of which functions as cultural consequence in the metacontingency. Group-rules are treated as verbal components of IBCs

2020; Sampaio, 2020; Sampaio et al., 2013). Some form of instruction presented by one member to the rest of the group seems to be a facilitator of selection by metacontingencies, promoting the first emission of specific topographies of the culturant and the coordination of group responses. In sum, what is referred to as group-rule generation may be more simply dealt with as *verbal components of IBCs*, which are important to analyze whenever present, but are especially important in complex metacontingencies involving distinct APs and CCs.

Considering the importance of IBCs' verbal components and the distinction between cultural antecedents and selecting environment variables presented in the last section, we propose a revised version of the elaborated account of metacontingencies (Fig. 2). This revised version can be employed to analyze specific social phenomena, such as the one illustrated in the following section.

Analyzing Social Phenomena with the Revised Elaborated Account of Metacontingencies: The State University of Londrina's COVID-19 Psychological Support Project

The COVID-19 Psychological Support Project is an ongoing set of community services and research activities of the State University of Londrina (*Universidade Estadual de Londrina*, UEL), in Paraná, Brazil, that initially provided psychological care for the University Hospital (UH) staff and COVID-19 inpatients. The project started at the end of March 2020, when UEL's Research and Postgraduation Dean's Office vice chancellor and UH's Psychiatry Internship coordinator requested professors of the Department of General Psychology and Behavior Analysis (DGPBA) to indicate psychologists who could offer psychological support to UH COVID-19 inpatients and frontline care professionals. DGPBA professors volunteered and invited graduate students and clinical psychologists to provide this service. They promptly responded to the call and attended a kickoff meeting, in which they established an organization to offer psychological support. From this moment on, the

second author participated in this project. Then, two DGPBA professors and professors of another four departments registered a project at the Extension Dean's Office. The project includes the following workgroups: (a) psychological support/psychotherapy, (b) administrative, (c) assessment, (d) training, (e) psychoeducation, and (f) scientific. These workgroups were organized in three sectors (1) the leading sector, responsible for target audience intervention, comprising the psychological support and psychoeducation workgroups; (2) the assistance sector, responsible for offering products and services for the psychological support/psychotherapy and the assessment workgroups, and training and professional development for volunteer psychotherapists; and (3) the integration sector, comprising the scientific and administrative workgroups, responsible for integrating all workgroups.

In May 2020, three DGPBA professors registered at UEL's Research and Post-graduation Dean Office three related research projects titled "Mental health of health professionals, patients, and family members involved in the COVID-19 pandemic: Proposition, application, and evaluation of psychological interventions"; "Training of psychotherapists for online assistance to participants involved with COVID-19"; and "Development and evaluation of an application for psychological support: Covidsupport." A couple of months later, the project was expanded with the offer of psychological support to health professionals and families in all of Londrina's public hospitals (cf. *Suporte Psicológico – COVID19*, 2020a). Afterward, the project expanded to members and families of the local police force (cf. *Suporte Psicológico – COVID-19*, 2020b), the inclusion of which was demanded by a major of the army based in Londrina. By July 2020, the target public was again expanded to assist elderly citizens. At the beginning of 2021, the project also included face-to-face conversation circles for students and psychotherapeutic group sessions. Ultimately, the general population of Londrina and all UEL students could receive psychological support from the project. Finally, in 2022 the project changed its focus to support post-COVID patients, especially adolescents and adults. The coordinators decided this because post-COVID psychological problems are numerous (Perobal, 2022a, 2022b): people are struggling to continue living without lost relatives, to fit in new conditions with the end of isolation measures, and to search for new jobs.

A couple of months after its beginning, over 100 members participated in the six workgroups of the project. Besides the two coordinators (DGPBA professors), each workgroup included a manager, an advisor, and an assistant. The participants were graduate and undergraduate students, psychologists, psychiatrists, and designers. The workgroups meet periodically via online video conferencing. The coordinators managed, scheduled, and conducted the meetings to discuss psychological support, its effects and problems, and future activities. The members of the workgroups participated in an online messaging group that enabled constant contact and urgent information dissemination. Contacts and document exchanges were made via e-mail and a cloud storage platform. Workgroup members were allocated according to their competence, ability, interests, and availability. The managers were mainly responsible for organizing the interactions, intra and inter workgroups, planning and coordinating activities, decision-making, and monitoring the objectives and measures of each workgroup. Based on the rules presented by managers and coordinators, the advisors conducted the actions proposed and distributed tasks to assistants.

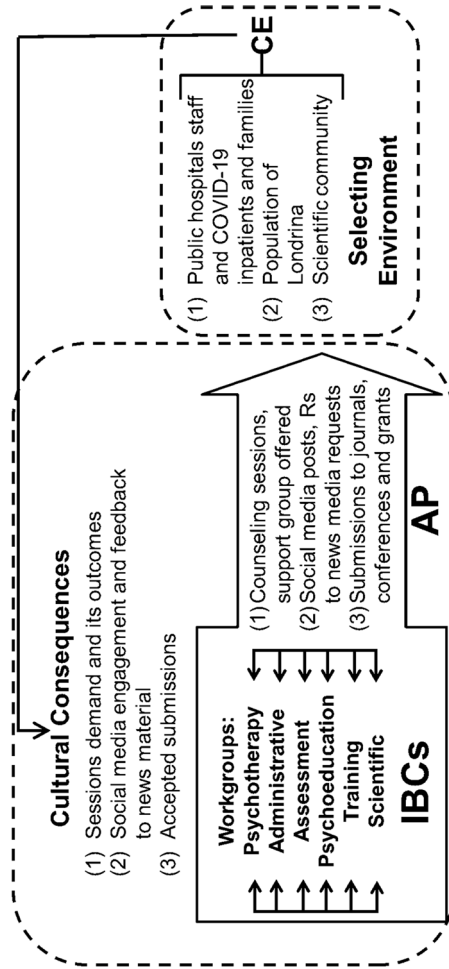


Fig. 3 Basic elements of the metacontingency involved in the State University of Londrina's COVID-19 Psychological Support Project. Note. IBCs, interlocking behavioral contingencies; AP, aggregate product; CE, cumulative effect. Based on Frighetto's (Frighetto, 2021) analysis and on the second author's participation and observations in the project

Based on culturo-behavior science and Ostrom's perspective regarding common-pool resources, Frighetto (2021) presented a descriptive analysis of how human resources are self-managed and shared between and among the project's workgroups. We can suggest the basic elements of the metacontingency involved in the project based on Frighetto (see Fig. 3). This metacontingency comprises IBCs encompassing the interrelations of six workgroups and their resulting APs. The project's primary AP was the offer of counseling sessions and support groups. The main selecting environment for this AP was composed of the public hospitals' staff, COVID-19 inpatients, and their families. This selecting environment produced session demand and its outcomes as cumulative effects. According to Balan et al. (2022), a total of 248 patients received psychological support until mid-2022. Related outcomes were directly measured by the Outcome Questionnaire (OQ-45; Lambert et al., 1996)—a measure of “subjective discomfort,” interpersonal relationships, and “social role performance”—and the Hospital Anxiety and Depression Scale (HADS; Zigmond & Snaith, 1983). Balan et al. evaluated the outcomes in three stages: (a) pre-intervention assessment, (b) post-intervention assessment, and (c) follow-up assessment—an average of two months after post-intervention. Stage 1 was performed by the therapists, who applied the instruments before the psychological support session(s) by sending online questionnaires. The study's researchers conducted Stages 2 and 3 by contacting the participants through instant messaging and online questionnaires. The two assessment instruments were answered by 137 participants in the pre-intervention stage, 53 in post-intervention, and 17 in follow-up assessments. The 53 participants who answered the pre- and post-assessment reported lower anxiety (HADS) and subjective discomfort (OQ45), but the effects on depression (HADS), interpersonal relationships, and social role performance (OQ45) were not significant. Balan et al. concluded that the psychological support offered by the project effectively reduced anxiety and subjective discomfort.⁴

Another set of the project's AP was developed mainly by the psychoeducational workgroup, which disseminated mental health care resources through Instagram and Facebook, responded to news media requests, and engaged in similar initiatives. One was the development of the mobile application *Suportecovid*, an instrument to train doctors, nurses, and other health professionals to manage environmental variables related to COVID-19. Psychotherapists and health professionals involved with the COVID-19 pandemic evaluated the app. The *Suportecovid* app will be applicable after the pandemic through minor changes. Also, the project produced psychoeducational material to guide hospital administrators in managing environmental variables that affect the mental health of the workers under their responsibility. The contents were prepared based on material developed by the Oswaldo Cruz Foundation and the Brazilian Psychological Society

⁴ Considering the high numbers of COVID-19-patients and deaths in the city during the study, additional psychological intervention would be necessary for some participants. When results of the OQ-45 and HADS were indicative of clinical significance in the post-intervention assessment, based on the instruments' criteria, the clients were directed to more counseling sessions. Even after Balan et al. (2022) finished the study, the assessment procedure continued for all participants of the support sessions to continuously evaluate the project's intervention.

about how to act in a stressful situation. The material produced was made available online and through posters posted at the hospitals. All these outcomes were received by the general population of Londrina producing social media engagement (e.g., increasing the number of followers and likes on the project's social media pages) and feedback from published news material (e.g., direct messages and comments received by project members).

Finally, the entire project's IBCs, especially those involved in the scientific workgroup, produced submissions to journals, conferences, and grants. The scientific community received these APs and generated CCs related to them, such as three student scholarships, published articles (e.g., Balan et al., 2022; Borloti et al., 2020; Haydu et al., 2022; Zanqueta et al., 2020), and conference abstracts (e.g., de Souza et al., 2020; Haydu et al., 2021; Sabino et al., 2021).

To expand into a revised elaborated account of the metacontingency, we suggest relevant cultural antecedents affecting the project members and selecting environmental variables. A first cultural antecedent was the requests to DGPBA professors from the Dean's Office vice chancellor and UH's Psychiatry Internship coordinator that prompted the start of the project. We may suggest that similar projects may never get started if not prompted by relevant external agents such as those. Following the project registration, the coordinators received requests from the community outside the university to provide psychological support for other public hospitals and the police force, which led to the expansion of the project. The psychological problems produced by the pandemic affected the hospital staff and the police force families, so the project also included psychological support for them. At the same time, traditional media (TV, radio, and newspapers) required materials produced by or with the participation of project members. All these requests indicated that hospitals' staff, COVID-19 inpatients, and their families, but also the general population of the city of Londrina (selecting environment parts [1] and [2] in Fig. 3), would favorably receive APs such as counseling sessions and information related to COVID-19 (APs [1] and [2] in Fig. 3).

A second cultural antecedent involved national, state-level, and local safety protocols related to social distancing and professional regulations related to psychological counseling and online psychotherapy (Resolution 04/2020 by the Conselho Federal de Psicologia, 2020). These directives indicated the form in which counseling sessions and information could be delivered remotely. They also prompted psychotherapists training to intervene remotely through brief therapy protocols and relates to the initial low demand for the project services from both UH inpatients and professionals—they expected to receive in-person psychotherapy. The psychoeducational workgroup then created a subgroup—the communication team—responsible for publicizing the project's objectives in traditional media (radio, television, and newspaper). They also initiated pages on Instagram (Suporte Psicológico UEL - COVID 19, n.d.-a) and Facebook (Suporte Psicológico UEL - COVID-19, n.d.-b), which disseminated weekly educational content (posts and videos) related to mental health and the pandemic. Besides this, they inform about the offer of psychological support. Publishing on social media, interacting with Facebook and Instagram followers, and publishing in newspapers, radio, and TV produced increased demand and social recognition for the project.

News about the COVID-19 pandemic and broader governmental and institutional measures were surely important to motivate all the project members. This cultural antecedent involves events such as: WHO defining COVID-19 as a pandemic (Sistema Universidade Aberta do SUS, 2020); news regarding the COVID-19 pandemic and the health system capacity in Brazil (e.g., increasing new COVID-19 cases and deaths, overcrowded hospitals, lack of essential equipment and intensive care units—M. N. de Carvalho, 2020); fake news dissemination (World Health Organization, 2020a); official communications to support mental and psychosocial well-being (World Health Organization, 2020b); SARS-CoV-2 prophylaxis, therapy and vaccine development (World Health Organization, n.d.); and the mandatory use of personal protective masks (Law 13,979, of February 6, 2020; Atos do Poder Legislativo, 2020). Important to note, all these events were also affecting hospital staff, the scientific community, and the general population of Londrina; that is, they also acted as relevant selecting environment variables, but with distinct functions. As cultural antecedents they prompted UEL staff to start, expand and maintain the project, while as selecting environment variables, they prompted UH staff and the general population to search for and demand intervention such as the one offered by UEL.

Finally, it is worth noting relevant verbal components of IBCs that seemed to be involved: (a) the administrative workgroup generated rules that described the project's general organization to other workgroups; (b) project members engaged in monthly online meetings to report completed activities, measured outcomes and to discuss future actions of each workgroup; (c) the scientific workgroup produced reports suggesting improvements to the psychological support/psychotherapy workgroup; and (d) constant online messaging maintained the coordination of all workgroups. As a detailed example, the following are three verbal IBCs related to the psychological support/psychotherapy workgroup:

1. Members of the workgroup met regularly to discuss each member's functions and receive information on the project rules and adjustments. For example, one adjustment was made based on the report given by the administrative workgroup about the expansion of the project to include members of the police and their families, which altered the inclusion criteria and the psychological psychotherapy/support workgroup agenda (Google Calendar).
2. The therapists made appointments for the counseling sessions, which could be sought spontaneously by HU servers or could be carried out through HU psychiatry resident's referral. The scheduling occurred based on the availability of the members of the psychological support/psychotherapy workgroup and members of the psychoeducation workgroup publicized the opening hours.
3. The therapists asked clients to sign informed consent terms, to notify the scientific workgroup which data could be included in the psychological intervention evaluation research.

These verbal IBCs were evolving throughout the project's development and as new members were added. For example, the first two IBCs above were present

since the beginning of the project, but others, such as the last verbal IBC mentioned, were added after the research project registration at UEL's Research and Postgraduate Dean's Office.

Conclusions: Theoretical and Methodological Implications

In this article, we propose revisions to the elaborated account of the metacontingency. Clearly distinguishing between cultural antecedents and selecting environment variables—instead of subsuming both in the concept of cultural milieu—is fundamental to specify which contextual events influence the culturant and which influence the selecting environment. Referring to verbal components of IBCs instead of group-rule generation emphasizes that verbal behaviors and rule-governed behaviors are major components of the culturant in most human social phenomena. These revisions should help us more precisely describe relevant social phenomena such as UEL's COVID-19 Psychological Support Project. Furthermore, the revision allows for designing related experiments, implementing applied research regarding the role of verbal behavior in cultural selection, and proposing more valuable and efficient interventions.

The UEL's COVID-19 Psychological Support Project is a metacontingency developed during the COVID-19 pandemic. An important initial cultural antecedent was the requests to DGPBA professors from the Dean's Office vice chancellor and the UH's Psychiatry Internship coordinator. The project comprises IBCs that encompass members of the six workgroups and have produced several APs (e.g., psychological support to citizens, development of psychoeducational material to guide hospital managers and to inform the general population, an app to support medical staff, scientific publications, conferences presentations, and scholarship for students). The selecting environment comprises the public hospitals' staff, COVID-19 inpatients and their families, the city general population, and the scientific community. This selecting environment maintains the project's practices by seeking assistance, interacting in social networks, searching for reports in traditional media, accepting submitted scientific articles, and offering scholarships and social recognition, among others. Only by carefully accounting for each element of this metacontingency can the project's coordinators better guarantee a continuous and effective intervention for the population.

The proposed revised elaborated account of metacontingency should, of course, be experimentally evaluated and refined. To experimentally manipulate cultural antecedents, for instance, researchers must present different stimuli to the participants composing the culturant and measure its effects. These stimuli can be instructions regarding criteria to produce CCs (e.g., Smith et al., 2011) or non-verbal stimuli related to different magnitudes or frequencies of CCs presentation (e.g., Azevedo & Todorov, 2016). Researchers should more thoroughly explore these or alternative strategies.

As for the selecting environment, metacontingency lab experiments conducted so far operationally define it as the presentation by experimenters of CCs for culturants emitted by dyads, triads, or quartets. Within such procedures, one cannot

manipulate selecting environment variables directly. To do that, the unit of analysis should change to the macrobehavior composing the consumer practices, implying a different experimental arrangement. The whole complexity of this phenomenon could only be captured by employing a set of participants emitting a specified cultural and a *second set of participants* who would receive the AP generated by the first set and emit responses whose combined effects produced, by its turn, a CC for the first set of participants.

Finally, many metacontingency experiments measured verbal components of IBCs, but less frequently directly manipulated them (e.g., Ardila-Sánchez et al., 2020; Leite, 2009; Sampaio, 2020). The manipulations, furthermore, have been limited to the permission or prohibition for the participants to chat (for a review, see Fonseca et al., 2022). The possibilities for future research in this area are ripe. Confederates could be used to present previously determined instructions (e.g., Leite, 2009), different communication media (e.g., presential, videoconferencing, audio only) could be compared, and the employment of only predetermined verbal stimuli (e.g., emoji, short sentences) could be evaluated.

All of these are areas demanding further investigation. The resulting data can be essential to a more comprehensive theoretical perspective on the cultural selection involved in metacontingencies. We need a consistent, clear, and specific set of terms dealing with how culture evolves to nurture the development and evaluation of social interventions such as UEL's COVID-19 Psychological Support Project.

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Data Availability Data sharing is not applicable to this article as no datasets were generated or analyzed during the current study.

Declarations

Conflict of Interest The authors declare that they have no conflict of interest.

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