EDITORIAL

RUNNING HEAD: Reversal Theory and Physical Activity

Reversal Theory as a Complementary Perspective on Moment-to-Moment Variations in Motivation for Physical Activity

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Author Note

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INTRODUCTION

Regular physical activity (PA) is a cornerstone of physical and mental health, yet sustained engagement remains challenging for a substantial proportion of adults worldwide (1). In this context, the recent review by Gerber et al. (2) provides an integrative synthesis of psychological, neurobiological, and evolutionary perspectives on PA motivation. By bringing together multiple theoretical traditions and linking them to underlying physiological systems, Gerber et al.'s review offers an updated resource for researchers seeking a comprehensive account of why people (fail to) engage in PA. The breadth of this synthesis also naturally opens space for complementary perspectives that emphasize aspects of motivation not easily captured by trait-like constructs or physiological states and systems.

In this Editorial, we introduce Reversal Theory (RT) as one such complementary framework. RT is a state-and-transition model of motivation that focuses on why motivational orientations shift within individuals over short time scales and on how understanding these shifts may help in designing effective intervention paradigms, particularly just-in-time adaptive interventions (JITAIs).

REVERSAL THEORY AND MOTIVATIONAL STATES

Reversal Theory (RT) proposes that individuals move dynamically between pairs of mutually exclusive metamotivational states, each associated with distinct values, preferences, and experiential qualities (3). Although RT comprises four such pairs (telic–paratelic, conformist–negativistic, mastery–sympathy, and autic–alloic), the telic–paratelic pair has received the most attention in PA and exercise contexts (4) and is therefore used here as an illustrative case. In the telic state, individuals are goal-oriented and future-focused. Activities are evaluated primarily in terms of their instrumental value, and outcomes such as health improvement, performance gains, or productivity are salient. In contrast, the paratelic state is characterized by a present-focused, activity-oriented mindset in which enjoyment, playfulness, and immediate experience are prioritized over distal consequences.

In addition to these differences in goal orientation, the telic and paratelic states are defined by contrasting preferences for arousal (5, 6). In the telic state, individuals prefer relatively low levels of arousal, with heightened arousal often experienced as unpleasant, anxiety-provoking, or aversive (5). Conversely, the paratelic state is associated with a preference for high levels of arousal, which are experienced as exciting, energizing, and

intrinsically rewarding (5). This has been empirically corroborated in relation to patterns of color preference, with consistent observations that hot colors (e.g., red, orange, which tend to increase arousal) are preferred within the paratelic state, whereas cool colors (e.g., blue, indigo, which tend to decrease arousal) are preferred when the telic state is operative (6). This arousal-preference principle is especially relevant to PA behavior, as PA can be performed at varying levels of intensity, thus resulting in more or less important changes in arousal.

A central idea of RT is that people repeatedly switch back and forth (i.e., "reverse") between the telic and the paratelic states (3-5). The time spent in each state may be brief, as reversals can occur very rapidly due to one of three primary mechanisms (3-5). Contingency-triggered reversals take place in response to sudden contextual changes (e.g., unexpected challenges or rewards). Satiation reflects an intrinsic tendency for prolonged occupation of one state to eventually induce a shift to its opposite. Finally, frustration-based reversals arise when goals central to a given state are persistently blocked. These mechanisms provide a principled explanation for the rapid motivational shifts commonly observed in everyday PA behavior and align well with examples discussed by Gerber et al., such as momentary high desire or high aversion to move.

FROM MOTIVATIONAL STATES TO ADAPTIVE INTERVENTION DESIGN

Just-in-time adaptive interventions (JITAIs) aim to deliver support at moments when individuals are most receptive and in forms that are most likely to be effective (7). Much of the existing JITAI literature focuses on when to intervene with a goal of maximizing receptivity and minimizing burden for participants (8).

RT suggests an additional and complementary question: what kind of intervention content is most congruent with a person's current motivational state? From this perspective, receptivity to intervention content is shaped not only by timing but also by the individual's momentary tolerance for, or desire for, arousal. Because PA elevates arousal in a greater or lesser extent, interventions that fail to match with state-dependent arousal preferences may inadvertently undermine motivation. When individuals are in a telic state, prompts that implicitly signal high intensity or high stimulation may be experienced as aversive, even if they align with valued long-term goals. Conversely, in a paratelic state, the same kind of signal may be welcomed and actively sought.

A state-contingent JITAI informed by Reversal Theory should therefore attach particular importance to the implied intensity and/or experiential quality of activity suggestions, aligning them with whether low-arousal regulation or high-arousal stimulation is momentarily preferred. Figure 1 schematically illustrates how telic and paratelic states, their associated indicator (color preference), and the principal reversal mechanisms proposed by RT can be mapped onto JITAI design elements.

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TOWARD A TESTABLE RESEARCH AGENDA

As evidenced by Figure 1, several research propositions with implications for PA promotion can be derived. As a priority, micro-randomized trials should compare the effects of state-congruent *versus* standard PA prompts among low-active people being in the telic or in the paratelic state on subsequent PA engagement. For instance, at repeated points in time, people identified as being in the paratelic mode could be randomized to receive either paratelic-congruent (e.g., *Ready for a quick run? Try 10 minutes of fast-easy intervals, 30s brisk-30s easy. See how energized you feel*) or standard prompts (e.g., *Any movement counts – try to be active for a few minutes*) allowing estimation of state-congruent effects on proximal PA. Such designs would provide a rigorous test of whether alignment between motivational state, arousal preference, and intervention content enhances short-term engagement. In addition, future studies could also determine whether telic or paratelic indicators can compete with well-established affective constructs such as anticipated affect (9, 10) in predicting short-term PA engagement.

CONCLUDING REMARK

Gerber et al. (2) emphasize that PA motivation arises from a complex interplay of evolutionary/biological, affective, psychological, and contextual mechanisms. RT contributes an additional layer by characterizing how within-person motivational shifts influence engagement in PA over time, offering actionable insights for both research design and practical intervention.

AUTHOR CONTRIBUTIONS

Fabien D. Legrand: conceived the editorial, drafted manuscript, edited and revised manuscript, approved final version.

Joanne Hudson: edited and revised manuscript, approved final version.

Ryan E. Rhodes: edited and revised manuscript, approved final version.

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157 **FIGURE**

158 **Figure 1.** Conceptual principles from Reversal Theory (green box) and their translation into

159 testable hypotheses for micro-randomized trials in physical activity promotion (red box).

160 *Please insert Figure 1 right before the section entitled* **TOWARD A TESTABLE RESEARCH**

161 **AGENDA** *(page 4 Line 99 in the present document)*

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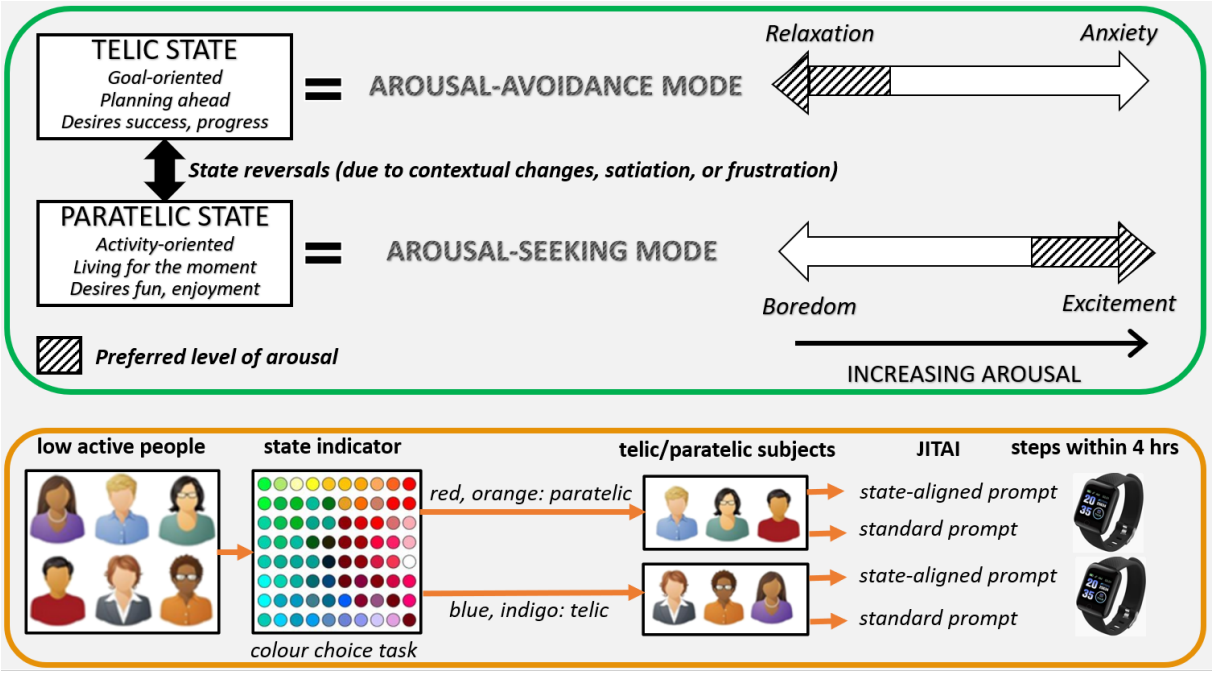

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