

Regulatory Mode Profiles and the Organization of the Flow of Time

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Abstract

Background: Individuals strive after goals through regulatory modes of assessment and locomotion. The independent inter-relationship between these two modes implies four profiles: assessor (i.e. high in assessment/low in locomotion), low regulator (i.e. low assessment/low locomotion), high regulator (i.e. high assessment/high locomotion), and locomotor (i.e. low assessment/high locomotion). We investigated the way individuals with different profiles organize the flow of time (i.e. past, present, and future) in order to explore how the outlook on time might be associated to changes in regulatory mode.

Method: High school pupils and university Students (N=522) answered to the Self-regulatory Mode Questionnaire and Zimbardo Time Perspective Inventory.

Results: The regulatory mode profiles had a significant effect on the five time perspective dimensions ($F(15, 1548)=14.66, p<0.001, Pillias' Trace=0.37$). Comparisons between individuals who differed in one regulatory mode but where similar in the other suggested that high levels of past positive and low levels of past negative were associated to low assessment when locomotion was high and to high locomotion when assessment was low. High levels in the future time perspective dimension were related to high levels of locomotion when assessment was high, while low levels of past negative were related to low assessment when locomotion was low.

Conclusion: The results illustrate the complexity of a dynamic system of regulation in which the same antecedents can lead to different outcomes (i.e. multi-finality) and different antecedents can lead to the same outcome (i.e. equifinality). Although only theoretical, this gives an idea of how some leaps might be abrupt as a quantum leap (i.e. extremely different profiles), while others might be serial (i.e. from one profile to another profile that shares the same level in one regulatory mode but that differs in the other).

Keywords: Assessment; Complex dynamic systems; Locomotion; Motivation; Person-centred approaches; Regulatory mode; Time perspective

Introduction

"Nonlinear interactions almost always make the behaviour of the aggregate more complicated than would be predicted by summing or averaging." John Henry Holland

Regulatory mode theory [1-4] suggests that individuals approach goals by pondering about different ways and their own capability to reach that goal (i.e. assessment) and by putting things into motion by simply starting and keep doing the behavior (i.e. locomotion). These two modes of behavior regulation support and constrain each other [5-7], but are theorized as essentially independent [4]. The independent inter-relationship between these two regulatory modes

implies that individuals do not only differ in assessment and locomotion between each other but also within themselves (cf. [8,9]). Specifically, because the regulatory mode system is a complex dynamic system it needs to be seen as a whole-system unit. Whole-system units are best studied by analyzing patterns of information or profiles [10]. In theory, there should be a myriad of probable patterns of combinations of peoples' levels of assessment and locomotion. However, at a large-scale level, there should be a small number of more frequently observed patterns or common profiles [10,11] (see also [12] for an explanation on personality as nonlinear dynamics in complex adaptive systems). In other words, although the possible variations of regulatory mode profiles are many, locomotion and assessment are best seen as part of a non-linear dynamic system [13] that respond to the laws of attractor states¹, which are essential for the understanding of most physical and human phenomena [14] (see also [15]).

¹ Fixed points, or steady states of a given dynamical system; these are values of the variable that don't change over time. Some of these fixed points are attractive, meaning that if the system starts out in a nearby state, it converges towards the fixed point (https://en.wikipedia.org/wiki/Dynamical_systems_theory).

In this line of thinking, some individuals might have an assessor profile (i.e. high in assessment/low in locomotion) and others a locomotor profile (i.e. low assessment/high locomotion). Additionally, the independent inter-relationship of this regulatory system also implies the probability that some individuals have a low regulator profile (i.e. low assessment/low locomotion), yet others have a high regulator profile (i.e. high assessment/high locomotion). The usefulness of this regulatory profiles model is that it helps to understand the dynamics within the system as well (cf. [8,16]) for example, it allows the investigation of research questions such as: in which conditions do individuals who are similar in one regulatory mode but that diverge in the other mode differ from each other in specific phenomena that also influences goal-achievement? This is important because a person is not only adapting to the environment or the goals to be achieved through her/his behavior regulation, but also to the regulatory mode and other psychological phenomena within her/him (cf. [13]).

The way humans organize the flow of time (i.e. past, present, and future) has been suggested as an important psychological phenomenon for goal-achievement. Humans' seem to organize time in five dimensions: (1) past negative which reflects a pessimistic attitude toward the past, (2) past positive reflecting a sentimental and positive view of the past, (3) present fatalistic which reflects a lack of hope and control for the future, (4) present hedonistic reflecting the desire of experiencing pleasure with slight concern for future consequences, and (5) future which reflects the ability to find reward in achieving specific long-term goals [17]. A balanced time perspective (i.e. low past negative, high past positive, low present hedonistic, and high future) is suggested as necessary for the experience of well-being and a good life [18,19]. A person's way of organizing the flow of time does indeed predict the reported use of alcohol, drug, and tobacco [20], risky driving [21], indecision and avoidant procrastinations [22], environmental engagement [23], the choice of food and of partner, educational achievement, and the distinctness of future goals [17].

The Present Study

We investigated if individuals differ in the way they organize time depending on their regulatory mode profile. By scrutinizing differences between individuals that match in one regulatory mode and differ in the other, we can make simulations of profile changes that can be expected when individuals fluctuate in their way of organizing the past, the present, and the future.

Method

Participants and procedure

A total of 579 individuals were recruited from a University and two high schools in the west of Sweden (207 males, 367 females, and 5 who did not report their gender, mean age 21.90 years SD=6.42 years, with a range of 17 to 69 years). The university students were psychology undergraduates who were asked to fill out the survey after a lecture. The high school pupils were from a medium size technical high school with a "computer-profile" and from a high school located in a small city in the western side of Sweden. A total of 57 individuals left too many items unanswered. This left a final sample of 522 valid respondents. This is a sub-sample from data used in one published study [19] and the same sample used in one unpublished study [24].

Nevertheless, the analyses conducted here have not been published elsewhere.

Measures

Regulatory mode

The two regulatory modes, assessment and locomotion, were measured using the Regulatory Mode Questionnaire [1]. A 30-item (12 for each mode and 6 for a lie scale) instrument with a 6-point Likert scale (e.g. assessment: 'I often critique work done by myself or others'; locomotion: 'I am a "doer"'). The Swedish version has been used in previous studies (e.g. [25,26]). In the present study Cronbach's alpha were 0.75 for assessment and 0.74 for locomotion. Although participants responded to the whole instrument, the lie scale score was no used in the analyses.

Time perspective

The Zimbardo Time Perspective Inventory [17] consists of 56 items that measure the five time dimensions: past negative (e.g. 'I think about the good things that I have missed out on in my life'), past positive (e.g. 'It gives me pleasure to think about my past'), present fatalistic (e.g. 'Fate determines much in my life'), present hedonistic (e.g. 'Taking risks keeps my life from becoming boring'), and future (e.g. 'I believe that a person's day should be planned ahead each morning'). The Swedish version has been used in previous studies (e.g. [18]). Cronbach's α in the present study was 0.85 for past negative, 0.72 for past positive, 0.63 for present fatalistic 0.76, and for present hedonistic, and 0.70 for future.

Statistical treatment

The regulatory mode profiles were created by dividing participants' self-reported assessment and locomotion scores into high and low using a median split. This resulted in the following regulatory mode profiles: 131 individuals with assessor profile, 144 individuals with a low regulator profile, 137 individuals with a high regulator profile, and 128 individuals with a locomotor profile.

Results

One Multivariate Analysis of Variance was performed using the five time perspective dimensions (i.e. past negative, past positive, present fatalistic, present hedonistic, and future) as the dependent variables. The participants' type of regulatory mode profile (i.e. assessor, low regulator, high regulator, and locomotor) was the independent variable. The regulatory mode profiles had a significant effect on the five time perspective dimensions ($F(15,1548)=14.66, p<0.001$, Pillai's Trace=0.37). The profiles differed in the following time perspective dimensions: past negative ($F(3,518)=26.59, p<0.001$), past positive ($F(3, 518)=8.39; p<0.001$), present fatalistic ($F(3,518)=4.09; p<0.01$), and future time ($F(3,518)=42.01; p<0.001$).

Comparisons between individuals at the extremes of the model (i.e. who differed in both regulatory modes) showed that individuals with a locomotor profile scored higher than individuals with an assessor profile in the past positive and future dimensions and lower in the past negative and present fatalistic dimensions. Additionally, compared to individuals with a low regulator profile, individuals with a high regulator profile scored higher in the past negative and future time perspective dimensions.

Comparisons between individuals who differed in one regulatory mode but were similar in the other (i.e. within differences) suggested that high levels of past positive and low levels of both past negative and future were associated to low assessment when locomotion was high (high regulator vs. locomotor). High levels of past positive and future and low levels of both past negative were associated to high locomotion when assessment was low (low regulator vs. locomotor).

High levels in the future time perspective dimension were related to high levels of locomotion when assessment was high (assessor vs. high regulator), while low levels of past negative were related to low assessment when locomotion was low (assessor vs. low regulator). See Table 1 for all the details when diametrically different profiles and within differences were investigated.

	Assessor	Low Regulator	High Regulator	Locomotor
Past Negative	3.26 ± 0.71LR ^{***} ,L ^{***}	2.81 ± 0.70 L ^{***}	3.08 ± 0.77LR [*] , L ^{***}	2.51 ± 0.64
Past Positive	3.26 ± 0.71	3.38 ± 0.64	3.40 ± 0.76	3.68 ± 0.62A ^{***} , LR ^{**} HR ^{**}
Present Fatalistic	2.50 ± 0.58L ^{**}	2.40 ± 0.48	2.36 ± 0.57	2.27 ± 0.47
Present Hedonistic	3.11 ± 0.42	3.11 ± 0.47	3.19 ± 0.53	3.24 ± 0.50
Future	3.06 ± 0.56	2.97 ± 0.47	3.58 ± 0.47A ^{***} , LR ^{***} ,L ^{**}	3.37 ± 0.47A ^{***} ,LR ^{***}

Note: *p<0.05; **p<0.01; ***p<0.001. A=higher compared to the assessor profile; LR=higher compared to the low regulator profile; HR=higher compared to the high regulator profile; L=higher compared to the locomotor profile.

Table 1: Means and standard deviations (±) in the five time perspective dimensions for individuals with different regulatory mode profiles.

Discussion

The results illustrate the complexity of a dynamic system of regulation in which the same antecedents can lead to different outcomes (i.e. multi-finality) and different antecedents can lead to the same outcome (i.e. equifinality) (cf. [27]). For example, an outlook on the flow of time comprising a less pessimistic attitude toward the past (low past negative) and a more sentimental and positive view of the past (high past positive) was here associated to changes to a locomotor profile (low assessment/high locomotion) from either a high regulator profile (high assessment/high locomotion) or a low regulator profile (low assessment/low locomotion). That is, the same time perspectives, but different outcome profiles (i.e. multi-finality). On the other hand, increases in the ability to find reward in achieving specific long-term goals (high future) lead to a locomotor profile when the individual has a low regulator profile, while decreases lead also to a locomotor profile when the individual has a high regulator profile. That is, different time perspectives, but the same outcome profile (i.e. equifinality) (Figure 1).

In the present study, we have addressed time in relation to the individuals' perspective on it. That is, the way human beings organize the flow of time as past, present, and future. Time, however, is also a quantifiable resource that can be handled as money, it can be saved or lost or rather effectively managed or mismanaged [28,29]. As accurately pointed out by Kruglanski, Pierro, and Higgins [28] individuals high in locomotion act quickly, multitask and refrain from procrastination, that is, for people in this mode, time is a resource. Nonetheless, their eagerness to keep "just doing it" and moving forward does influence how they organize the flow of time [28]. They are suggested as future oriented, having little or no preoccupation with the past [28], and as shown in the present study, they tend to contemplate past experiences as well. That being said, the results here cast a shed of grey on this notion. High levels of locomotion were indeed related to the individual's ability to find reward in achieving specific long-term goals (i.e. high scores in the future time perspective dimension), but only when the locomotor profile (low assessment, high locomotion) was compared to the assessor profile (high assessment,

low locomotion) or the low regulator profile (low assessment, low locomotion). In contrast, individuals with a high regulator profile (high assessment, high locomotion) scored actually higher in the future time perspective dimension than those with a locomotor profile. We suggest that the ruminative nature (i.e. high assessment) combined with the eagerness to keep moving (i.e. high locomotion) in individuals with a high regulator profile makes them to aim for the future more than individuals with a locomotor profile do. Nevertheless, they seem to have a dark reminiscence of the past and both a pessimistic (high past negative) and a less sentimental and positive view of the past (low past positive), at least compared to those with a locomotor profile. They probably try to not make past mistakes, which makes them more future oriented than individuals with a locomotor profile. Nevertheless, individuals with a locomotor profile do present a more balanced time perspective.

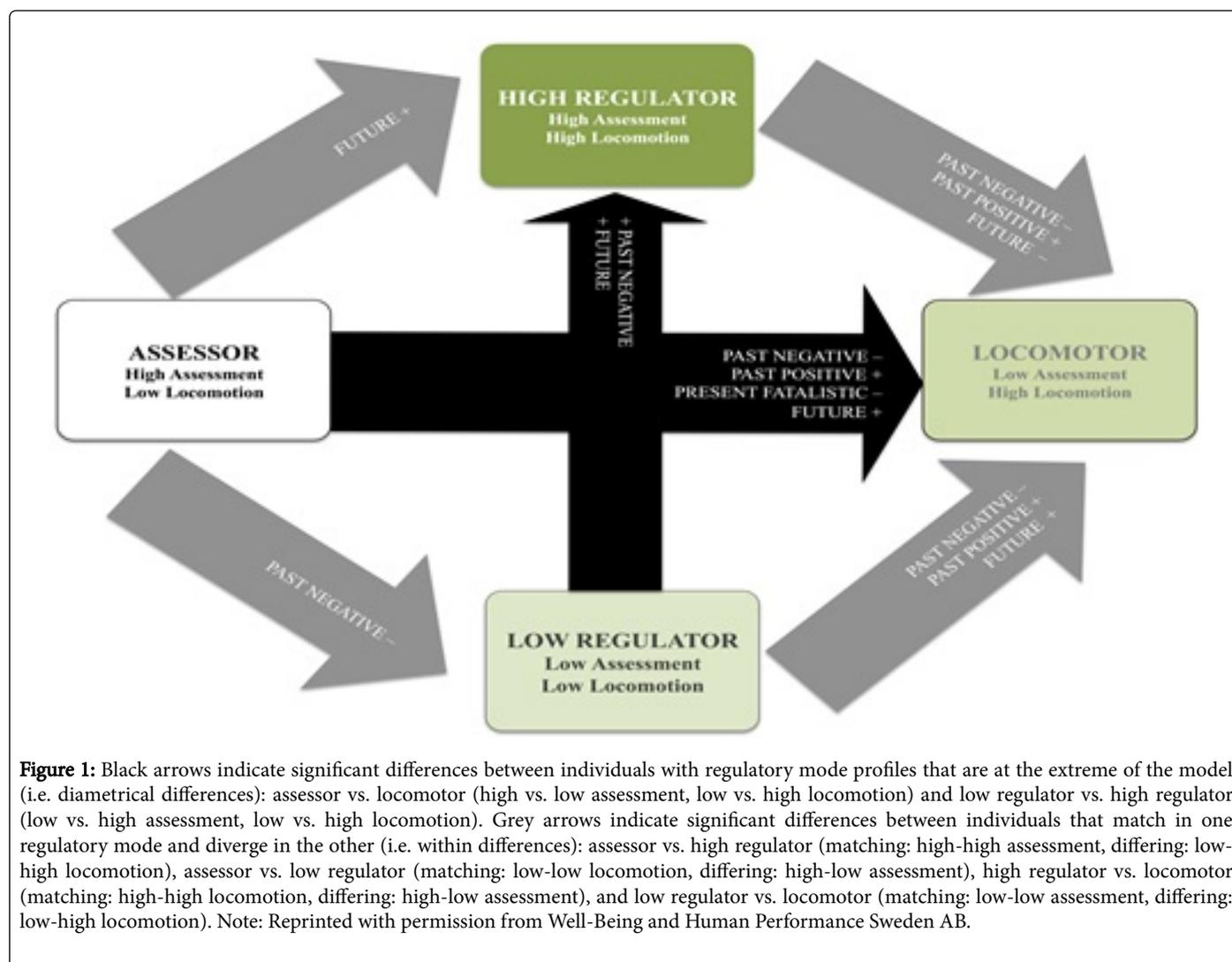
Limitations, Suggestions for Future Research, and Applications

Some important limitations are the fact that the present study was cross-sectional and that the data is self-reported and therefore subject to personal perceptual bias. Thus, the expected changes in profile remain theoretical. Replication and longitudinal studies should therefore be the next step. In addition, future studies should be conducted by controlling for demographics, such as, education, age, and gender. Intervention studies should also be pursued. Person-centered well-being interventions, for instance, have been recently developed (<http://anthropedia.org>). This specific type of intervention targets character development using evidence-based techniques centered around a ternary or triune structure of character: self-directedness (i.e. the person's view and relation to the self), cooperativeness (i.e. the person's view and relation to others), and self-transcendence (i.e. the person's view and relation to nature, spiritual order, and the universe as a whole) [13]. For instance, the notion of a triune character model as measured by the Temperament and Character Inventory is related to psychophysiological coherence, a state of calm alertness that occurs naturally with sustained positive emotions and can be induced by slow and deep breathing [30]. A more

mature and developed character is associated with greater parasympathetic activity resulting from mature emotional self-regulation associated with an outlook of unity, connectedness, and harmony with one's self, others, and the world as a whole [13,31,32]. Hence, character is indeed a regulator of behavior that probably covers both assessment and locomotion. Studies investigating the effect of person-centered well-being interventions (i.e. well-being coaching) on sustainable personal development are now under elaboration and under their way in Swedish settings, such as, schools, hospitals, and primary care clinics [33] (<http://ltblekinge.se/Forskning-och-utveckling/Blekinge-kompetenscentrum/Forskning-och-Utveckling-FoU/projekt2/externa-projekt/hallbar-personlig-utveckling/>).

The idea of empowering or enabling individuals is an essential ingredient of effective health care [34-37]. In this context, the partnership between the patient and health professionals offers the

opportunity to empower patients to make self-directed choices about their health [34,35,37]. Analogical to care management [34,35], teachers and students' relationship is an opportunity to empower youth to excel in academic achievement but more importantly to teach practices for their personal development through the life span and not just only for grades [38-41]. For instance, while students' level of assessment is positively related to their grade point average, their well-being is even more strongly associated to their grades [26,42]. In this context the Science of Well-Being [13] serves as a guide with principles and practices that help people live a healthy and happy life or to answer the question of what does it take to cultivate lasting well-being. When students are more informed, involved, and empowered to answer this question, they will make intuitive and practical decisions about their own education and life as a whole [39].



Conclusions and Final Remarks

Our study shows the value of using models that are person-centered when investigating differences between individuals. We could simulate/predict the “movement” or how different outlooks on the organization of the flow of time might “push” an individual with one type of regulatory mode profile over to another profile. Although only

theoretical, this gives an idea of how some leaps might be abrupt as a quantum leap (i.e. from one profile at the extreme of the model to the other extreme: black arrows in Figure 1), while others might be serial (i.e. from one profile to another profile that shares the same level in one regulatory mode but that differs in the other: grey arrows in Figure 1).

“That which is in locomotion must arrive at the half-way stage before it arrives at the goal.”

Aristotle

“The only real valuable thing is intuition”

Albert Einstein

Competing Interests

Dr. Danilo Garcia is the Director of the Blekinge Center of Competence, which is the Blekinge County Council's research and development unit. The Center works on innovations in public health and practice through interdisciplinary scientific research, person-centered methods, community projects, and the dissemination of knowledge in order to increase the quality of life of the habitants of the county of Blekinge, Sweden. He is also an Associate Professor at the University of Gothenburg and together with Professor Trevor Archer and Associate Professor Max Rapp Ricciardi, the leading researcher of the Network for Empowerment and Well-Being. Erik Lindskär is a research assistant at the Blekinge Center of Competence and a member of the Network for Empowerment and Well-Being.

Author Contributions

Danilo Garcia conceived and designed the experiments, performed the experiments, analyzed the data, wrote the paper, prepared figures and/or tables, reviewed drafts of the paper.

Erik Lindskär wrote the paper, reviewed drafts of the paper.

Data Availability

The raw data is available upon request to the Network for Empowerment and Well-Being, lead researcher Danilo Garcia: <http://ltblekinge.se/Forskning-och-utveckling/Blekinge-kompetenscentrum/Summary-in-English/>.

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