

# Insights Into Physical Activity Adoption in Diabetes Patients: When Cultural Materialism Met the Transtheoretical Model

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## Research Article

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## Abstract

# Background

Although physical activity (PA) is a key behaviour for preventing and controlling diabetes (T2DM), low adoption-adherence continues to impair patient progress. Importantly, for many patients, intentional PA may have never been central to their wider cultural context. Therefore, progress in behaviour change may be more about collective than individual processes. The aim of this study was to identify barriers to undertake and maintain PA overtime and describe the relationship and the influence between these barriers in T2D patients' real-life.

## Methods

Twenty-two T2D patients contributed either to focus groups (n = 5) or to semi-structured interviews (n = 4). We explored adoption-adherence using an established behaviour change model (Transtheoretical) and an anthropological research method (Cultural Materialism) throughout a qualitative analysis.

## Results

Findings suggested patients responded to PA promoted through medicalised services, using two basic, yet inter-related, social processes. To consider adopting PA a Basic Social Psychological Process was used. In contrast, patients willing to sustain PA focused on prominent 'infrastructural' barriers, using a Basic Social Structural Process.

## Conclusion

This interpretation simplifies in two processes the change of behaviour related to PA. At the same time, defines the barriers' relationship between the different levels and the influence that each level has in patients' real-life. These insights support using phased, ecological frameworks to design and promote PA to patients with T2D, so they maintain changes over time.

## Background

Type 2 diabetes (T2D) is one of the main causes of mortality worldwide (1). Occidental countries are the most affected with this pathology, for example, in Europe the prevalence was 8.9% in 2019 and estimates are that in 2040 it will affect more than 700 million patients at a total estimated health care cost of ~ 161 billion Euros (1). At 9.4% Spanish prevalence is higher than in other European countries; the direct annual public healthcare cost is ~ 20 million Euros (1).

The major risk for T2D is obesity, which is mainly associated with an unhealthy lifestyle, especially poor diet and prolonged inactivity (2). By altering these behaviours to bring about even a 1% reduction in HbA1c brings powerful patient benefits; all-cause mortality may be reduced by up to 14% (3). Moreover, the costs of managing T2D have been estimated to be three times lower in patients who control their HbA1c through physical activity (3).

In this regard, there is robust evidence demonstrating a wide range of health benefits arising from PA for patients with, or at high risk of, T2D (4). PA is directly associated with a reduction in the risk of T2D due to its ability to control glucose metabolism and HbA1c levels (5). In patients with T2D, PA can also reduce body weight and improve musculoskeletal health (5), prevent cognitive decline, reduce symptoms of depression and anxiety (6) and improve global functioning and quality of life (7).

Given the scale and span of these PA benefits, it remains a medical/Public Health priority to deploy more effective PA promotion. This has assumed even greater urgency given the links between fasting blood glucose levels and 28-day survival and T2D precondition in patients affected by COVID-19 (8, 9).

Despite this evidence, T2D patients continue to have major problems with PA adoption-adherence and this affects both treatment and prevention (10, 11). While 40% of patients did not follow-up general medical recommendations regarding lifestyle changes related to

diet or tobacco, the figures worsen when the changes also involve PA (12). Further, patients with T2D have higher odds of dropping out from PA treatments compared to other types of interventions (13), suggesting condition-specific issues.

Different reasons explain low treatment adherence in patients with T2D; shortfalls in motivation, information and/or lack of time are some of the most cited issues (14). Healthcare staff are also unwilling to persist with PA promotion when they see how difficult their patients find it (15).

To deal with the range of potential influences on PA behaviour, ecological frameworks are helpful. A number of such frameworks are available today, including COM-B model or Behaviour Change Wheel (16), Self Determination Theory (17) and Social Ecological Theory (18). One of the most commonly used theoretical adoption-adherence frameworks in PA interventions is the Transtheoretical Model (TTM) (19–21). The TTM describes an individual's motivations and readiness to change behaviours through different stages (precontemplation, contemplation, action, and maintenance), with up to 10 different processes of changes being used at the respective stages (19). The processes of change reflect cognitive and behavioural factors across intra-personal, social and structural contexts.

Ecological models recognise that a range of influences affect any individuals' behaviour, including social and cultural barriers (18, 22). Regardless of the face validity of any 'multiple influences' argument, it is obviously difficult for time-poor healthcare professionals to operationalise frameworks with many working components (15). As a result, PA provision can be under-developed. In this way, the success of interventions from clinical contexts will rely on the resourcefulness and motivation of individual patients (18).

Given the obvious yet profound behavioural shortcomings of the prevailing approach, it is timely to address how different factors play out in real world attempts at behaviour change. In this understanding, Cultural Materialism (CM) offers an anthropological framework with an associated research method. CM aims to understand the human behaviour differences between cultures and societies throughout the relationship between environmental restrictions, cultural levels of influence and individual beliefs (22, 23). Importantly, CM has the potential to facilitate a more comprehensive and politically engaged understanding of the factors that influence processes of knowledge-making in relation to the medicalised contexts (24, 25).

The aim of this study was to explore qualitative perceptions of the cultural significance of barriers to PA among adults experiencing T2D. Combining the TTM with the epistemology of the CM offers a new way to generate a better understanding of the problematic adoption-adherence to PA that prevails in T2D.

## Methods

### Design

The qualitative study protocol was approved by the Vic University – University of Central Catalonia.

### Theoretical approach: Cultural Materialism

This research strategy is based on Marxist idea that material changes are largely determined by recurrent patterns in social organization and ideology (23). Further, in the CM research method, all behaviour rests on the relationship between the natural environment and the methods people use to obtain the resources needed to survive, *aka* the mode of production. Combining the mode of production with recurrent patterns forms the cultural infrastructure. That infrastructure determines the differences and similarities of different human cultures (22, 26).

CM distinguishes three different levels of culture - infrastructure, structure, and superstructure - and two different points of view - emic and etic (23, 26). The infrastructure is both the base of the culture and the frontier between culture and nature. As a deterministic force, the infrastructure has primacy over the other two sociocultural levels (22). The essence of the CM approach is that the infrastructure is almost always the most significant force behind the evolution of a culture (22).

### Recruitment

Patients with T2D were recruited from Pharmacy *Sant Genís* (Barcelona, Spain) and from the *Monistrol de Montserrat* CAP (Primary Health Centre) between September 2018 and February 2020. Pharmacy employees and a nurse from the primary health centre informed clients diagnosed with T2D about the study. All interested patients volunteered their demographic/personal details. Potential

participants were telephoned to enrol in a focus group. Individual interviews were arranged for participants who could not attend a group.

Eligibility required a self-reporting a T2D diagnosis from a doctor, continuing for two or more years. This meets the criterion proposed by the American Diabetes Association (27). We excluded people presenting learning difficulties or poor Spanish or Catalan speaking or writing skills.

## Data collection and analysis

The study was based on focus groups and semi-structured interviews. Before recording the process, participants were informed about the study, questions were answered. Satisfied individuals signed the informed consent. In both discussion formats open questions addressed the different cultural levels of behaviour influence proposed by CM: a) type of job or mode of production (e.g. socioeconomic status) and domestic responsibilities linked to the modes of reproduction, b) political and domestic economic barriers (e.g. perceived safety), and c) beliefs and behaviours related to PA adoption/adherence. Interviews lasted between 45 and 60 minutes and were conducted in Catalan or Spanish. PA levels were recorded using the Physical Activity Questionnaire – Senior Form.

Interviews were informal, expressing no judgments, criticisms, or (dis)approval of contributions and carried out in the place where the recruitment was undertaken. According to COREQ guidelines, and prior to formal data capture, the process of the focus groups was trialled three times to test and validate the interview guide. We introduced open questions concerning their beliefs and the effect on T2D to PA protocols to enrich the interview guide. In a spirit of continuous improvement, the guide was reformulated and improved throughout the study after each focus group or interview was conducted. The interviewer/focus group facilitator stopped collecting further data, when no new key themes were emerging in the discussions.

Once audio recorded discussions were transcribed they were re-read a number of times. Barriers were then codified using two *a priori* frameworks; from the TTM and the CM paradigm. The analysis was performed throughout inductive reasoning. That approach linked the individual perceptions (i.e. TTM) and cultural constrictions (i.e. CM) affecting PA adoption-adherence. As the data were collected, repeated ideas, concepts, and elements were tagged to codes and categories; these could be *a priori* (e.g. political economy) or emerging from the data (e.g. basic social processes).

## Results

From more than 40 interested patients, 22 participated. Each contributed to one of five focus groups with four to 10 participants in each group, or four one-to-one semi-structured interviews, conducted between April 2019 and February 2020. Participants were not related to each other; none were friends. The mean age of the groups was 70.9 years (min 40; max 84) (see Table 1). Participants had a wide range of PA levels, between 700 METs to more than 5000 according to IPAQ-SF. Neither strong correlations nor significant differences were found between PA levels, age or gender.

Table 1  
Participation Characteristics.

<b>Participants n</b>	<b>22</b>
Female n (mean age and SD)	10 (66.67± 13.07) years
Male n (mean age and SD)	12 (74.08± 9.01) years
Mean years with T2D (SD)	10.2 (5)
Insulin dependents n	5 (3 men 2 women)
Mean Age years (SD)	70.90 (11.27)
Age Range years	40 to 84
METs Mean (SD)	2195.2 (1482.03)
METs range	480 to 5775
Spearman's correlation coefficient between age and METs	-0.128 (p-value 0.580)
METs female Mean (SD)	1891.67 (933.1)
METs male Mean (SD)	2422.83 (1796.75)
t-student, Male vs Female METs	p-value < 0.392

T2D: Type 2 Diabetes mellitus

SD: Standard deviation

Results suggest that the two categories of TTM stages - being physical active (Action or Maintenance stages) or inactive (Precontemplation or Contemplation) - were distinguished by two basic social processes (*BSPs*); one was psychological, the other structural (see Fig. 1).

The first *BSP*, affecting physically inactive people in Precontemplation and Contemplation, was a basic social psychological process (*BSPsyP*), reflected beliefs and interpretations, i.e., the emic and mental, superstructure. When patients were in the Action or Maintenance stages this *BSPsyP* was no longer influential. Instead, these patients focused on actual behaviour and how-to bring PA about. For them, creating sustainable routines relied on a basic social structural process (*BSPsP*) that addressed barriers imposed by structure and infrastructure (e.g. role of social groups and work).

## Basic social psychological process

The dominant barriers affecting patients in Precontemplation and Contemplation were linked to a *BSPsyP* and related to emic and mental superstructures. Examples of these constraints included powerful perceptions, such as lack of time, poor motivation, lack of personally relevant knowledge and unsuitable advice. In general, patients in these stages were most focused on intra-personal barriers related to their personal superstructure:

"I don't see myself regularly carrying on a PA program. First, because I am fifty-some years old, I don't feel like doing this, I'm not motivated. Besides, I don't have time because of my work. [Male, 54 years old; focus group 1: lower-income].

Throughout this *BSPsyP*, barriers are alienating because they were seen as being intra-personal, rather than originating from the surrounding infrastructure (e.g. gender discrimination). This alienation may occur where PA is seen as existing through the infrastructure designed to support young adults exists and constrained for older adults by the socially constructed superstructure:

"Sports? Not for me, this is for young and healthy people". [Male, 76 years old; focus group 2: lower-income].

"When I was young I did all types of sports, even gymnastics, but now? How? I'm too old". [Male, 57 years old; interview 4: lower-income].

As a result, seen through CM, the superstructure social construction surrounding PA combines invisible influences created by the infrastructure and the structure of the culture. In this understanding, in the superstructure level PA is unlikely to be regarded as a necessity.

## Basic social structural process

Barriers that constrained adherence to PA (Action and Maintenance stages) recurred throughout this *BSSocP*. Economic barriers, gender or age discrimination, work-life balance or architecture and city political mobility are all factors related to structure. In contrast, grandparental responsibilities and the sedentariness and/or physical (in)activity that predominates at work, are examples of infrastructure (see Fig. 1). Sociocultural organisation, expressed through structure and the infrastructure, represents the superstructure of PA. Therefore, PA as a concept is constructed and belongs to the dominant classes, making it a pattern of social class. Thus, PA can be *marketed* as a luxury value for patients, yet it can only be supported by people in less economically favoured positions by successfully managing the wider range of barriers – often emerging unexpectedly - that may surround them:

“We all have the same time, it’s a question of priorities ... Anyway, you know, when I was young it was strange to see girls doing sports! It was something for young men. All my brothers played football, but not me, I did not do any kind of sport. Neverminded, I don’t have plenty of time because I sometimes have to take care of my grandchildren, though I do yoga two times a week and dance two other times in the old people’s home. Otherwise, I do not walk as much as I want because it’s not easy with the ups and downs nearby.” [Woman, 72 years old; interview 2: middle-income].

Moreover, as PA is more likely in the presence of positive infrastructure and structure, any’ perception of alienation may be influenced by the power relationships between the different parts of the society (i.e. patterns of class). Thus, women, older people and low-income individuals face a difficult position because these barriers depend on sociocultural factors controlled by the dominant societal agents and agencies. Importantly, *BSSocP* is neither experienced equally, nor seen as being even, across society.

## Combining the Basic Social Processes

Barriers belonging to the superstructure were hardly influenced by the structure and the infrastructure of the culture (i.e. primacy of the infrastructure) (see Fig. 2).

Thus, the *BSPsyP* is not an individualised issue, where solutions lie solely with patients (see Fig. 3). Otherwise, patients have to overcome the first - psychological - barriers of behaviour change imposed by the emic and mental superstructure. While these psychological barriers are hardly influenced by sociocultural barriers, they may alienate some patients from attempting to manage/overcome them. Thus, the sociocultural barriers (e.g. gender discrimination) stemming from the structural and infrastructural levels remains unaddressed by those patients who feel alienated by the superstructure barriers and unable to deploy the *BSSocP* needed to support change over time.

For example, as social class was a barrier to starting a PA program (i.e. the cost impaired enrolment in a club or gym), offering free gyms may be seen as a good solution. However, many patients have powerful factors, originating in *BSPsyP*; these factors may be so pervasive and influential that they prevent accessing the positive support offered through such *BSSocP* ‘solutions’:

“They put a free gym near the football pitch, but who goes there? Nobody. The first two weeks we go there to do some gymnastics, it was something new, but now, it’s empty all day! People don’t have the will to do it, it’s worthless” [Male, 66 years old; focus group 5: lower-income].

Finally, whereas patients in the Preparation and Action stages regarded structural and infrastructure barriers as being insurmountable, individuals in Maintenance saw them as resolvable. Given that this insurmountability reflected both *BSPsyP* and *BSSocP*, acting dynamically and/or interactively at different times, their PA may be especially brittle and subject to impermanence:

“The problem is the logistics, when I’m there I kind of enjoy it because I’m able to switch off from work. I’m motivated now but I don’t know how to do it, maybe if there was a gym near to my work it will be easier, because I will be able to go on my way home. But there isn’t. So, as I said, right now, for me, the problem is the logistics, I don’t know how to handle it.” [Woman, 45 years old, Interview 3; high-income]

## Discussion

This study set out to establish the qualitative perspectives of people with T2D on the PA promotion they received from health care professionals. To freshen our understanding of these issues, we adopted a multi-point theoretical approach to explore the relevance of what the people needed with what they received. We also blended the familiar TTM (18, 19, 28) with key constructs from a less familiar framework, CM (22, 23), to help understand why people with T2D, who have so much to gain from adopting and sustaining PA, find it so challenging.

From a PA adoption perspective, our key finding is that low- and underactive people with T2D are dominated by superstructural issues in the *BSPsyP*. In everyday terms, this relates to attitudes, beliefs and preferences. PA promotion for people in the stages of Precontemplation, Contemplation and Preparation will need to address long-held beliefs regarding the appropriateness of PA for them and for managing their diabetes. Importantly, we found no interviewees who recognised that PA can effectively alleviate any need for T2D medications (29). On the other hand, we found substantial evidence corroborating recent research (30) showing that older Hispanic interviewees rehearse the idea that lost functioning is normal and that adopting PA is inappropriate at their time of life, even after securing substantial health benefits through a 24-month trial.

The *BSPs* affecting PA are strongly influenced by cultural infrastructure. Some *BSPs* seem ever-present (e.g. gender) while others act intermittently in response to key events (e.g., picking up and caring for grandchildren) and contexts (e.g., being in different locations). At the same time, the patients' TTM stage provides a powerful guide for determining the *BSPs* that may best help start or maintain a PA program. Uniquely, we have summarised and simplified the relationship between the most cited barriers, the CM, the TTM stages and the *BSPs*. Doing so, we hope to encourage more health care professionals to promote PA while addressing the priorities of their patients' real worlds.

Our evidence provides healthcare staff with approaches grounded in 'real-world' life and that may be better timed to meet changing needs. People living with diabetes who are in the low-active stages a *BSPsyP* is related to awareness and to personal relevance of PA issues. In contrast, people in the more active stages of change are affected by a *BSSocP* and the structure and infrastructure of the CM. The consequences for better PA promotion by healthcare staff deserve consideration as they face issues not only in promoting PA successfully, but also in attempting to refine their routine practice using study outcomes (18).

We recruited no entirely sedentary patients, meaning all did PA at some level. Pre-existing behaviour represents an important opportunity for health care promoters to promote further PA by helping patients to transfer their existing problem-solving skills to the perplexing problems thrown up by unstable daily lives. Simply focusing on the perceptions and intra-personal characteristics of T2D patients, healthcare staff is likely to overlook the powerful influence of successfully navigating what had previously been seen as insurmountable structural and infrastructural barriers. The resulting sense of agency is important; yet it runs counter to some current 'solutions'. For example, many of the contemporary protocols and techniques proposed to improve the PA adherence (e.g. HIIT) may require expert supervision and/or access to sports facilities that many patients cannot acquire without substantial personal investment (21). In this regard, using high intensity protocols are unlikely to address 'lack of time' as patients perceive it, and will not produce positive behaviour change (13, 31). Health care staff who follow-up on their PA interventions are only likely to become dispirited by such outcomes.

In these cases, while many patients may be able to enroll, few follow-up with healthcare recommendations once a study is discontinued(14, 32). For that reason, although studies may establish efficacy, they do little to help maintenance (which may be taken as a marker of effectiveness); PA adherence typically decreases at three to six months post-intervention(14, 32). To that end, we suggest that many studies have focused on PA adoption-adherence as a *BSSocP*, meaning it addresses the immediate infrastructural barriers during the study without addressing the wider, systemic, *BSPsyP* issues that were always likely to become prominent post-intervention. The recurrent challenges surrounding behaviour change in low socioeconomic status communities attests to this concern (33)

Left unaddressed, these high-intensity protocols and behaviour changes techniques may simply enhance the *marketing* of the PA. Indeed, our results suggest that the concept of PA continues to be seen as the concern of young-middle aged males and is seen as a luxury, rather than a biological or social necessity(34). For example, in Spain, during the breakdown of COVID-19 one of the things that was prohibited was to do PA outdoors. Relying on these *marketing* approaches is likely to add to the alienation from PA already experienced by many low-active T2D patients, who are lower income groups, female and elderly. To widen the appeal of PA, another cultural concept of PA has emerged: therapeutic exercise and 'Exercise is Medicine' (35, 36). However, without the capability of doing PA, even these approaches may create more barriers (i.e. economic barriers) than they solve (35).

We do not mean that overcoming the infrastructural barriers and find a way to help the patients throughout the *BSSocP* is unimportant, but we should not forget that some behaviour change techniques might not solve infrastructural and structural barriers. Also, patients may need to go through a *BSPsyP* and overcome the superstructure barriers that might arise in the first steps of change behaviour. To attach that *BSPsyP* it might be needed to rebuild the social PA concept throughout the structure and the infrastructure. Otherwise, we risk overlooking a huge number of vulnerable patients facing the greatest combinations of barriers to changing their lifestyles (i.e. lower-income, women and elderly patients). That so because PA and therapeutically exercise concept might enhance structural and infrastructural barriers.

Although participant homogeneity might be a limitation in the study, the sample featured representatives from the different stages of the TTM and the different levels of the CM paradigm. With that approach, a fresh interpretation of the 'PA problem' has emerged. Our approach has blended CM and TTM to establish a *BSP*. In this regard, we hypothesise that the TTM can be practically revised to two different *BSPs*; one reflects superstructure and the other structure and infrastructure levels.

This new interpretation aims to help healthcare professionals, who rarely have sufficient time to apply the TTM in consultations (15). The simplicity of this approach may help improve outcomes arising from the actions of healthcare professionals.

## Conclusion

This new interpretation of the PA problem suggests that future studies and healthcare or political interventions that aim to deal with the PA adoption-adherence issue should be aware of these two different and yet interlinked *BSPs*. Otherwise they could fall to wrong conclusions in well-controlled study that might not be useful in patients' real-life. A *BSPsyP* is needed to help the patient's awareness and go from precontemplation to preparation stages, and a *BSSocP* is needed to maintain change over time. Thus, precontemplation to preparation stages are linked to psychological barriers, although might be highly influenced and conditioned by cultural barriers. On the other side, action and maintenance stages are linked to cultural and social barriers, although psychological barriers might limit or facilitate the outcome. Health care professionals and political interventions that aim to deal with the PA adoption-adherence issue should be aware of the differences between these two different yet interlinked processes.

Importantly, both *BSPs* need to align support successful behavioural adaptation. Moreover, we recommend being careful with the conclusions about the behaviour change techniques proposed in studies. While they seem useful across studies, they can lose their effectiveness as in patients' real lives flex and adapt (14, 32). For this reason, we suggest that it is necessary to reconsider the 'PA problem' as a problem of making the right combinations of powerful influences affecting individual patients' unfolding, real-life situations. The context of COVID-19 could hardly provide a more start for this understanding, while the severity of the complications of excess body weight and under-activity in people with T2D (8, 9) only underlines its importance and urgency.

More qualitative research is needed to investigate the challenges facing healthcare, physical exercise, psychologist, sociologist and medical anthropological professionals in promoting PA to people with T2D. It is timely for the health care professions to recognize that T2D is a social epidemiological pandemic; many of its key solutions lie in the way we construct and support 'community'. Under-activity in people with T2D is likely to continue, and possibly extend, as long as individual approaches are used to address structural issues.

## List Of Abbreviations

Diabetes mellitus tipe 2

T2DM

Physical activity

PA

Basic Social Structural Process

BSSocP

Basic Social Psychological Process

BSPsyP

Cultural Materialism

CM

Transtheoretical model

## Declarations

### Ethics approval:

All methods used in this study were conducted in accordance with the Declaration of Helsinki. The study was approved by the Ethic comité of the Vic University – Central University of Catalonia.

### Consent to participate:

Informed consent to participate was given and sign by each participant.

### Availability of data and materials:

The data that support the findings of this study are not publicly available. Data are however available from the authors upon reasonable request and with permission of University of Vic-Central University of Catalonia.

### Competing interest:

Non to declare.

### Funding:

This research was not found by any institution or public found.

### Authors' contributions:

**GJC:** Conceptualization, Methodology, Supervision, Project administration, Writing-original draft, Writing-review and editing. **JBR:** Conceptualization, Methodology, Supervision, Visualization, Writing-review and editing. **RDR:** Visualization, Writing-review and editing. **MMH:** Methodology, Formal analysis, Visualization, Writing-review and editing. **APR:** Writing-review and editing. **JM:** Conceptualization, Methodology, Supervision, Writing-review and editing.

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## Figures

**Figure 1**

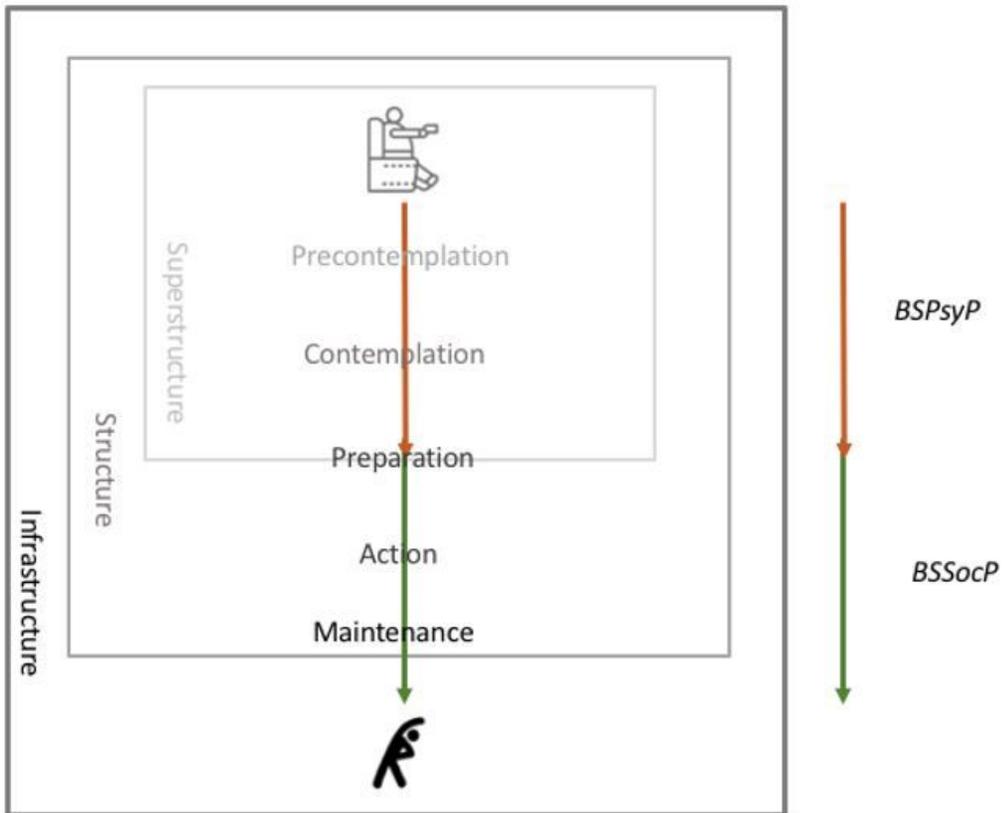
	Precontemplation n=32	Contemplation n=28	Preparation n=52	Action n=47	Maintenance n=70	Basic social psicological proces n=55	Basic social structural proces n=56
Emic and mental superstructure n=59	20	20	14	4	3	31	2
Etic and behaviour superstructure n=40	16	16	10	5	2	23	2
Etic and behaviour structure n=63	2	1	28	31	35	5	41
Etic and behaviour infrastructure n=37	2	2	11	16	23	5	18
Basic social psicological proces n=55	20	17	15	4	2		
Basic social structural proces n=56	0	0	23	30	42		

**Figure 1**

Relationship between barrier codification with the CM epistemology, TTM stages and the BSPs. Numbers (n) indicate the frequency of a category being used in interview coding. Green colour: barriers and processes related to BSSocP. Brown colour: barriers and process

related to the BSPycP. The color in both cases increase in intensity as higher frequency of relationship between CM and TTM and decrease if less relationship exists.

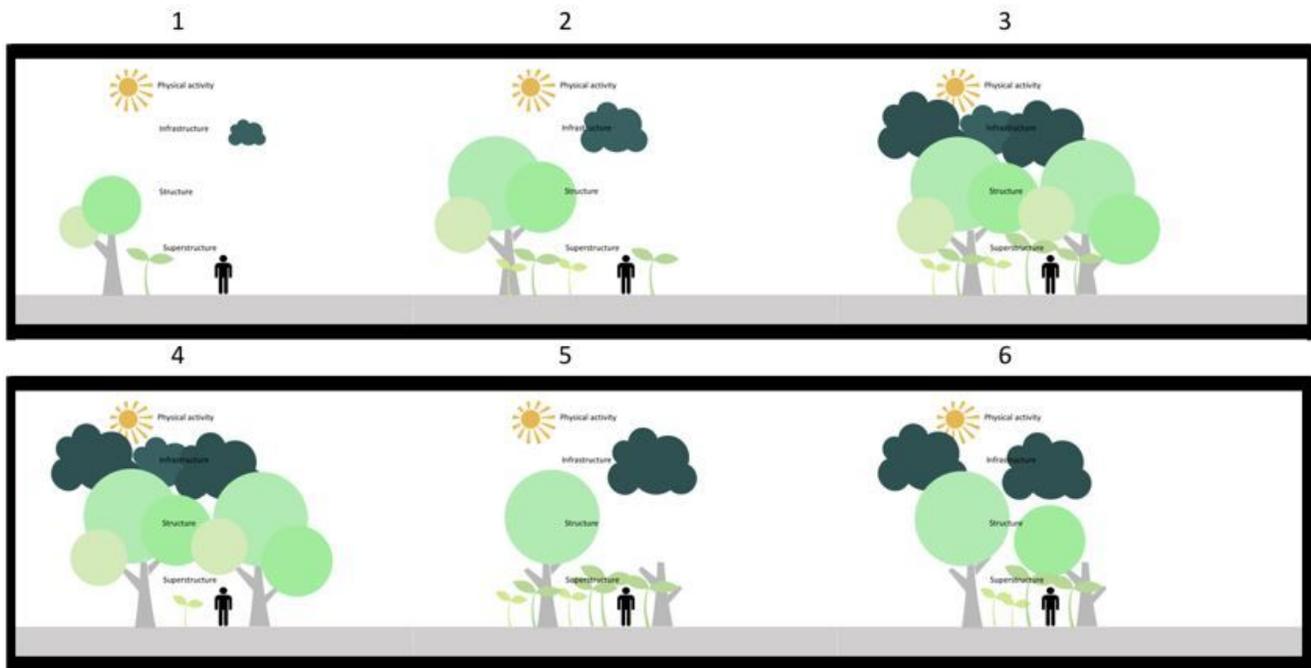
**Figure 2**



**Figure 2**

Relationship between Cultural Materialism and Transtheoretical Model. BSPsyP: Basic social psychological process; BSSocP: Basic social structural process.

**Figure 3**



**Figure 3**

Relationship between Cultural Materialism epistemology and PA adoption-adherence. Sun: physical activity; Clouds: Infrastructure barriers; Trees: Structure barriers; Undergrowth: Superstructure barriers Up to down and left to right: Images one, two and three represents three patients with different levels of barriers in all three levels of CM epistemology. It tries to represent that, as more barriers in the infrastructure (clouds with rain), more barriers will be found in the structure and the superstructure (vegetation). Images four, five and six represent different situations when we try to improve the PA adoption-adherence in patients with diabetes. Image four represent patients that, although saving superstructure barriers, they are not able to follow up with the PA levels because they might not be able to change and overcome the infrastructural and structural barriers. In that case, a basic structural social process is needed. Image five represent patients that have to overcome superstructure barriers. In that kind of patients, we can offer free gyms and other infrastructural or structural solutions, however, a basic structural psychological process is needed in first place. Image six represents patients that might have to overcome both processes: coping only with one of the two basic social processes will result with one of both situations seen in image four and five.