

Factors Affecting the Acceptance, Enjoyment, and Understanding of Perceptual Control Theory in a Student Sample

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Abstract

Since its inception over fifty years ago, Perceptual Control Theory (PCT) has successfully gained empirical evidence to support both its theory and therapeutic application. Despite this, PCT has had little impact within psychology and is still relatively unheard of. Up until recently, no published research has examined student’s subjective experience of learning PCT for the first time. The present research employed qualitative methodology to investigate the barriers individuals face when learning PCT, and involved the use of a semi-structured interview to assess student’s firsthand experiences of learning. Interpretative Phenomenological Analysis revealed both positive and negative factors within four superordinate themes: (1) learning and understanding; (2) personal acceptance; (3) personal and global influences on learning; (4) consequences of learning. All of these themes contributed to an individual’s learning, understanding and acceptance of PCT. Findings are discussed using theoretical, philosophical, and empirical accounts.

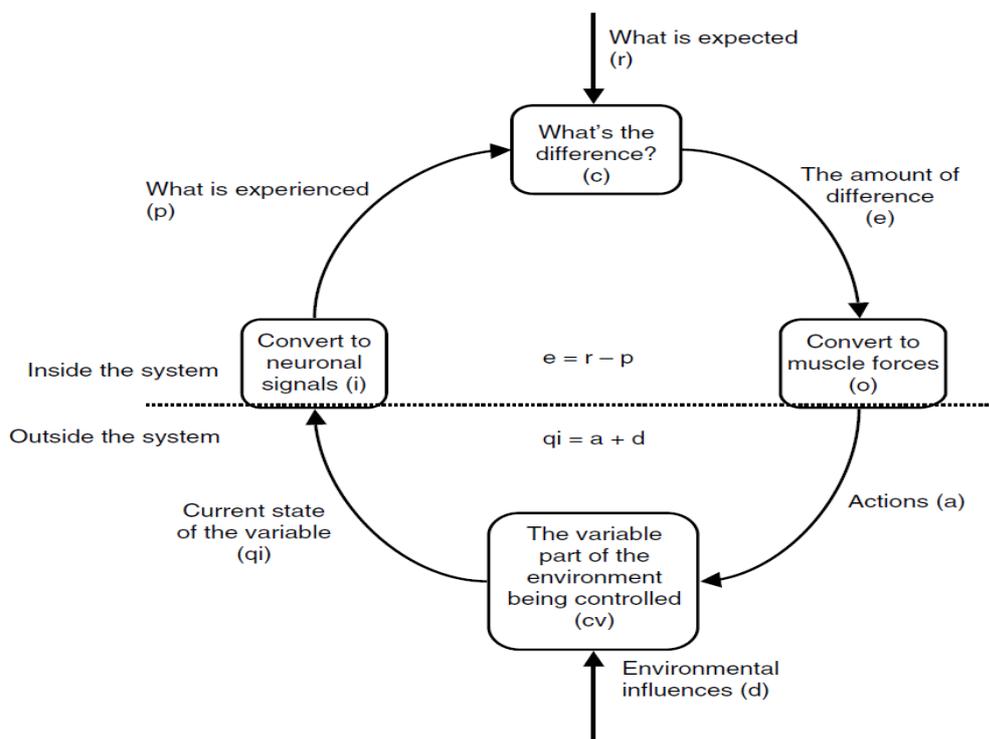


Fig. 1. The negative feedback loop, an integral component in Perceptual Control Theory. Adopted from Carey (2008).

Introduction

Formulated by William T. Powers (1973), PCT suggests that underlying all human behaviour is the process of control, or the ability to control a variable within fixed limits despite outside disturbances (Mansell & Carey, 2009). Derived from a machine model based on control engineering (Powers, 1973), PCT argues that human actions and perceptions are intertwined, suggesting that on one hand, actions stabilize a person’s perceptual world, on the other, a

continuous flow of perception is necessary for behaviour to take place (McClelland, 1994). This stems from a hierarchy of negative feedback loops (see Figure 1), consisting of perceptual input, an internal standard, and a comparator (Locke & Latham, 2002). The comparator compares sensory input to a preset goal (internal standard) with the difference being an error signal. The error signal then transforms into action, counteracting this error, with information being re-inputted as a perceptual signal closing the loop (McClelland, 1994). PCT therefore argues that individuals behave to control their perceptions, rather than perception being the causal factor of behaviour (Bourbon, 1997). The full theory includes an explanation of how control loops are organised in a hierarchy to implement complex goals, and the process of *reorganisation* which specifies how learning occurs through trial-and-error changes in the parameters of the system.

PCT has also enjoyed a range of empirical support spanning across multiple phenomena including the understanding of psychological disorders (Mansell, 2005). Yet despite such strong evidence for the efficacy of the theory and its applications, PCT has had relatively little impact and is largely unheard of (Gibson, 2009). This has been attributed to the theory's age, its development by an engineer, its implication that existing theories are inaccurate, and its overly mechanistic view of people (Mansell, 2009). Philosophy however, suggests that there are many other, more abstract variables at play in the acceptance of any scientific theory.

The philosophical standpoint of Thomas Kuhn (1962) argues towards science being held together by pre-existing ideas upon which no one can agree (pre-science). One will eventually become dominant and accepted by the vast majority of scientists working within that field. This is known as normal science, and takes place within a theoretical framework, known as a paradigm. However anomalies are often found within each framework, but are disregarded by its proponents who continue to work only on problems they can solve. Science is then ready for change, however, paradigms are impossible to measure due to each groups diverse way of seeing things, their differential approaches to problem solving, and the differing scientific standards each set themselves. This is known as incommensurability (Kuhn, 1962), therefore, although a new theory may be deemed better, revolution can only take place when a new generation of scientists take over and accept it, allowing it to be adopted by the majority (Kuhn, 1962).

In addition, Posner, Strike, Hewson, and Gertzog (1982) suggest that for scientific change to take place, *accommodation* has to occur. Accommodation is a change in both central and self concepts, with central concepts being facilitated by a theory's ability to solve current problems, and self concepts being derived from an individual's previous experience, making more diverse ideas appear unintelligible. Therefore, Posner et al. (1982) suggest that for successful accommodation to occur there must be 1) dissatisfaction with existing theories, 2) new concepts must be deemed intelligible 3) new concepts must be seen as plausible, 4) as well as exhibiting the potential for further, fruitful research.

In support of the proposition outlined by both Kuhn (1962) and Posner et al. (1982), Margolis (1993) suggests that within each paradigm the rules of science are not consciously held, but are merely taken for granted. Polanyi (1974) argues that this tacit or unconscious knowledge forms a 'habit of mind', which develops through exposure due to everyone in the psychological community converging on the same idea. Therefore, entrenched responses occur within each paradigm without conscious attention, becoming difficult to change or indeed notice. This, Margolis (1993) argues, is how beliefs, judgements, and attitudes develop towards new paradigms, because even though one can logically see the benefits of new ideas, previous habits of mind still entrenched in old paradigms exist and inhibit the success of new ones (Margolis, 1993).

Evidence for the cognitive processes which underlie the theoretical propositions of both Polanyi (1974), and Margolis (1993) can be observed within the supporting literature for Mindset Theory (MT; Gollwitzer, 1990). MT suggests that the mechanism underlying the one-sided selection of information occurs via a deliberative and implemented mindset (Gollwitzer, 1990). During the deliberative phase, an individual open-mindedly evaluates all of the information available to them, once a decision has been reached; the implemental phase inhibits inconsistent, novel ideas from being considered. This latter, closed minded process, allows an individual to avoid conflicting ideas by selectively processing information salient only to their chosen goal or paradigm. Therefore, the one sided analysis of information that occurs via an implemented mindset after a decision has been made, inhibits contradictory information (such as novel scientific ideas) from being considered and subsequently adopted (Taylor & Gollwitzer, 1995).

Recent empirical findings support these assumptions. Brannon, Tagler, and Eagley (2007) conducted three experiments to test selective exposure effects (Freedman & Sears, 1965) or whether attitude strength moderates individual's selective exposure to information. Overall, findings suggested that upon exposure to differing stimuli, participants disregard opposing ideas and only select information consistent with their attitudinal standpoint. In regard to the adoption of new paradigms, studies such as these explain how habits of mind (Polanyi, 1974., Margolis, 1993) and Mindsets (Gollwitzer, 1990) stay reinforced and unchanged as an individual only selects and seeks information consistent with their world view, rather than information that may lead to subsequent attitudinal (or scientific) change (Brannon et al. 2007).

Within PCT itself, the process of change – reorganisation - is driven by increases in *intrinsic error* – discrepancies in important goals, typically related to survival and social affiliation. Thus, one obstacle to changing one's scientific views may be that significant change is only required when key intrinsic needs are threatened. This is unlikely in an academic environment that subscribes, on the whole, to the status quo view of human behaviour.

Potentially, within the Gollwitzer (1990) account, the closed mindset described above may correspond to awareness that is focused on perceptions that are situated low in a control hierarchy, in the service of concrete goals. In contrast, an open mindset may correspond to awareness that is located towards superordinate levels where principles and plans can be reprioritised and shifted. Thus, one obstacle to changing one's views is that awareness must be shifted towards higher, conceptual levels. Within PCT, the uppermost level described to date is the *system concept* level which appears to map closely to Posner et al's (1982) model. In PCT, this level represents the kinds of self concepts and views of the world one tries to experience. It is most likely that scientific frameworks are perceived at this level. Thus, change would need to occur at the level at which scientific theories are 'regulated' to form even higher level perceptions. It is possible that many academics are not even aware that stimulus-response psychology or input-compute-output approaches represent testable theories – they are assumed; errors and inaccuracies in experimental results are rarely taken as evidence to question this overarching assumption. Yet, this is exactly what successful experiments using PCT demonstrate (e.g. Marken, 1985; Powers, 1978).

In light of the above philosophical, theoretical and empirical positions, this study aims to investigate the internal and external barriers individuals face when coming into contact with PCT for the first time. Qualitative methodology, or more specifically, Interpretive Phenomenological Analysis (IPA; Smith and Osborn, 2007) is used to observe a person's first-hand experience of learning PCT for the first time.

Method

Design

A semi-structured interview was used to examine people's experiences of learning about PCT. More specifically, this focussed on participants firsthand accounts of their experience, perception, and overall view of the theory after first time exposure. The interview schedule was developed in two stages.

Interview Schedule Development

Stage 1

An informal focus group was formed to comprise the interview schedule which was to be used. In order to identify the obstacles and advantages students face before and after the exposure to PCT, five pairs were formed each consisting of one individual with previous experience and one without prior experience of learning PCT.

Stage 2

A range of items to include in the interview schedule were discussed. Each pair agreed upon three possible items which were deemed to be the most salient. Pairs critically evaluated each of the proposed items, disregarding less pertinent items. A final list of ten primary items was produced including a small selection of secondary, follow up items. Care was taken to ensure that all questions were open-ended in order for participants to give a full account of their experience. For an example of the interview schedule, please see appendix I.

Participants

Nine psychology students from the University of Manchester took part in the study. All of which had taken an introductory PCT course module, *Control and Conflict in Human Behaviour*. All participants had previously signed a consent form stating their permission to be contacted.

Apparatus

An Olympus VN-5500PC digital voice stereo was used to record the interview.

Procedure

Each pair formed in the original focus group was assigned a participant to be interviewed. The interview was carried out using the previously designed interview schedule.

Data Analysis

The data derived from the interview was subjected to IPA (Smith and Osborn, 2007). Each interview was individually transcribed and re-read in order to develop familiarity. The left hand margin was used to note down initial ideas. The themes were then identified, with the more abstract themes being noted in the right hand margin. From this, a list of emergent themes was developed as the connections between the themes were identified and collated into clusters. A super-ordinate theme was then used to explain the theme for each cluster. Quotations from the text were added to support each identified theme. In order to combine all the data from each participant in the study, a table of master themes was produced to collate the sub-themes identified in all the accounts. A cyclical process was used in which themes were checked and re-

checked against the narrative before the process was finished. Please see below for tables of themes and supporting quotations.

Results

The analysis of the transcripts revealed four main superordinate themes. These were:

1. Learning and understanding
2. Personal acceptance
3. Personal and global influences on learning
4. Consequences of learning

Sub themes also emerged within each of the above themes. Please see table 1 for all themes in their entirety.

Table 1. Compositional structure of interpretive phenomenological analysis themes

Theme 1 Learning and understanding ^a	Theme 2 Personal acceptance of PCT ^a	Theme 3 Personal and global influences on learning ^a	Theme 4 Consequences of learning ^a
Positive factors that influence learning and understanding of PCT ^b Demonstrations ^c Electronic resources ^c Journals ^c Diagrams ^c	Factors that influence personal acceptance ^b Understanding ^c Individual differences ^c	Lecturers influence ^b Interpersonal influences ^c Teaching styles ^c	Positive consequences of learning about PCT ^b Application to ones' own life ^c Application to a clinical setting ^c
Negative factors that inhibit learning and understanding of PCT ^b Initial difficulty in understanding ^c	Negative factors that inhibit personal acceptance ^b Incompatible with other theories ^c Overly mechanistic ^c	Others influence ^b Influences of psychological community ^c	Negative consequences of learning about PCT ^b PCT does not account for everything/doubt and confusion ^c

^a Superordinate theme

^b Master Theme

^c Sub-categories

Learning and understanding

Please see Table 2 for supporting quotations. Although not every participant mentioned demonstrations, electronic resources, journals, and diagrams consecutively, overall, participants suggested that these resources were the most helpful in gaining further insight into the applicability, accessibility, and understanding of the theory. Participants consistently expressed a

difficulty in understanding PCT after its initial contact, with many adding that this could inhibit a desire to learn, understand, and accept the theory prior to having experienced it.

Table 2. Quotations for theme 1: Learning and Understanding

Positive factors that influence learning and understanding of PCT	Negative factors that inhibit learning and understanding of PCT
<p>Demonstrations</p> <p><i>'An elastic band to show the conflict where you' got to keep the knot over the circle...we did a lot of examples in class. Examples were good'.</i></p>	<p>Initial difficulty in understanding</p> <p><i>'It does take a while to get and I think a lot of people are put off by that'.</i></p>
<p>Electronic resources</p> <p><i>'I found the PCT website was good...how you would use PCT in education and business'.</i></p>	<p><i>'I thought it took a long time initially to get my head around it...with the negative feedback loop and stuff'.</i></p>
<p>Journals</p> <p><i>'The theories are really clear and simple so it was easy to learn. The external reading of Warrens 2005 paper, and Powers' papers were really simple to understand so it made it really easy to read around the subject'.</i></p>	
<p>Diagrams</p> <p><i>'The pictures and diagrams make it accessible at first in that you want to read it because it seems, well, it seems a little bit easier...so it just consolidates your learning and in helps you organise your thoughts</i></p>	

Personal Acceptance

Please see Table 3 for supporting quotations. Participants talked about the importance of understanding PCT before they were able to accept the theory. Again, immediate understanding was deemed as a salient factor in the theories acquisition and acceptance. Participants also talked about the interpersonal factors involved in the acceptance of PCT. Overall the idea of an open mind was observed to be the most important determinant of whether one was open or closed to the theory. The overall idea of PCT being incompatible with other paradigms was also observed to be important for the participants who didn't accept the theory. One reason was due to a rejection of the mechanistic component inherent in the description and explanation of PCT.

Table 3. Quotations for theme 2: Personal acceptance of PCT

Factors that influence personal acceptance	Negative factors that inhibit personal acceptance
<p>Understanding <i>'I wasn't really against it or for it...Most of it was just understanding it mainly first, before you could make your decision'.</i></p> <p>Individual differences <i>'I think it just depends on the person, if someone is quite open minded about hearing new theories then I think it would be a good theory for them...but if someone is quite set in what they think it can be that it would be quite difficult for them to accept'.</i></p>	<p>Incompatible with other theories/mechanistic <i>'The whole sort of assumption underlying the theory is completely incompatible with the rest of psychology and it undermines everything we have learned so far'.</i></p> <p><i>'I just think there's something more to human life and human experience than a diagram, or what can be represented in a diagram' .</i></p>

Personal and Global influences on Learning

Please see Table 4 for supporting quotations. The lecturers' overall enthusiasm for the theory appeared to be an important aspect in the acquisition of learning, so much so that choices to take the module were based on the lecturer's personality and teaching style rather than the content. Parallels between other, more traditional, therapeutic applications were made, with participants clearly seeing the benefits of PCT as an application in its own right. However, when talking about other influences, participants consistently expressed their doubt about wanting to learn about PCT given that it had not yet been accepted in the wider psychological community.

Table 4. Quotations for theme 3: Personal and global influences on learning

Lecturers influence	Others influence
<p>Interpersonal Influences/Teaching style <i>'We did a little bit about it in the second year but I didn't base my choice on it. I based it on the lecturers'.</i></p> <p><i>'I like lecturers that are interested in what they are speaking about and are enthusiastic'.</i></p> <p><i>'The lectures were really simple and didn't cover too much so it was quite easy to pick up as you went along'.</i></p>	<p>Influences of psychological community <i>'You can see some parallels to CBT and cognitive therapies and stuff like that but I kind of just felt that it hadn't been taken up by the kind of psychological community'.</i></p> <p><i>'I straight way got the impression that it hadn't been taken up by the psychological community, we weren't really told why not so there is always a doubt there'.</i></p>

Consequences of Learning

Please see Table 5 for supporting quotations. Participants generally acknowledged the efficacy of PCT’s application to everyday life. In addition, the clinical applicability of Method of Levels Therapy, derived from the theoretical underpinnings of PCT, was also observed to be an effective therapeutic tool, with many suggesting that both of these factors to be a positive consequence of learning the theory. However, although many could see the benefits in learning the theory as well as its therapeutic application, they appeared confused, with many suggesting that PCT was unable to explain behaviour as a whole. These contradictory responses appeared consistently throughout the narrative, with many participants being unable to give an answer as to why this was the case.

Table 5. Quotations for theme 4: Consequences of Learning

Positive consequences for learning about PCT	Negative consequences for learning about PCT
Application to own life <i>‘You can see it in practice and then you go way and apply it to whatever is going on in your own life’.</i>	PCT doesn’t account for everything/Doubt and confusion <i>‘I’m just not sure about it, it just doesn’t seem to account for everything, I haven’t found a specific example but I’m sure I will.’</i>
Application to a clinical setting <i>‘They propose from PCT a type of therapy called Method of Levels Therapy, and that therapy seems spot on in terms of how to treat people’.</i>	<i>‘I think there’s something missing, and I’m not sure what it is I’m afraid, but it’s just not right yet’.</i>

Discussion

Results from qualitative analysis uncovered both positive and negative factors which contributed towards participant’s successful understanding, acceptance, and learning of PCT. Positive factors were seen to be facilitated by good resources, individual differences, lecturers influence and the theories successful application. However, an initial difficulty in understanding, as well as the theories incompatibility and overall lack of acceptance, all contributed towards an individual’s lack of confidence in the theory, which in turn appeared to inhibit their overall understanding, acceptance and learning of PCT.

Analysis revealed that understanding of the theory was an important factor in the facilitation of acceptance. These findings are supported by Posner et al. (1982) who propose that in order to accommodate and accept a new theory, one must first understand it. Although learning resources were found to aid understanding, Margolis (1992) suggests that individual habits of mind inhibit immediate understanding as a result of their unconscious adherence to existing paradigms, suggesting that this delay could hinder an individual’s acceptance of the theory.

Personal acceptance was also seen to be inhibited by PCT’s incompatibility with other theories. Forsell (1994) highlights the difficulty in understanding new theories when individuals belong to an incompatible paradigm. This can be interpreted the Kuhnian idea of

incommensurability (Kuhn, 1962), as the lack of comparison between divergent paradigms results in the individual maintaining a differential view of the world as well as an inability to accept new ideas inconsistent with their own. Additionally, the negative view of PCT's mechanistic component was also found to be a salient factor in individual's lack of acceptance. Existing literature also supports this as Mansell (2009) makes similar observations.

Further interpretations can be made in regard to participant's personal acceptance via the propositions outlined by Mindset Theory (MT; Gollwitzer (1990), which suggests that when individuals are in a post-decisional phase of goal pursuit, they must initiate only the actions which are instrumental to their initial, chosen goal (Henderson, De Liver, & Gollwitzer, 2008). We discussed earlier how this proposal could be construed within PCT itself. This finding further supports the philosophical standpoints of Kuhn (1962), Margolis (1992), and Forsell (1994) who argue towards the difficulty that individuals face in the acquisition of ideas when faced with a divergent paradigm incompatible with their own. For example, the negative views of PCT may have been considered by participants during the deliberative stage of goal pursuit (Gollwitzer, 1990). Therefore, the theory's drawbacks originally outlined by Mansell (2009) including PCT's development by an engineer, its implication that existing theories are inaccurate, and its overly mechanistic view of people (Mansell, 2009), would all contribute towards whether a participant would adopt the theory during the deliberation process. If a decision was made against PCT at this stage, it would be impossible to implement further, therefore all energies would go towards refuting, rather than accepting the theory (Gollwitzer, 1990), even though an individual could logically see its benefits (Margolis, 1993).

Personal influences were also seen to facilitate the successful learning of PCT. These included lecturers influence, and teaching styles. However, a more problematic factor was that of outside influences, or the influence of the scientific community. This is interpreted by Polanyi (1974) who suggests that due to each scientific community all converging on the same idea, individuals who belong to that paradigm gain a tacit or unconscious knowledge only of the concepts within their given paradigm facilitating the further inhibition of new theoretical ideas. Furthermore, although the participants could see the applicable efficacy of PCT, the above variables appeared to cast an overall doubt upon the theory. For example, participants refuted the claims that the theory could account for all behaviour of living systems yet none were able to give a reason why.

This study has noted the limitations in drawing conclusions from naturalistic observations using a relatively small sample of participants, as these findings may not be generalisable towards a larger population. However, the salient themes which did emerge were observed consistently, allowing for enough empirical justification to conduct further research with the use of a larger cohort. In addition to this, participants were given the choice as to whether they wished to be contacted to take part. This may not represent the most optimal sampling method as pre determined bias or demand characteristics, may have had an effect on the overall findings. Therefore, further studies may wish to include a sample of individuals across a range of locales, all of which have a base understanding of the theory but did not take an introductory course module via the same institution, in doing so, this may tease out any additional biases, as well as give more accurate representation of generalisability towards the population.

In conclusion, the findings of this study would argue that there are many factors at play in the acceptance, understanding, and successful learning of PCT. Research suggests that attitudes have an integral part to play in the acceptance and enjoyment of the theory. However, philosophical proponents argue that there are many more mediating factors at play in the successful acquisition of new scientific ideas, including internal and external variables affecting

levels of understanding, the influence of the wider psychological community, as well as the central variables needed to facilitate conceptual change. Therefore, future research may wish to look at all these factors in order to further understand why a theory grounded in empirical evidence and successful application has yet to be accepted into mainstream psychology. At present, it is greatly promising that the theory is nevertheless gaining acceptance within a proportion of a yearly cohort of undergraduate students through the way that it is taught, demonstrated and explained.

Acknowledgements

Thank you to all of the undergraduate students who were involved in interviewing, being interviewed and transcribing for this study.

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Appendix

Appendix I: Interview schedule

- What immediately comes to mind now when you think about PCT?
- What were your first impressions of PCT?.....follow up with
 - “What was your initial reaction to hearing about the theory?”.....
 - “how does this compare with your impressions of it now?”
 - If people have altered opinions, ask “what has made you change the way you think?”
- Why did you choose “Control and conflict in everyday life and clinical settings” as a 3rd year module?
- How does PCT compare to your understanding of other psychological approaches?
- How does learning PCT compare to learning other psychological theories?
- What helped you to understand PCT?.....follow up with

- “Did you use any resources that were helpful/ not helpful?”
- “Why were they helpful/ not helpful?”
- What are your thoughts on the way in which PCT might relate to everyday life?
- What do think about PCT as a theory that could be accepted into mainstream psychology?
- Do you have any thoughts on what the implications of PCT are?
- Tell me what you think about the idea that PCT explains human behaviour?