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## DO PEOPLE WITH DIFFERENT PERSONALITIES REACT DIFFERENTLY TO THE INTERVENTIONS OF ACCEPTANCE AND COMMITMENT THERAPY?

## ALI SE LJUDJE Z RAZLIČNIMI OSEBNOSTNIMI LASTNOSTMI ODZIVAJO RAZLIČNO NA INTERVENCIJE TERAPIJE SPREJEMANJA IN PREDANOSTI?

### ABSTRACT

This study evaluated the effectiveness of Acceptance and Commitment Therapy (ACT) interventions in changing psychological flexibility processes in young physically active adults aged 20 to 25 years (N = 30). It also examined the moderating role of personality traits, measured with the Big Five Questionnaire (BFQ). Participants self-selected into either an experimental group, which completed eight weekly ACT-based interventions, or a passive control group. All participants completed the BFQ and the Multidimensional Psychological Flexibility Inventory (MPFI) at baseline. The MPFI was administered again after 10 weeks, while personality was assessed only at baseline. The study showed that at baseline, psychological flexibility processes differed between the groups, with the experimental group reporting lower flexibility. After 10 weeks, no significant differences remained. The ACT interventions were associated with a reduction in inflexibility processes in the experimental group, while the control group also showed a decrease in flexibility processes. Within the experimental group, the personality trait of dominance negatively predicted changes in most psychological flexibility processes. While previous research supports the effectiveness of ACT interventions for mental health, this study expands current understanding by focusing on a physically active young adult sample and assessing both flexibility and inflexibility processes. Personality traits, particularly dominance, may moderate ACT intervention outcomes.

*Keywords:* acceptance and commitment therapy (ACT), psychological flexibility, personality traits, dominance, young adults

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### IZVLEČEK

Predstavljena študija je preučevala učinkovitost intervencij terapije sprejemanja in predanosti (ACT) na spremembe v procesih psihološke fleksibilnosti pri fizično aktivnih mladih odraslih, starih med 20 in 25 let (N = 30). Poleg tega je bilo s pomočjo vprašalnika Velikih pet (BFQ) ocenjeno tudi, kakšno vlogo imajo pri tem osebnostne lastnosti. Udeleženci študije so se sami razvrstili bodisi v eksperimentalno skupino, ki je končala osem tedenske ACT-intervencije, bodisi v pasivno kontrolno skupino. Vsi udeleženci so na začetku študije izpolnili vprašalnik BFQ in večdimenzionalni vprašalnik psihološke fleksibilnosti (MPFI). MPFI so udeleženci izpolnili še enkrat po desetih tednih, medtem ko se je njihova osebnost ocenila le na začetku študije. Študija je pokazala, da so bili procesi psihološke fleksibilnosti med skupinama na začetku študije različni, pri čemer je eksperimentalna skupina izražala nižjo fleksibilnost. Po desetih tednih razlik med skupinama ni bilo več. Pri eksperimentalni skupini so bile ACT-intervencije povezane z zmanjšanjem procesov nefleksibilnosti, medtem ko so se v kontrolni skupini zmanjšali procesi fleksibilnosti. V eksperimentalni skupini je dominantnost, kot osebnostna lastnost, negativno napovedovala spremembe pri večini procesov psihološke fleksibilnosti. Medtem ko prejšnje raziskave podpirajo učinkovitost ACT-intervencij na duševno zdravje, ta študija širi trenutno razumevanje vpliva intervencij na procese fleksibilnosti in nefleksibilnosti, s poudarkom na vzorcu fizično aktivnih mladih odraslih. Osebnostne lastnosti, predvsem dominantnost, lahko vplivajo na učinke ACT-intervencij.

*Ključne besede:* terapija sprejemanja in predanosti (ACT), psihološka fleksibilnost, osebnostne lastnosti, dominantnost, mladi odrasli

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<https://doi.org/10.52165/kinsi.31.2.252-277>

## INTRODUCTION

Acceptance and Commitment Therapy (ACT) is a form of psychotherapy that belongs to the third wave of behavioural therapies. It is a therapeutic approach based on the processes of mindfulness, acceptance, present moment, commitment and behavioural activation, with the aim of promoting psychological flexibility (Hayes et al., 2006). It is an evidence-based therapy that is effective in working with various psychological problems. It is a procedural form of psychotherapy that focuses on promoting the therapeutic processes of psychological flexibility (Hayes et al., 2011).

Psychological flexibility, as conceptualised within ACT (Hayes et al., 2006), represents a set of adaptive cognitive and behavioural processes that are critical to understanding human responses to complex environments. It encompasses the ability to recognise and adapt to changing situational demands, reconfigure mental resources, shift perspectives, and balance competing wants, needs, and life domains (Kashdan & Rottenberg, 2010). Doorley et al. (2020) operationalize psychological flexibility as the tendency to respond to situations in ways that facilitate the pursuit of valued goals, arguing that psychological flexibility is most important in situations that are challenging and stressful. Research supports associations of psychological flexibility with self-compassion, satisfaction with job performance, and general well-being (Hayes et al., 2006; Kashdan & Rottenberg, 2010; Yadavaia et al., 2014), while psychological inflexibility is associated with an overwhelming number of constructs including, but not limited to, depression, anxiety, stress, substance abuse, negative body image, eating disorders, pain catastrophizing, thought suppression, job burnout, and workplace absenteeism (Bluett et al., 2016; De Boer et al., 2014; Hayes et al., 2006; Lloyd et al., 2013; Luoma et al., 2011).

A well-known concept in the field of ACT is experiential avoidance, which is a facet of psychological inflexibility. When a person is unwilling to stay in touch with a particular private experience (body sensation, emotions, thoughts, memories), behavioural therapists refer to this phenomenon as experiential avoidance, in other words, emotional avoidance or cognitive avoidance (Hayes et al., 1996). The extensive literature highlights the negative effects of experiential avoidance on mental health, in which people adopt inflexible behavioural patterns to avoid unwanted internal states such as depression, anxiety, obsessive-compulsive symptoms, and addictions, among many other psychological and behavioural challenges (Akbari et al., 2022; Luoma et al., 2011).

The ACT method has also been applied to people without severe somatic illness or psychopathological problems, where ACT interventions have shown positive or promising results in smoking cessation (Bricker et al., 2014; Gifford et al., 2004), weight maintenance (Forman et al., 2015; Lillis et al., 2011; Lillis & Kendra, 2014), and physical activity promotion (Butryn et al., 2011; 1993 et al., 2021). However, little is known about the factors that contribute to individual differences in response to ACT interventions (and processes within ACT) and how these differences can be identified and better understood. For example, which ACT processes experience the most notable changes in response to different personality traits, contributing to a more accurate understanding of the dynamic relationship between personality and ACT? To begin answering these questions, we turn to the topic of personality and the Big Five as relevant predictors of individual differences in ACT adoption.

Personality represents a relatively consistent and unique sum of an individual's psychological, cognitive, and physical traits (Musek, 1993). Personality traits are not just attributes that a person possesses. Personality traits also fundamentally shape and influence how people experience emotions (Eldesouky & English, 2019), which emotion regulation strategies they use (Gresham & Gullone, 2012) and traits also determine the ability to regulate (Ivcevic & Brackett, 2014). In recent decades, the five-factor model of personality has become the predominant model for understanding personality structure and is now the most commonly used model in personality psychology.

The Big Five traits are ideal for predicting individual differences in emotion regulation, especially in the context of psychological flexibility, as research has shown a direct link between psychological flexibility and neuroticism, extraversion and conscientiousness (Gloster et al., 2011; Kashdan et al., 2020; Kashdan & Rottenberg, 2010; Steenhaut et al., 2019). Steenhaut et al. (2019) have even shown that personality has an indirect influence on well-being via psychological flexibility in older and young adults. There is growing evidence for the effectiveness of psychological flexibility interventions based on ACT, particularly in the sports domain (Mooney, 2022), but there remains limited evidence for the moderating role of specific personality traits in influencing the outcomes of these interventions.

### **The contribution of Big Five personality traits in predicting individual differences in the adoption of ACT interventions**

Several views have been proposed for a better understanding of the relationship between personality traits and psychological flexibility. According to Kashdan & Rottenberg's (2010)

conceptualization, flexibility is highly dependent on the exact configuration of each individual's personality traits, noting that the dimensions of neuroticism and openness to experience are consistent with the five-factor model of personality. Individuals with high neuroticism scores often show persistence on self-related issues that divert attention from adaptive behaviors such as problem solving and efforts to achieve personally valuable goals (O'Brien & DeLongis, 1996). People with high levels of neuroticism have difficulty choosing strategic responses (Gunthert et al., 1999) and have difficulty disengaging from negative thoughts and feelings. This obstacle not only stands in the way of a full connection with the present moment, but also hinders alignment with values and commitment (Kashdan & Rottenberg, 2010). Better acceptance correlates with a stronger commitment to actions and behaviors that align with one's values (Hayes et al., 2011).

In the recent study by Kashdan et al. (2020), a significant relationship was found between negative emotionality and avoidance tendencies, indicating a resistance to acceptance of negative emotions and stress in athletes. Conversely, conscientiousness showed a positive correlation with increased utilization (using one's internal resources to overcome obstacles and move toward valued goals, even in the presence of discomfort or adversity) and decreased avoidance, suggesting a proactive use of internal resources to overcome challenges. Of note, the combined influence of conscientiousness and open-mindedness led to favorable results in all subscales of psychological flexibility. Athletes characterized by an open-minded personality showed an increased tendency to accept stress and negative emotions (Rutherford, 2021). Psychological flexibility even proves to be a crucial mechanism to explain the relationship between personality and well-being, as it fully explains the effect of personality on well-being in almost half of the models.

This exploration of the intricate relationships between personality, psychological flexibility, and well-being sets the stage for an intriguing investigation: are there discernible moderating effects of personality on the development of psychological flexibility through ACT interventions?

### **The present research**

The existing literature emphasizes the role of personality as a moderator that enhances well-being through positive psychological interventions (Ng, 2015). Given that positive psychological interventions have been shown to enhance well-being (Bolier et al., 2013; Gander et al., 2016; Sin & Lyubomirsky, 2009; Tejada-Gallardo et al., 2020), our study seeks

to extend this understanding by examining the nuanced interplay between personality traits and the cultivation of psychological flexibility through ACT.

Our investigation examines changes in specific processes as well as global factors of psychological flexibility and inflexibility in young, physically active adults following ACT-based group interventions, which so far have not been extensively researched. Previous research in this area has primarily relied on a global measure (AAQ) that does not distinguish between individual processes of flexibility and inflexibility, leaving the distinct effects of ACT on individual processes largely unexplored. Additionally, this study explores the moderating and predictive roles of personality traits in the adoption of ACT processes, with the aim of identifying personality profiles most likely to engage with and benefit from ACT interventions, thereby supporting improved psychological functioning in physically active populations.

## METHODS

### Participants

A total of 60 participants were included in the study, 29 of whom signed up for the experimental group and 31 for the control group. The participants were between 20 and 25 years old. Of these participants, 31 were female and 29 were male, i.e. both genders were equally represented. All participants were physically active students who exercised more than five hours per week. None of the participants had previous experience with psychological interventions or training, and all were physically healthy and had no psychopathological symptoms. The experimental group participated in eight one-hour ACT interventions over an eight-week period and were psychologically assessed before and after the intervention. The control group only received the psychological assessments. The 29 participants in the experimental group had an average age of 21.61 years ( $SD = 3.33$ ), 14 of whom were female (48.3%). The mean age of the control group was 21 years ( $SD = 3.25$ ), of which 17 were female (54.8%). Participants were recruited using a systematic approach. Methods such as the snowball system and online advertisements were used, with the latter also being distributed via student organisations. All participants took part in the study voluntarily. Before the study began, participants were informed about the purpose and procedures of the study and signed an informed consent form. All participants completed the follow-up survey. This study was

approved by the Ethics Committee for Sport at the Faculty of Sport, University of Ljubljana, Slovenia.

### Measures

Big Five Questionnaire designed to measure personality traits in individuals aged 14 and older (BFQ, Slovene edition; Caprara et al., 1997) evaluates the five capital domains of personality along with ten facets: energy (subcategories activity and dominance), acceptability (subcategories cooperation and kindness), consciousness (subcategories precision and perseverance), emotional stability (subcategories emotional control and impulse control) and openness (subcategories openness for culture and openness for experience). Participants were required to rate the extent to which each statement described them, using a 5-point scale ranging from 1 (strongly disagree) to 5 (strongly agree). The questionnaire consists of 132 items grouped into ten scales. In addition to the five dimensions of personality and their sub-dimensions, the BFQ includes an additional scale of sincerity, which assesses an individual's tendency to provide socially desirable responses. The BFQ was translated, adapted, and standardized for use in the Slovenian context and has adequate psychometric properties. The reliability coefficients of the BFQ dimensions in the Slovenian context were high (energy  $\alpha = .83$ ; agreeableness  $\alpha = .76$ ; conscientiousness  $\alpha = .83$ ; emotional stability  $\alpha = .87$ ; openness  $\alpha = .80$ ; and sincerity  $\alpha = .80$ ) (Bucik et al., 1997).

Multidimensional psychological flexibility inventory (MPFI) consists of five items (i.e., statements) for each of the six dimensions of pflexibility (PF) and the six dimensions of psychological inflexibility (PI), respectively, totalling 60 items. The dimensions include (PF/PI): acceptance/experiential avoidance; contact with the present moment/lack of contact with the present moment; self as context/self as content; defusion/fusion; committed action/inaction; and values/lack of contact with values (Rolffs et al., 2018). Participants were required to rate the frequency of experiencing each statement over the past two weeks, using a 6-point scale ranging from 1 (never true) to 6 (always true). The English MPFI has demonstrated strong psychometric properties, including robust support for a model with 12-factor loadings onto two higher-order factors, significant correlations with the most widely-used measures of inflexibility (i.e., AAQ, AAQ-II, and AFQ-Y), and estimated Cronbach's  $\alpha$  values for the different subscales ranging from .87 to .95. In the first sample, the Cronbach's  $\alpha$  values for the six subscales of PF range from .82 to .94, while for the six subscales of PI, the values range from .83 to .94. In the second sample, the Cronbach's  $\alpha$  values for the six

subscales of PF range from .73 to .90, and for the six subscales of PI, the values range from .70 to .89 (Rolffs et al., 2018).

## Procedure

The ACT interventions were conducted at the Faculty of Sport in Slovenia under the guidance of a trained facilitator with a background in physical education. To ensure standardization and optimal delivery of the ACT interventions, supervision was provided by a licensed clinical psychologist. The ethical considerations of the study were reviewed and approved by the ethics committee for ethical issues related to sports. After the initial measures of personality (Big Five Questionnaire, BFQ) and psychological flexibility (Multidimensional Psychological Flexibility Inventory, MPFI), the experimental group was introduced to the ACT approach in the first session, where participants were familiarized with ACT constructs such as psychological flexibility, destructive normality, and rational framing theory. The group was also informed about the purpose of the interventions, the program structure, and the roles and responsibilities of the participants. The interventions were conducted over a period of eight weeks, with one 45-minute session per week. This means that the experimental group received a total of 6 hours of ACT interventions. The program consisted of six modules based on the processes of ACT, with a separate intervention assigned to each process. They were presented in the following order: values clarification, defusion, present moment, acceptance, self as context, committed action. The program was predominantly text-based and included information on each topic, wellbeing tasks, experiential exercises and relevant metaphors. All exercises were available to participants in the form of a flashcard at the interventions and were also accessible in digital form throughout the program. Participants were encouraged to follow the modules of the program, but also had the opportunity to explore and tailor the content to their individual needs. Participants completed ACT exercises and recorded their experiences on reflection paper, which was kept in a secure locker until the next intervention. Participants also had full access to personalized feedback on their questions related to the interventions and exercises during and after the intervention. The final intervention served to summarize the entire program and provided participants with the opportunity to ask final questions and make additional entries in their reflection papers if they wished to revisit or extend certain exercises. The purpose of the tailored feedback, given in accordance with ACT principles, was to tailor the content of the program to each participant's needs by guiding them step-by-step through the program content, motivating participants, encouraging behavioral activation when needed, and empathetically encouraging them to continue despite potential

challenges. The final session served as a follow-up, during which the MPFI was measured again. The control group, who had only completed the initial psychological measurements, underwent a second MPFI assessment after eight weeks without any intervention.

Data collection took place between February and September 2023 at the Faculty of Sport in Ljubljana (Slovenia). After informed consent, participants completed the questionnaires individually and anonymously. A series of standardized self-assessments were conducted at the beginning of the study and again after eight weeks. Statistical analysis revealed no significant age differences between the experimental group ( $n = 29$ ) and the control group ( $n = 31$ ). The data was analyzed using SPSS version 15.0 and Excel.

## RESULTS

Table 1. Comparison of personality traits of groups of participants.

	Experimental group		Control group		<i>t</i>	<i>sig (t)</i>	Cohen's <i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
Lie scale	31.24	5.15	31.32	5.59	-0.06	0.48	5.38
Dynamism	38.38	6.10	40.32	6.40	-1.20	0.12	6.26
Dominance	37.79	5.78	38.65	6.44	-0.54	0.30	6.13
Cooperativeness	43.48	3.88	43.39	5.70	0.08	0.47	4.91
Politeness	39.93	5.44	39.26	7.60	0.39	0.35	6.64
Scrupulousness	40.72	6.13	39.65	7.68	0.60	0.28	6.97
Perseverance	43.38	7.20	43.68	5.21	-0.18	0.43	6.25
Emotion control	35.59	6.41	38.58	9.19	-1.47	0.07	7.97
Impulse control	33.41	6.42	34.06	7.60	-0.36	0.36	7.06
Openness to culture	36.38	5.83	35.45	6.07	0.60	0.27	5.95
Openness to experiences	40.21	6.10	38.84	4.72	0.97	0.17	5.42
Energy	76.17	10.24	78.97	11.44	-0.99	0.16	10.88
Friendliness	83.41	8.65	82.65	11.43	0.29	0.39	10.18
Conscientiousness	84.10	11.24	83.32	8.97	0.30	0.38	10.13
Emotional stability	69.00	11.51	72.65	15.18	-1.04	0.15	13.53
Openness	76.43	10.37	74.29	7.70	0.90	0.18	9.06

The results in Table 1 show that there were no differences in the personality traits between the participants in the experimental group and the control group. No differences were found in either the 5 main traits or the 10 sub-traits of the Big Five model. There were also no

differences in the lie scale, i.e. we can truly say that the personality structure of the two groups of participants was the same.

Table 2. Group comparison of psychological flexibility and inflexibility subscales before and after the intervention.

	Experimental group		Control group		<i>t</i>	<i>sig</i> ( <i>t</i> )	Cohen's <i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
<i>Before intervention</i>							
<b>Global flexibility</b>	<b>3.74</b>	<b>0.50</b>	<b>4.18</b>	<b>0.66</b>	<b>-2.90</b>	<b>0.01</b>	<b>-0.74</b>
Acceptance	3.26	0.87	3.71	1.04	-1.83	0.04	0.96
Present moment awareness	4.06	0.76	4.28	0.97	-1.01	0.16	0.88
Self as context	3.78	0.92	4.33	0.90	-2.33	0.01	0.91
Defusion	3.00	0.79	3.54	0.91	-2.42	0.01	0.86
Values	4.34	0.87	4.68	0.89	-1.49	0.07	0.88
Committed action	4.02	0.82	4.54	0.92	-2.29	0.01	0.87
<b>Global inflexibility</b>	<b>2.77</b>	<b>0.55</b>	<b>2.50</b>	<b>1.00</b>	<b>1.29</b>	<b>0.20</b>	<b>0.33</b>
Experiential avoidance	3.52	0.90	3.37	1.25	0.51	0.31	1.10
Lack of contact with the present moment	2.35	0.89	2.08	1.01	1.09	0.14	0.95
Self as content	3.11	0.99	2.81	1.24	1.04	0.15	1.13
Fusion	2.91	1.01	2.65	1.41	0.84	0.20	1.24
Lack of contact with values	2.37	0.71	2.01	1.02	1.54	0.06	0.88
Inaction	2.37	1.05	2.10	1.22	0.91	0.18	1.14
<i>After intervention</i>							
<b>Global flexibility</b>	<b>3.89</b>	<b>0.60</b>	<b>3.95</b>	<b>0.72</b>	<b>-0.32</b>	<b>0.75</b>	<b>-0.08</b>
Acceptance	3.58	0.84	3.47	0.99	0.45	0.33	0.92
Present moment awareness	4.12	0.81	4.18	0.86	-0.29	0.39	0.84
Self as context	3.94	0.84	4.16	0.88	-0.98	0.17	0.86
Defusion	3.26	0.74	3.40	0.90	-0.64	0.26	0.83
Values	4.30	0.92	4.34	0.90	-0.14	0.45	0.91
Committed action	4.14	0.78	4.12	1.00	0.07	0.47	0.90
<b>Global inflexibility</b>	<b>2.45</b>	<b>0.58</b>	<b>2.49</b>	<b>0.76</b>	<b>-0.24</b>	<b>0.81</b>	<b>-0.06</b>
Experiential avoidance	3.11	0.75	3.23	1.07	-0.48	0.32	0.93
Lack of contact with the present moment	2.18	0.87	2.32	0.90	-0.59	0.28	0.89
Self as content	2.50	0.83	2.74	1.25	-0.86	0.20	1.07
Fusion	2.44	0.83	2.62	1.17	-0.68	0.25	1.02
Lack of contact with values	2.13	0.75	2.12	0.85	0.07	0.47	0.80
Inaction	2.29	0.97	1.95	0.75	1.53	0.07	0.86

Table 2 shows the dimensions of psychological flexibility and inflexibility of the participants in the experimental and control groups before and after the intervention. Before the intervention, the control group showed a higher statistically significant difference in the factor of global psychological flexibility ( $t = -2.90, p = .01, d = -0.74.$ ) compared to the experimental group. This difference was also reflected in several dimensions of psychological flexibility, with self as context ( $t = -2.33, p = .01, d = .91$ ), defusion ( $t = -2.42, p = .01, d = 0.86$ ), committed action ( $t = -2.29, p = .01, d = 0.87$ ) and acceptance ( $t = -1.83, p = .04, d = 0.96$ ) all showing statistically significant differences.

There were no statistical differences in any of the other flexibility dimensions and there were no statistical differences in global inflexibility and its dimensions.

After the psychological flexibility intervention, there were no more statistical differences between the groups.

Table 3. Comparison of baseline and post-intervention psychological flexibility dimensions in the experimental group.

	Before intervention		After intervention		<i>t</i>	<i>sig (t)</i>	Cohen's <i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
<b>Global flexibility</b>	<b>3.74</b>	<b>0.50</b>	<b>3.89</b>	<b>0.60</b>	<b>-1.03</b>	<b>0.31</b>	<b>-0.27</b>
Acceptance	3.26	0.87	3.58	0.84	-1.73	0.05	1.01
Present moment awareness	4.06	0.76	4.12	0.81	-0.39	0.35	0.86
Self as context	3.78	0.92	3.94	0.84	-0.97	0.17	0.92
Defusion	3.00	0.79	3.26	0.74	-1.58	0.06	0.89
Values	4.34	0.87	4.30	0.92	0.20	0.42	0.92
Committed action	4.02	0.82	4.14	0.78	-0.90	0.19	0.70
<b>Global inflexibility</b>	<b>2.77</b>	<b>0.55</b>	<b>2.45</b>	<b>0.58</b>	<b>2.10</b>	<b>0.04</b>	<b>0.56</b>
Experiential avoidance	3.52	0.90	3.11	0.75	2.12	0.02	1.03
Lack of contact with the present moment	2.36	0.91	2.18	0.87	1.09	0.14	0.87
Self as content	3.11	0.99	2.50	0.83	3.61	0.00	0.90
Fusion	2.91	1.01	2.44	0.83	3.02	0.00	0.84
Lack of contact with values	2.37	0.71	2.13	0.75	1.80	0.04	0.70
Inaction	2.37	1.05	2.29	0.97	0.39	0.35	1.05

Table 3 shows some changes in the psychological flexibility of the participants in the experimental group after the intervention they underwent. They were better in acceptance and

there was also less experiential avoidance as the negative counterpart of acceptance. They also found it easier to see out of context as they saw themselves less as content people, there was significantly less fusion and they became more in touch with their values. These changes are reflected in the significant reduction in the global inflexibility factor ( $t = 2.10, p = .04, d = 0.56$ ), indicating that the ACT interventions reduced participants' psychological rigidity.

Table 4. Comparison of baseline and post-intervention psychological flexibility in the control group.

	Before intervention		After intervention		<i>t</i>	<i>sig (t)</i>	Cohen's <i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
<b>Global flexibility</b>	<b>4.18</b>	<b>0.66</b>	<b>3.95</b>	<b>0.72</b>	<b>1.33</b>	<b>0.19</b>	<b>0.34</b>
Acceptance	3.71	1.04	3.47	0.99	1.34	0.10	0.99
Present moment awareness	4.28	0.97	4.18	0.86	0.55	0.29	1.05
Self as context	4.33	0.90	4.16	0.88	1.13	0.13	0.82
Defusion	3.54	0.91	3.40	0.90	0.85	0.20	0.89
Values	4.68	0.89	4.34	0.90	2.41	0.01	0.79
Committed action	4.54	0.92	4.12	1.00	2.44	0.01	0.94
<b>Global inflexibility</b>	<b>2.50</b>	<b>1.00</b>	<b>2.49</b>	<b>0.76</b>	<b>0.04</b>	<b>0.97</b>	<b>0.01</b>
Experiential avoidance	3.37	1.25	3.23	1.07	0.64	0.26	1.29
Lack of contact with the present moment	2.08	1.01	2.32	0.90	-1.71	0.05	0.76
Self as content	2.81	1.24	2.74	1.25	0.44	0.33	0.81
Fusion	2.65	1.41	2.62	1.17	0.17	0.43	0.84
Lack of contact with values	2.01	1.02	2.12	0.85	-0.70	0.24	0.82
Inaction	2.10	1.22	1.95	0.75	0.96	0.17	0.86

Table 4 shows some of the changes that occurred in the control group participants in the dimensions of psychological flexibility, even though they did not participate in the interventions. The post-intervention measurements showed that the control group participants were less clear about their values and less committed to action, while also feeling less in touch with the present moment. These psychological flexibility dimensions were statistically noteworthy, but did not affect either the global flexibility or inflexibility factor in any meaningful way.

The purpose of this experiment was to determine whether certain personality traits predicted changes in psychological flexibility and inflexibility following the ACT-based interventions. First, we wanted to analyse the significant correlations between these two constructs to examine the detailed relationship between them. As can be seen in Table 5, we found several significant correlations. Energy ( $r = -0.43, p < .05$ ) and dominance ( $r = -0.50, p < .01$ ) showed a negative correlation with changes in global psychological inflexibility, suggesting that lower levels of these traits were associated with greater reductions in inflexibility. Similarly, the psychological inflexibility dimension of inaction, was significantly negatively correlated with dominance ( $r = -0.51, p < .01$ ), energy ( $r = -0.53, p < .01$ ) and dynamism ( $r = -0.42, p < .05$ ). A decrease in inflexibility subscales of experiential avoidance positively correlated with emotional control ( $r = 0.41, p < .05$ ), suggesting that participants with more emotional control are less avoidant. Scrupulousness ( $r = -0.40, p < .05$ ) was also negatively associated with a decrease in lack of contact with values. Personality traits and sub-traits that correlated with the flexible side of psychological flexibility included the following: An increase in committed action showed three negative correlations with friendliness ( $r = -0.49, p < .01$ ), cooperativeness ( $r = -0.43, p < .05$ ), and politeness ( $r = -0.48, p < .01$ ), suggesting that less agreeable individuals show greater improvements in committed action.

Table 5. Correlation of personality traits and changes in flexibility after flexibility intervention.

	Increase					Decrease			
	Global flexibility	Acceptance	Present moment awareness	Defusion	Committed action	Global inflexibility	Experiential avoidance	Lack of contact with values	Inaction
Lie scale		-0.52**							
Energy						-0.43*			-0.53**
Dynamism									-0.42*
Dominance						-0.50**			-0.51**
Friendliness					-0.49**				
Cooperativeness					-0.43*				
Politeness					-0.48**				
Conscientiousness									
Scrupulousness								-0.40*	
Emotional stability			-0.41*	-0.46*					
Emotion control							0.41*		
Impulse control	-0.39*		-0.49**	-0.47*					

Note: \*Correlation is significant at the 0.05 level (2-tailed); \*\*Correlation is significant at the 0.01 level (2-tailed).

Emotional stability and impulse control correlated negatively with an increase in defusion as well as present moment awareness. Acceptance was also found to correlate negatively with a lie scale. The global flexibility factor was significantly associated only with impulse control ( $r = -0.39, p < .05$ ), suggesting that lower impulse control predicted greater overall increases in psychological flexibility. When we see correlations between personality sub-dimensions and flexibility changes, these are also evident at the personality level. Due to the fact that we found correlations, we also wanted to see whether predictions could be made, i.e. whether personality can influence changes in flexibility.

Table 6. Regression of personality traits on changes in flexibility.

	<i>R</i>	<i>R Square</i>	Adjusted <i>R Square</i>	<i>F</i>	<b>Sig.</b>	<b>Significant predictors (Beta, sig)</b>
<b><i>Increase</i></b>						
<b>Global flexibility</b>	0.80	0.64	0.39	2.57	<b>0.04</b>	Dominance (-0.08; 0.00), Lie scale (-0.06, 0.04)
Acceptance	0.74	0.55	0.25	1.81	<b>0.14</b>	
Present moment awareness	0.77	0.60	0.32	2.17	<b>0.08</b>	Impulse control (-0.81; 0.10)
Self as context	0.77	0.60	0.32	2.17	<b>0.08</b>	Dominance (-0.77; 0.00), Cooperativeness (-0.50; 0.04), Friendliness (0.68; 0.03)
Defusion	0.80	0.63	0.38	2.52	<b>0.05</b>	Dominance (-0.70; 0.01), Perseverance (0.62; 0.03)
Values	0.77	0.59	0.31	2.11	<b>0.09</b>	Dominance (-0.78; 0.00), Scrupulousness (0.78; 0.01), Impulse control (-1.17; 0.02), Emotional stability (1.31; 0.02)
Committed action	0.80	0.64	0.39	2.57	<b>0.04</b>	Dominance (-0.67; 0.01), Openness (1.14; 0.04)
<b><i>Decrease</i></b>						
<b>Global inflexibility</b>	0.80	0.64	0.37	2.40	<b>0.06</b>	Dominance (-0.06; 0.02)
Experiential avoidance	0.71	0.50	0.16	1.48	<b>0.23</b>	
Lack of contact with the present moment	0.68	0.47	0.07	1.19	<b>0.37</b>	
Self as content	0.74	0.54	0.23	1.74	<b>0.15</b>	
Fusion	0.70	0.49	0.13	1.37	<b>0.28</b>	
Lack of contact with values	0.68	0.46	0.09	1.25	<b>0.33</b>	
Inaction	0.77	0.59	0.31	2.09	<b>0.09</b>	Dominance (-0.57; 0.03)

The results in Table 6 show that changes in psychological flexibility can be predicted by personality traits. The increase in defusion and committed action can be predicted with statistical significance. For both characteristics, a higher increase will occur in individuals who have lower dominance. Higher perseverance will help a person to improve in defusion and more openness will lead to more committed action. We also took a closer look at some traits of psychological flexibility where we can speak of a tendency towards statistical significance, e.g. increase in awareness of the present moment, self as context and values, and a decrease in inaction. It is interesting to note that dominance almost always plays an important role, in the sense that changes towards a more psychologically flexible person are more likely to occur in people who are not very dominant. Dominance was the only trait that significantly predicted both global factors: an increase in global flexibility ( $p = .04$ ) and a decrease in global inflexibility ( $p = .06$ ), with the former showing slightly higher statistical significance. Individuals with a lower levels of dominance responded more positively overall to the ACT interventions. They showed a greater increase in adaptive psychological processes (flexibility) and a greater decrease in maladaptive processes (inflexibility). This suggests that individuals with low dominance may be more open to change or more responsive to the core mechanisms of ACT.

## DISCUSSION

Research has shown that ACT based interventions promote well-being (Katajavuori et al., 2023) and improve general distress (Prudenzi et al., 2021). To better understand the mechanisms of change in ACT, researchers have investigated the impact of interventions on both psychological flexibility and inflexibility, exploring how underlying processes contribute to therapeutic change. Our investigation examines changes in specific processes as well as global factors of psychological flexibility and inflexibility in young, physically active adults following ACT-based group interventions, which so far have not been extensively researched. Previous research in this area has primarily relied on a global measure (AAQ) that does not distinguish between individual processes of flexibility and inflexibility, leaving the distinct effects of ACT on individual processes largely unexplored. Additionally, this study explores the moderating and predictive roles of personality traits in the adoption of ACT processes, with the aim of identifying personality profiles most likely to engage with and

benefit from ACT interventions, thereby supporting improved psychological functioning in physically active populations.

*Aim 1: A change in psychological flexibility factors*

The first aim in our study was to see what changes happened in dimensions of psychological flexibility after ACT interventions in young physically active population. Our data (

Table 3) show that a change happened on all levels of psychological flexibility dimensions, where most statistical differences happened in inflexibility sub-dimensions. After interventions participants were less seeing themselves as content, were less fused with their thoughts, were able to find more contact with their values and were less avoidant.

The only psychological flexibility process that emerged statistically significant was Acceptance. These changes were also reflected in global factors as well, where intervention group exhibited a statistically significant decrease in global psychological inflexibility ( $p = .04$ ).

It is important to note that the control group initially showed higher levels of global psychological flexibility compared to the intervention group. However, after the interventions, this gap closed, and the two groups exhibited comparable scores, suggesting a potential effect of the intervention on enhancing flexibility or at least maintaining it.

We emphasise that although the global psychological flexibility factor did not significantly change in the intervention group following the interventions, a notable decline was observed in the control group in the second measurement. Specifically, the control group exhibited a significant reduction in values-based action and commitment, which contributed to a substantial drop in their overall flexibility scores. Young adults, specifically university students are exposed to mental health problems (Auerbach et al., 2018; Bruffaerts et al., 2018), where they can have an effect in both academic as well as personal domains.

Our research shows that even physically active young adults over time become less engaged in committed action and their values become less clear. These two MPFI subscales show strong correlations with current levels of vitality (Rolffs et al., 2018). A decrease in these psychological flexibility processes would suggest a decrease in motivation, diminished sense of purpose and more vulnerability to stress.

To our knowledge, this study is the first to comprehensively evaluate changes across all dimensions of psychological flexibility and inflexibility in response to a group-based ACT interventions.

This study builds on the recent comprehensive review by Rolffs et al. (2018), which synthesised core dimensions of psychological flexibility across current research evaluating outcomes of ACT interventions. Their findings highlighted that ACT interventions lead to significant improvements across global dimensions and sub-dimensions of psychological flexibility and inflexibility, specifically robust improvements in acceptance, global inflexibility, cognitive fusion, self as content, committed action, and defusion. Consistent with these findings, our results also demonstrated that the most notable changes occurred within the dimensions of psychological inflexibility.

These findings suggest that while ACT interventions were theoretically designed to enhance psychological flexibility (Hayes et al., 2006), in practice, they predominantly target psychological inflexibility and its associated processes. Even within our population of healthy, physically active young adults, ACT interventions produced notable changes predominantly in the dimensions of psychological inflexibility.

Our findings also align with the work of Rolffs et al. (2018), the only study to our knowledge that has used the MPFI to examine specific changes in psychological flexibility and inflexibility dimensions following an ACT interventions. Their case study of a single female client who completed a 4-session ACT-based group therapy demonstrated significant improvements in global psychological inflexibility and specific dimensions such as self as content and lack of contact with values, while again not showing any change in dimension of psychological flexibility.

ACT interventions seem to cause similar changes in psychological inflexibility dimensions in a wide range of contexts, including diverse delivery formats, populations, and treatment mechanisms. This suggests that ACT exercises and metaphors do not need to be overly specific for a particular psychological problem or individual for them to be effective at producing immediate relief from negative symptoms.

Although ACT interventions appear effective at relieving negative symptoms by targeting psychological inflexibility, they should also aim to enhance specific psychological flexibility processes of values and committed action.

At the same time the most interesting finding in our first aim was the drop in global psychological flexibility and its processes of values and committed action in the control group. These two MPFI sub-scales show strong correlations with vigour (Rolffs et al., 2018), indicating their importance in sustaining motivation, engagement, and a sense of purpose. Our findings highlight the potential importance of interventions that specifically target these components of psychological flexibility. In particular ACT interventions that emphasise values and committed action may be especially effective in addressing the psychological needs of physically active young adults.

ACT interventions might be better at targeting psychological flexibility processes if they were more informed by individual differences in personality traits.

Integrating personality-focused approaches within ACT interventions could enhance their effectiveness by tailoring them to address individual differences in personality (Kashdan et al., 2020). The literature has begun exploring this approach through the development of the Personalized Psychological Flexibility Index (PPFI) (Jo et al., 2023), which assesses flexibility specifically in the context of personal values and valued goals. This tool may offer valuable insights into how individuals regulate emotions and behaviors in dynamic environments, potentially guiding therapists in selecting or tailoring exercises and metaphors to better suit each individual's unique needs. This approach may foster changes specifically within dimension of psychological flexibility. To expand on this area our second aim in this study was to examine the influence of personality on changes in psychological flexibility dimensions after group ACT interventions in young physically active adults.

### *Aim 2: Relationship of personality and psychological flexibility*

In recent years there has been a big move towards researching the relationship between personality and psychological flexibility (Kashdan et al., 2020). Personality-informed approach can address the designing of psychological interventions to make them more effective (Rebele et al., 2021). Our study focused on researching the influence of personality on the adoption of group based psychological interventions, specifically which psychological flexibility processes are most influenced by which personality traits in physically active young adults.

When we examined correlations between personality traits and psychological flexibility dimensions, we found that developing psychological flexibility through group ACT interventions may be more challenging for impulsive individuals. Specifically, they struggle

to cultivate greater openness and adaptability through processes such as present moment awareness and defusion, as they tend to suppress impulses even during novel experiences that could provide deeper insight into their functioning. Similarly, emotionally stable individuals may be less motivated to develop mindfulness and defusion skills, as they experience fewer intense or distressing emotions and may be less attuned to subtle internal experiences.

In the same vein, energetic and highly dominant individuals who are impatient may find it difficult to engage with ACT interventions, which require experiential and emotional openness to internal experiences. For these individuals, ACT interventions may seem counterintuitive or even threatening, potentially leading to resistance or superficial engagement with group interventions.

Values and values-based committed action are important for a meaningful life (Hayes, 2016; Katajavuori et al., 2023), and personality traits such as conscientiousness and agreeableness may influence individuals' ability to connect with and act on their values. Our findings suggest that individuals who are overly structured and adhere rigidly to rules and personal standards have difficulty clarifying deep personal values or developing new, self-defined flexible values. Following these values can be particularly challenging for agreeable and polite individuals if the new values disrupt social harmony or create interpersonal conflict.

The only trait in our research that positively correlated with the adoption of ACT interventions was emotional stability. Individuals who are calm and emotionally resilient were more willing to experience distress associated with difficult internal experiences through ACT intervention exercises.

These results are particularly relevant for physically active young adults, a population often characterized by ongoing personality trait change, particularly in dimensions such as emotional stability, conscientiousness, and extraversion (Robinson et al., 2015). Traits such as impulsivity and dominance are commonly reinforced in competitive and performance-oriented environments, where quick decision-making and assertiveness are valued. Emotional stability may also be more prevalent due to the psychological benefits of regular physical activity. However, these same traits may hinder engagement with ACT interventions, which require openness, reflection, and experiential processing. This suggests that tailoring ACT approaches to account for the personality profiles typical of this population may improve intervention effectiveness.

To further expand on the relationship between personality dimensions and psychological flexibility processes, we aimed to investigate whether specific personality dimensions could predict changes in particular processes within an ACT intervention. By identifying these predictive relationships, we can gain valuable insights into how individual differences may influence treatment outcomes in physically young adults.

It is noteworthy that personality dimensions predominantly predicted changes in psychological flexibility processes, whereas inflexibility processes were largely unaffected.

Our findings show that trait dominance is a central personality dimension influencing responsiveness to ACT interventions, exerting the strongest and most widespread influence across the majority of psychological flexibility processes.

Dominant individuals tend to prioritise control, assertiveness, and goal-directed behaviour, which can conflict with the foundational principles of ACT interventions. ACT emphasises openness to internal experience, behavioural flexibility, and a commitment to actions guided by personal values rather than rigid goals or externally imposed standards. This mismatch may hinder the effectiveness of ACT for highly dominant individuals, who are more likely to resist the therapeutic stance of relinquishing control and embracing psychological discomfort. Such resistance may also manifest in a tendency toward idealised self-presentation, as suggested by elevated scores on the lie scale. Dominant individuals may also remain passive, avoidant and could struggle with actively engaging in intervention process, limiting their capacity to benefit from key ACT interventions.

Our data shows that dominant physically active young adults may find it difficult to engage with ACT processes such as values, committed action, defusion, and self as context due to the highly structured and externally driven nature of their daily lives. With routines shaped by training programs and academic demands, they may struggle to connect with intrinsic values and also act on them without external direction. Defusion can be particularly challenging, as it involves distancing from rigid self-referential thoughts that align with their control-oriented mindset. Similarly, the process of self as context may conflict with their stable and authoritative self-concept, making it harder to adopt a flexible, observer perspective.

On the other hand, individuals who are emotionally stable and less prone to impulsive behaviour may be better able to connect with their internal values at a deeper level, as they are more capable of tolerating discomfort and maintaining clarity in the face of challenging

internal experiences. Similarly, open individuals are likely to engage more in value-based actions, as they tend to be receptive to new experiences and introspective processes. Those with high levels of perseverance may show greater improvement in defusion skills, as their capacity for sustained effort and persistence supports the development of cognitive distancing from rigid or unhelpful thoughts.

### **Limitations**

First, the study relied solely on self-assessments, which are susceptible to biases such as social desirability and subjective interpretation. Future research could address this limitation by incorporating standardised and clinically validated assessment tools that are less susceptible to such biases. Although personality is typically considered a stable construct, future studies could measure personality traits both pre- and post-intervention to examine whether significant changes occur.

In terms of measuring psychological flexibility and inflexibility, the use of weekly diaries to track fluctuations in psychological flexibility/inflexibility processes during the intervention could provide more detailed insights. This approach would allow researchers to better understand the dynamic nature of psychological flexibility and how ACT interventions affect specific psychological flexibility processes. Furthermore, additional behavioural observations to assess participant engagement and the inclusion of measures of well-being could help to identify potential moderators or mediators within the psychological flexibility processes.

Second, the study design was quasi-experimental, with participants self-selecting into the intervention group. This leads to a potential selection bias, as individuals who are predisposed to change or more motivated are more likely to have participated. Future research using randomised controlled trials (RCTs) would strengthen the causal conclusions and mitigate the selection bias.

Third, the sample was limited to physically active young adults, a population that often shows weaker intervention effects compared to clinical samples. This limits the generalizability of the results to other populations or age groups. Future studies should include a more diverse range of participants to investigate whether personality traits predict changes in psychological flexibility in a broader context.

Fourth, there is a lack of studies that comprehensively examine all dimensions of psychological flexibility and inflexibility, which limits direct comparisons and

contextualization of results. Although our results suggest that ACT interventions primarily influence processes of inflexibility rather than flexibility, these interpretations should be taken with caution after accounting for personality traits. Future research should further investigate how psychological inflexibility and flexibility processes change independently and interactively in different populations to further clarify the treatment mechanisms involved in ACT interventions.

Longitudinal studies are needed to examine the dynamic interplay between personality traits and psychological flexibility over time. By examining how personality traits influence changes in specific psychological flexibility processes, researchers can develop more targeted interventions that promote lasting behavioural change and possibly even personality development.

## CONCLUSION

This study aimed to investigate the impact of ACT-based group interventions on the psychological flexibility and inflexibility processes of physically active young adults and to examine the predictive role of personality traits in shaping these changes. Using the MPFI, we were able to assess changes across distinct dimensions of psychological flexibility and inflexibility, allowing for a more nuanced understanding of how ACT interventions influence psychological functioning. Our findings showed that the intervention primarily led to improvements in psychological inflexibility processes, with limited effects observed on flexibility dimensions.

Dominance emerged as the most influential personality trait in predicting changes across several flexibility processes, including values, committed action, defusion, and self as context. This suggests that individuals high in dominance may have difficulty engaging with core ACT principles, which emphasise openness, acceptance, and flexible engagement with personal values. In contrast, individuals with high emotional stability, openness, friendliness, and perseverance demonstrated greater responsiveness to ACT processes, suggesting that these traits may facilitate deeper engagement with the intervention and support sustained psychological change.

The daily life of a physically active young adult is strongly shaped by academic demands and structured training regimens, which may weaken their connection to intrinsic values and make

it more difficult to act in accordance with them. These environmental factors, combined with dominant personality traits, may reduce the capacity to benefit from ACT unless the intervention is adapted to address these barriers directly. Importantly, our findings also suggest that psychological flexibility and inflexibility are not simple opposites but may vary independently, with trait- and context-specific factors influencing each differently.

Overall, this research underscores the value of integrating personality assessment into ACT-based interventions. By identifying traits that either support or hinder engagement with specific ACT processes, interventions can be more precisely tailored to individual needs. Future work should continue to explore how personality-informed adaptations can improve ACT's effectiveness across different populations and settings, particularly in structured, high-demand environments such as those faced by physically active young adults.

### Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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