

DOI <https://doi.org/10.30525/2592-8813-2023-2-5>

EXPLICIT AND IMPLICIT ATTITUDES TOWARDS HARDINESS IN VARIOUS OCCUPATIONAL GROUPS

Irina Plotka

*Doctor of Psychology, Professor at the Department of Psychology,
Baltic International Academy (Riga, Latvia)
irinaplotka@inbox.lv*

Nina Blumenau

*Doctor of Engineering Sciences, Associate Professor at the Department of Psychology,
Baltic International Academy (Riga, Latvia)
nina.blum@gmail.com*

Abstract. The aim of the research was to identify the features of explicit and implicit assessments of hardiness and its components obtained for participants whose occupations are associated with risk: security guards, long-distance lorry drivers, footballers from one of the top football league teams; participants with occupations associated with unconditional execution of orders. Measurements were made using specially designed four modifications of the classical IAT and the self-report procedure Bartone's Dispositional Resilience Scale. The study showed that there are differences in implicit and explicit attitudes towards hardiness and its components in groups of participants from different occupations: most guards and long-distance lorry drivers revealed a negative implicit challenge; the majority of 'soldiers' were found to have negative attitudes towards the commitment. The vast majority of long-distance lorry drivers showed matches of the measurements results. The independence of implicit and explicit 'overall' attitudes toward hardiness, and their content, is also shown.

Key words: Hardiness, Commitment, Control, Challenge, Implicit measures, Implicit Associative Test (IAT).

The concept of attitude is one of the central concepts in psychology, as it is associated with human behaviour. The essence of an attitude is that it characterises an individual's attitude to a certain object, based on his/her assessments. Since the mid-1990s, research on attitudes has been shaped by a dualism that has gained enormous popularity across all areas of psychology: the implicit-explicit dualism (s. Gawronski & Payne, 2010), which has its roots in the development of a new class of indirect measurement instruments, distinct from direct measurement instruments based on self-report. A central feature of these instruments is that they rely on experimental procedures adapted from cognitive psychology. They are known as implicit measures, whereas self-reported measures are called explicit ones. A key feature of implicit measures applied to the study of attitudes is that evaluative responses are inferred from objective performance indicators, such as participants' speed and accuracy in responding to attitudinal stimuli (Gawronski et al., 2020).

Implicit attitudes are mainly the result of associative processes. Explicit attitudes are mainly the result of propositional processes. Explicit measurements are direct, controlled, and conscious. They measure the conscious assessments that come to subjects' minds after some deliberation (Petty, Fazio & Briñol, 2009). They are direct, since the participant is aware of what is being measured. They are based on explicit knowledge of oneself and allow to adequately measure the true attitude to the extent that the individual is aware of it and that he/she is ready to publicly express his/her attitude. Advances in social cognition have made it possible to study many psychological constructs not only on a controlled, but also on an automatic level. Implicit measurements, which are indirect, automatic, and unconscious, are associated with a more effective assessment of attitudes since they do not involve deliberate assessments or strategic manipulation (e.g., socially desirable judgment). Implicit measurements are based on measuring the reaction time (RT) of the participants performing various tasks and their attention being focused on the task completion, and not on the object of attitude (Rudman, 2011).

Implicit Association Test (IAT). One of the main implicit procedures is the classical IAT (Greenwald, McGhee, & Schwartz, 1998), an experimental procedure based on measuring the strength and speed of actualisation of automatic associations between individual representations of a person. It is a tool that measures the relative relationships between pairs of concepts called categories and attributes. During the performance of the IAT, participants randomly classify categories and attributes in a certain way. The IAT main hypothesis is that participants' responses will be faster and more accurate if specific attributes and categories are associated with stronger associations than if the association between them is weaker.

The combined use of implicit and explicit measures not only provides additional information about the adequacy of measurements, but also gives a deeper understanding of the construct being studied (Rudman, 2013).

Hardiness and Resilience

Resilience is the ability to recover from adversity without the experience of significant distress, effective coping and adaptation in managing personal hardship combined with a sense of purpose in daily life and of personal control over what occurs in one's life.

Hardiness is a personality variable that promotes resiliency (Bartone et al., 2008. Maddi, 2007). Hardiness is a set of attitudes, or disposition that motivates an individual to the kind of positive action that aids in converting personal tragedy into a growth experience (Maddi, 2002). Hardiness dampens the effects of a stressful situation through information gathering, decisive actions, and learning from the experience (APA Dictionary of Psychology, 2009).

Hardiness is regarded as a pattern of attitudes, skills, and abilities which constitutes courage (Maddi, 2013), the ability not to lose health and self-possession under pressure of stressful situations.

In 1979, Sofia Kobasa noticed that people who experience high degrees of stress without falling ill have a personality differentiating them from those who become sick under stress. This personality difference is characterised by the term hardiness. She formulated three hypotheses about control, commitment and challenge that help to cope with stress. Resilience is the capability to adapt to threatening situations without experiencing considerable stress. Hardiness denotes personality traits that moderate perception of stressful factors.

The components of hardiness are Commitment, Control, and Challenge a.k.a. 3Cs.

Commitment is an important personality characteristic. It is formed in the process of the person's interaction with the environment. It motivates a person to self-realization, leadership, healthy way of thinking and behaviour. It enables a person to feel significant and valuable enough to be fully involved in solving life problems despite the presence of stressful situations (Maddi, 2013).

Control is expressed in the ability to lead the actions and events of what is happening. It is manifested in the search for active ways of influencing the effects of stress, as opposed to helplessness and passivity. It motivates a person to turn all stress from potential disasters into opportunities for personal growth. It is the desire for action and struggle that allows us to influence the result of what is happening, despite the fact that this influence may not be absolute and success is not guaranteed (Maddi, 2013).

Challenge determines openness and susceptibility to changes in a person's life, which are viewed as new opportunities (opposite to the fear of change). If a person is able to perceive life situations as a challenge, then he achieves a sense of satisfaction by using stress as an opportunity for development. Such people believe that you can learn from both mistakes and achievements (Maddi, 2013).

Existential psychologists believe that "choose the future" regularly requires courage. Without courage, one may "choose the past" regularly, which stagnates the quest for meaning. Hardiness, comprised of the attitudes of commitment (vs. alienation), control (vs. powerlessness), and challenge (vs. security) is offered as an operationalisation of existential courage (Maddi, 2004).

The studies of hardiness for different occupations have their own features. The present investigation is based on the analysis and generalisation of the studies presented and published by Irina Plotka

and colleagues (2013, 2015, 2017), Šaplavska and Plotka (2014). **The aim of the research** was to identify the features of explicit and implicit assessments of hardiness and its components obtained for research participants whose occupations are associated with risk: for occupations associated with unconditional execution of orders, for security guards, for long-distance lorry drivers, for professional footballers.

Research questions

1. Are there differences in implicit and explicit hardiness and its components among research participants, depending on their occupational group?

2. Is there an implicit-explicit correspondence between the results of measurements of hardiness and its components using the appropriate IAT experimental procedures and self-reporting procedures?

3. What are the common factors underlying the relationship between implicit and explicit hardiness and its components?

Method

Participants – 214.

(1) 74 of them were aged 21 – 50 years old (*Mdn* = 29) with profession associated with risk and with the unconditional execution of orders ("soldiers");

(2) 75 of them were aged 22 – 64 years old (*Mdn* = 45) security guards whose work presupposes the presence of stressful situations, and, accordingly, personal qualities that help withstand stress. Working as a security guard implies the ability to use physical strength and aggression.

(3) 40 of them were aged 26 – 55 years old (*Mdn* = 38) long-distance lorry drivers;

(4) 25 professional footballers from a top football league team, aged 19 – 25 years old (*Mdn* = 21).

Implicit measures: the experimental procedures based on the classical IAT methodology (Greenwald, McGhee, & Schwartz, 1998) and modified IAT (Šaplavska & Plotka, 2014): IAT1 – Commitment, IAT2 – Control, IAT3 – Challenge, IAT4 – Hardiness. IAT experimental procedures measure the effect of hidden, implicit associations of verbal stimuli, i.e. categories, reflecting the content of the hardiness construct and its components with attributes of positive or negative valence.

The categories are the verbal stimuli. This is a set of behavioral characteristics determined by personality traits, intentional and motivational characteristics of an individual and semantically related to hardiness and its components. The stimuli were selected in accordance with the theoretical approaches of S. Maddi and P. Bartone and the content of the DRS-15 methodology.

IAT 1 Commitment: Isolation, Commitment, Detachment, Meaningfulness, Meaninglessness, Involvement, Monotonous life, Content life, Boredom, Concern.

IAT 2 Control: Wait, Act, Cede, Overcome, Weaken, Manage, Drift, Influence, Depend on circumstances, Define.

IAT 3 Challenge: Stability, Dinamicity, Consistency, Changes, Reliability, Risk, Safety, Uncertainty, Commonplaceness, Search.

IAT 4 Hardiness: Senselessness, Meaningfulness, Lack of initiative, Overcoming, Safety, Risk, Passivity, Resilience, Avoidance, Vigorousness.

The attributes are verbal stimuli: the words with a strong positive or negative affective meaning (Schlossberg, 1952). Positive valence: "Love, joy, peace, happiness, luck". Negative valence: "Hatred, disgust, contempt, evil, anger".

Apparatus: E-Prime 2®.

Explicit measure: "Dispositional Resilience Scale, DRS-15" consists of 15 items, including 3 subscales (commitment, control, and challenge) of 5 statements each. The statements were rated on a 4-point Likert scale: "Not true at all" (0); "Somewhat true" (1); "Fairly true" (2); "Completely true" (3).

Commitment determines how actively a person is involved in life (as opposed to non-involvement), and allows a person to feel important and valuable enough to be fully involved in solving life problems, despite the presence of stressful situations. "Most of my life gets spent doing things that are meaning-

ful. **I feel that my life is somewhat devoid of meaning. I really look forward to my daily activities. Most days, life is really interesting and exciting for me. *Life in general is boring for me** (Bartone, 1995).

Control determines the degree to which a person can influence what is happening as opposed to feeling helpless). *“By working hard, you can nearly always achieve your goals. *I don’t think there is much I can do to influence my own future. How things go in my life depends on my own actions. It is up to me to decide how the rest of my life will be. My choices make a real difference in how things turn out in the end”*(Bartone, 1995).

Challenge defines openness and sensitivity to life changes, which are seen as opportunities for personal growth (as opposed to fear of change). *“*I don’t like to make changes to my regular activities. Changes in routine are interesting to me. I enjoy the challenge when I have to do more than one thing at a time. *It bothers me when my daily routine gets interrupted. *I like having a daily schedule that doesn’t change very much”* (Bartone, 1995).

The reverse statements are marked with asterisks*.

The **hardiness** is defined as the sum of scores on three subscales.

Higher scores correspond to more pronounced hardiness, commitment, control and challenge, respectively.

In all previous studies, Cronbach's alpha was at least .70.

Methodological balance of implicit and explicit procedures

The main principle behind the creation of measuring implicit and explicit procedures was their methodological balance, which was achieved by selecting verbal stimuli in the IAT procedure that were identical to those presented in the DRS-15 subscales.

Results

Variables. To define the effect of implicit associations in all our studies of hardiness, D-scores were used. According to the accepted international classification, the effect exists when

– $D \geq 0.15$, i.e. the implicit associations with Hardiness (Commitment, Control, Challenge) category together with positive attributes or the one opposed to it vs Hardiness (vs Commitment, vs Control, vs Challenge) category together with negative attributes are more stronger.

– $D \leq -0.15$, i.e. the implicit associations with Hardiness (Commitment, Control, Challenge) category together with negative attributes or the one opposed to it vs Hardiness (vs Commitment, vs Control, vs Challenge) category together with positive attributes are more stronger;

– $-0.15 < D < 0.15$ – no effect found. In this case, two situations are possible: (1) ambivalence of associations; (2) very weak associations (Rudman, 2011).

In this research, the *D-scores* are: *Hardiness D(IAT)*, *Control D(IAT)*, *Commitment D(IAT)*, and *Challenge D(IAT)*.

The explicit variables according to DRS-15:

– *Hardiness (Bartone)*, $Q_1 = 25.0$, $Q_3 = 38.0$.

– *Control (Bartone)*, $Q_1 = 9.00$, $Q_3 = 13.25$;

– *Commitment (Bartone)*, $Q_1 = 8.00$, $Q_3 = 11.0$;

– *Challenge (Bartone)*, $Q_1 = 7.00$, $Q_3 = 11.0$.

The quartiles of the combined group were used to divide the scores into high, low and medium.

Research Question 1. Frequency analysis – the Fisher’s angular transformation test was used to answer the first research question (Figures 1-5). There are some relevant facts to note.

“Soldiers”. The data were obtained on a sample of people whose occupation is related to risk, the specific activity of whom involves strict adherence to orders. The manifestation of commitment in their activities is strictly regulated, limiting the possibility of leadership, awareness of self-worth and value, and the possibility of full integration into the solution of life tasks.

59% of the participants showed negative implicit commitment, i.e. alienation according to Muddi (2004). 19% of the participants showed implicit effect and 22% did not reveal any implicit effect,

which is statistically significantly less than 59%: $\varphi^* = 4.83$, $p < .001$, effect size Cohen's $h = 0.79$ is almost large.

At the explicit level, only 8% of the participants are aware of this. 65% of participants showed an average level of commitment, which is statistically significantly higher than the percentage of participants (27%) with a high level of engagement: $\varphi^* = 4.74$, $p < .001$, effect size Cohen's $h = 0.78$ is almost large.

Guards. 53% of the participants showed negative implicit challenge, i.e. security according to Maddi (2004). 24% of the participants showed positive and 23% did not reveal any implicit effect, which is statistically significantly less than 53%: $\varphi^* = 3.76$, $p < .001$, effect size Cohen's $h = 0.61$ is medium.

At the explicit level, only 56% of the participants are aware of this. 40% showed an average level of challenge, which is statistically significantly less than 56% of the participants with a high level of commitment: $\varphi^* = 1.97$, $p = .049$, effect size Cohen's $h = 0.30$ is small.

Drivers. 57% of the participants showed negative implicit challenge or security. 20% of the participants showed positive and 23% did not reveal any implicit effect, which is statistically significantly less than 57%: $\varphi^* = 4.14$, $p < .001$, effect size Cohen's $h = 0.90$ is large.

At the explicit level, only 3% of the participants might be aware of this fact. 15% of the participants revealed a medium level of challenge, which is statistically significantly less than 83% of the participants with a high level of challenge: $\varphi^* = 6.63$, $p < .001$, effect size Cohen's $h = 1.48$ is large.

In Figure 1, the distributions of participants from different occupational groups according to the levels of implicit and explicit attitudes are shown.

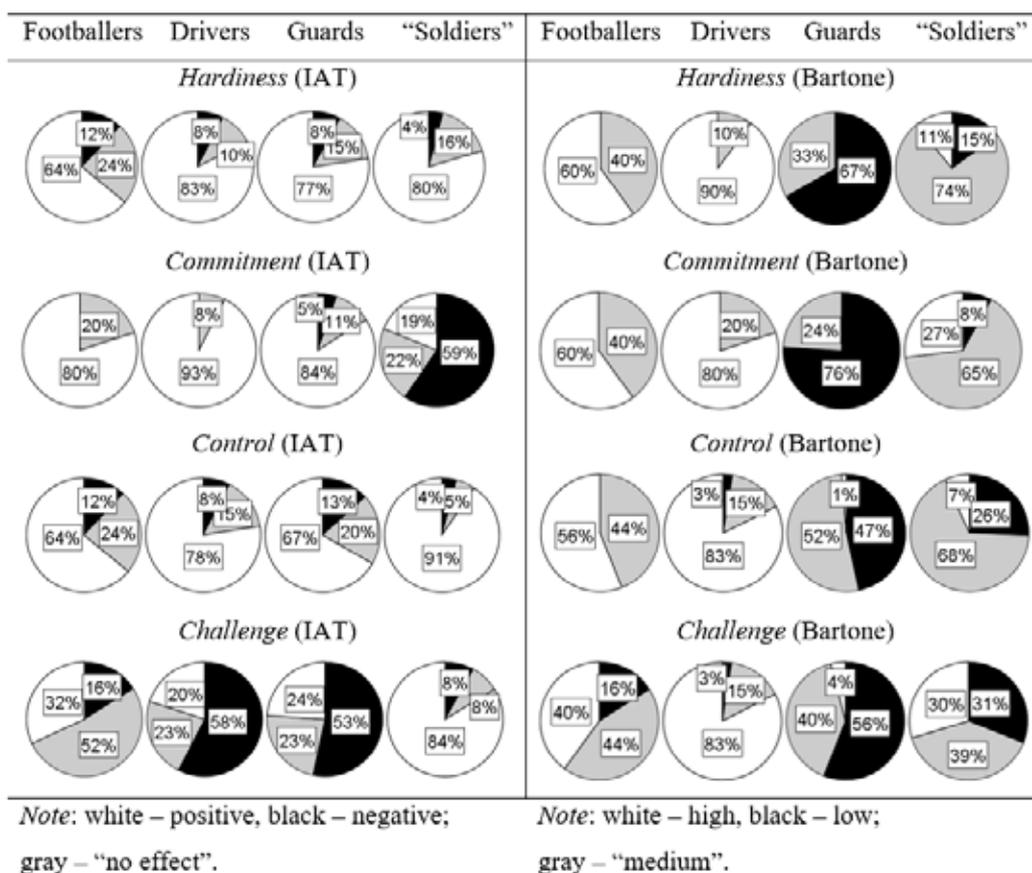


Figure 1. Distribution of Participants from Different Occupational Groups According to the Levels of Implicit and Explicit Attitudes

Figures 2-5 show 'portraits' of the participants from different occupational groups according to their implicit and explicit resilience and its components. The scores for the explicit variables were multiplied by certain coefficients to make the images clear.

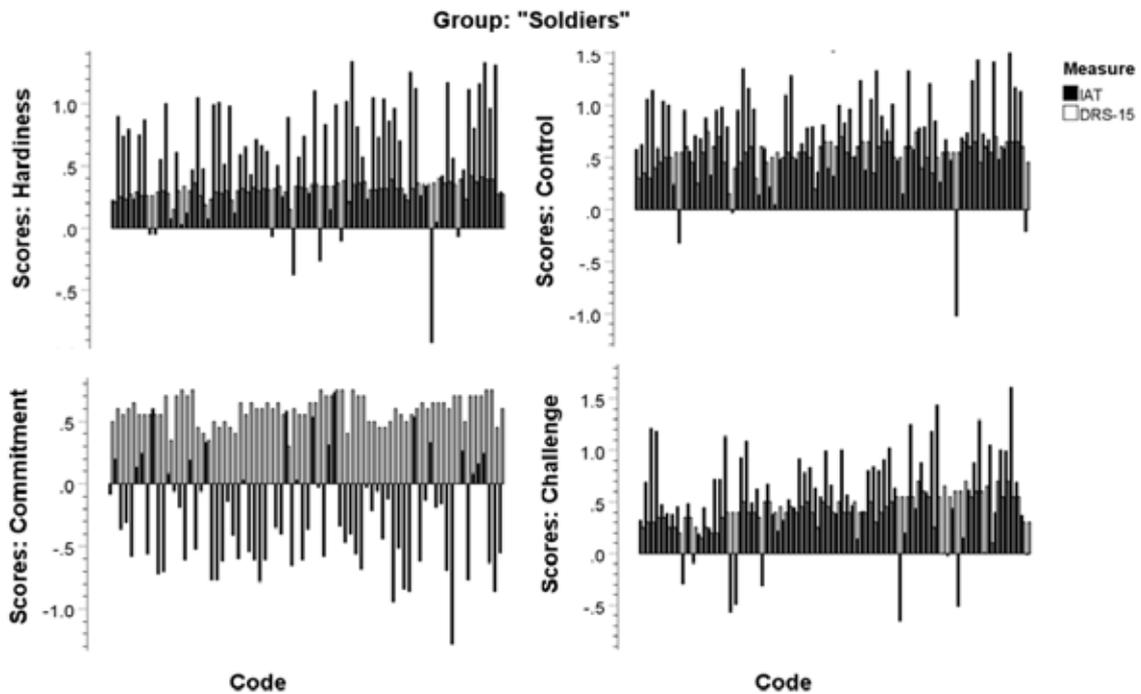


Figure 2. Implicit and Explicit Hardiness: “Soldiers”

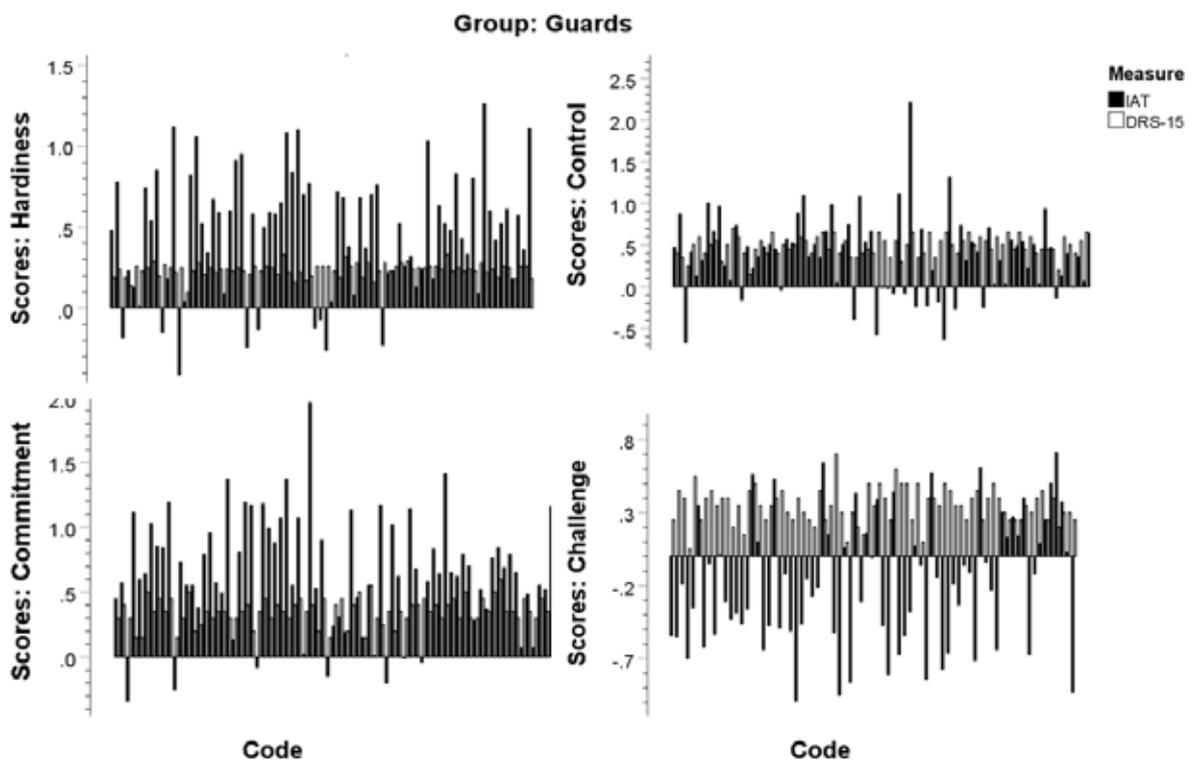


Figure 3. Implicit and Explicit Hardiness: Guards

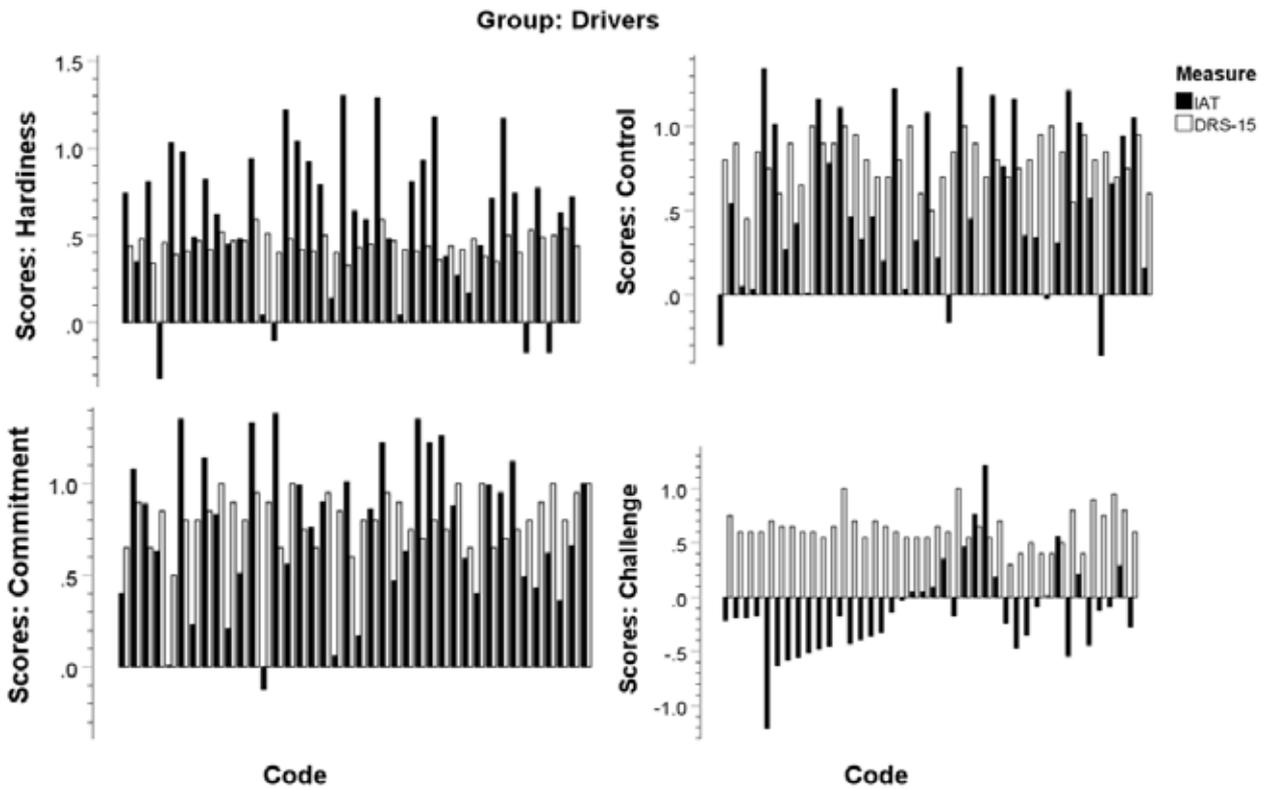


Figure 4. Implicit and Explicit Hardiness: Drivers

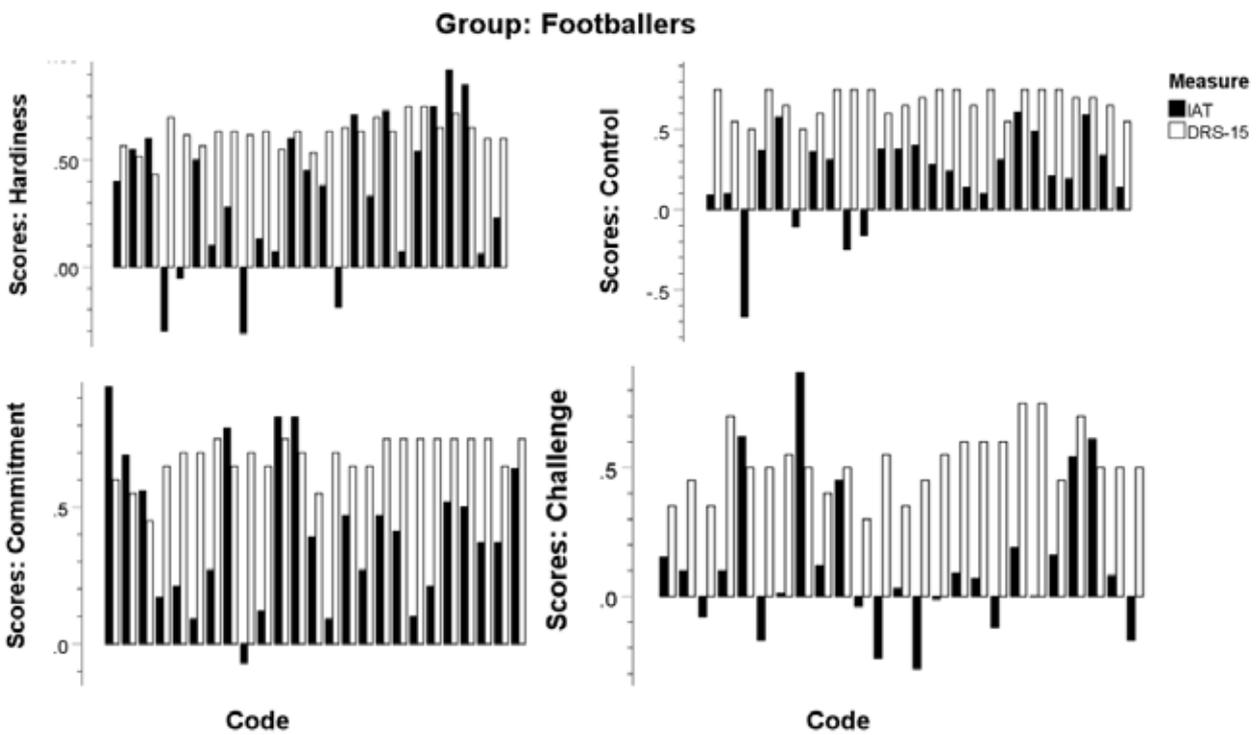


Figure 5. Implicit and Explicit Hardiness: Footballers

Research Question 2. Implicit-explicit correspondence between the results of hardiness and 3Cs measurements using the respective experimental IAT and self-report procedures was established using Pearson and Spearman correlation coefficients (Table 1). The number of matches of the implicit-explicit results of the measurement was also calculated (Table 2).

Table 1

Implicit-Explicit Correspondence between the Results of Measurements: Correlations

Group	Variables <i>D(IAT)- Bartone</i>	Correlation Coefficient	Correspondence	Effect size
“Soldiers”	All variables		Uncertain consistency	
Guards	<i>Hardiness</i>	$r_s(75) = -.25^*, p = .035$	Inconsistency	Near to medium
	<i>Commitment</i>	$r_s(75) = .17, p = .14, ns$	Consistency	low
Drivers	<i>Hardiness</i>	$r_s(40) = -.17, p = .29, ns$	Inconsistency	low
	<i>Challenge</i>	$r_s(40) = -.20, p = .21, ns$	Inconsistency	low-medium
Footballers	<i>Control</i>	$r(25) = .32, p = .12, ns$	Consistency	medium
	<i>Commitment</i>	$r(25) = -.21, p = .32, ns$	Inconsistency	low-medium

Table 2

Implicit-Explicit Correspondence between the Results of Measurements: Percentages of Matches

Group	<i>Hardiness</i>	<i>Control</i>	<i>Commitment</i>	<i>Challenge</i>
“Soldiers”	16%	12%	23%	26%
Guards	11%	19%	8%	37%
Drivers	73%	63%	78%	23%
Footballers	52%	56%	48%	20%

The maximum percentage of matches – 78% – is observed for commitment in the group of Drivers. It is statistically significantly higher than the percentage of mismatches 22%: $\phi^* = 4.31, p < .001$, effect size Cohen’s $h = 0.96$ is large.

Research Question 3. To understand what the common factors underlying the relationship between implicit and explicit hardiness and its components are, the factor analysis for each occupational group was done: two factors (Kaiser criterion), Principal Component Method, Rotation’s method Varimax with Kaiser Normalisation, Rotation converged in 3 iterations, Scores based on method “Regression” (s. Tables 3-4, Figure 6). Cumulative percent for two factors of total variance explained are: for ‘soldiers’ $62.95\% = 35.29\% + 27.66\%$; for guards $51.92\% = 26.38\% + 25.54\%$; for drivers $54.69\% = 31.47\% + 23.22\%$.

Due to the insufficient number of observations for the group of football players, factor analysis was not performed.

As a result, it was found that in all groups under consideration Component 1 is described mainly by explicit variables and Component 2 is described mainly by implicit variables. Component 1 can be called by *Explicit ‘overall’ hardiness attitude*, and Component 2 by *Implicit ‘overall’ hardiness attitude* (Figure 6, Table 3).

Table 3

Rotated Component Matrices

Drivers	Component 1	Component 2
Hardiness (Bartone)	.993	-.057
Control (Bartone)	.725	-.196
Commitment (Bartone)	.686	-.212
Challenge (Bartone)	.681	.249
Challenge D(IAT)	-.233	-.002
Hardiness D(IAT)	-.075	.839
Control D(IAT)	.040	.778
Commitment D(IAT)	-.090	.632
Guards	Component 1	Component 2
Hardiness (Bartone)	.990	-.074
Challenge (Bartone)	.725	-.042
Control (Bartone)	.619	-.119
Commitment (Bartone)	.378	.045
Hardiness D(IAT)	-.055	.778
Control D(IAT)	-.083	.761
Commitment D(IAT)	.187	.667
Challenge D(IAT)	.178	-.625
“Soldiers”	Component 1	Component 2
Hardiness (Bartone)	.996	.044
Control (Bartone)	.852	.012
Commitment (Bartone)	.773	.052
Challenge (Bartone)	.704	.040
Control D(IAT)	-.017	.882
Challenge D(IAT)	.089	.792
Hardiness D(IAT)	-.030	.758
Commitment D(IAT)	-.066	-.478

Table 4

Component Score Coefficient Matrices

Drivers	Component 1	Component 2
1	2	3
Control D(IAT)	.060	.428
Commitment D(IAT)	.000	.340
Challenge D(IAT)	-.094	-.014
Control (Bartone)	.281	-.066
Commitment (Bartone)	.265	-.077
Challenge (Bartone)	.289	.175
Hardiness D(IAT)	.018	.454
Hardiness (Bartone)	.397	.026
Guards	Component 1	Component 2
Control D(IAT)	.005	.373
Commitment D(IAT)	.130	.343
Challenge D(IAT)	.048	-.300
Control (Bartone)	.291	-.022
Commitment (Bartone)	.185	.045
Challenge (Bartone)	.346	.023
Hardiness D(IAT)	.020	.383
Hardiness (Bartone)	.472	.022

Table 4 (Continued)

1	2	3
“Soldiers”	Component 1	Component 2
Control D(IAT)	-.033	.401
Commitment D(IAT)	-.009	-.215
Challenge D(IAT)	.008	.357
Control (Bartone)	.303	-.020
Commitment (Bartone)	.274	.001
Challenge (Bartone)	.249	-.003
Hardiness D(IAT)	-.034	.345
Hardiness (Bartone)	.354	-.010

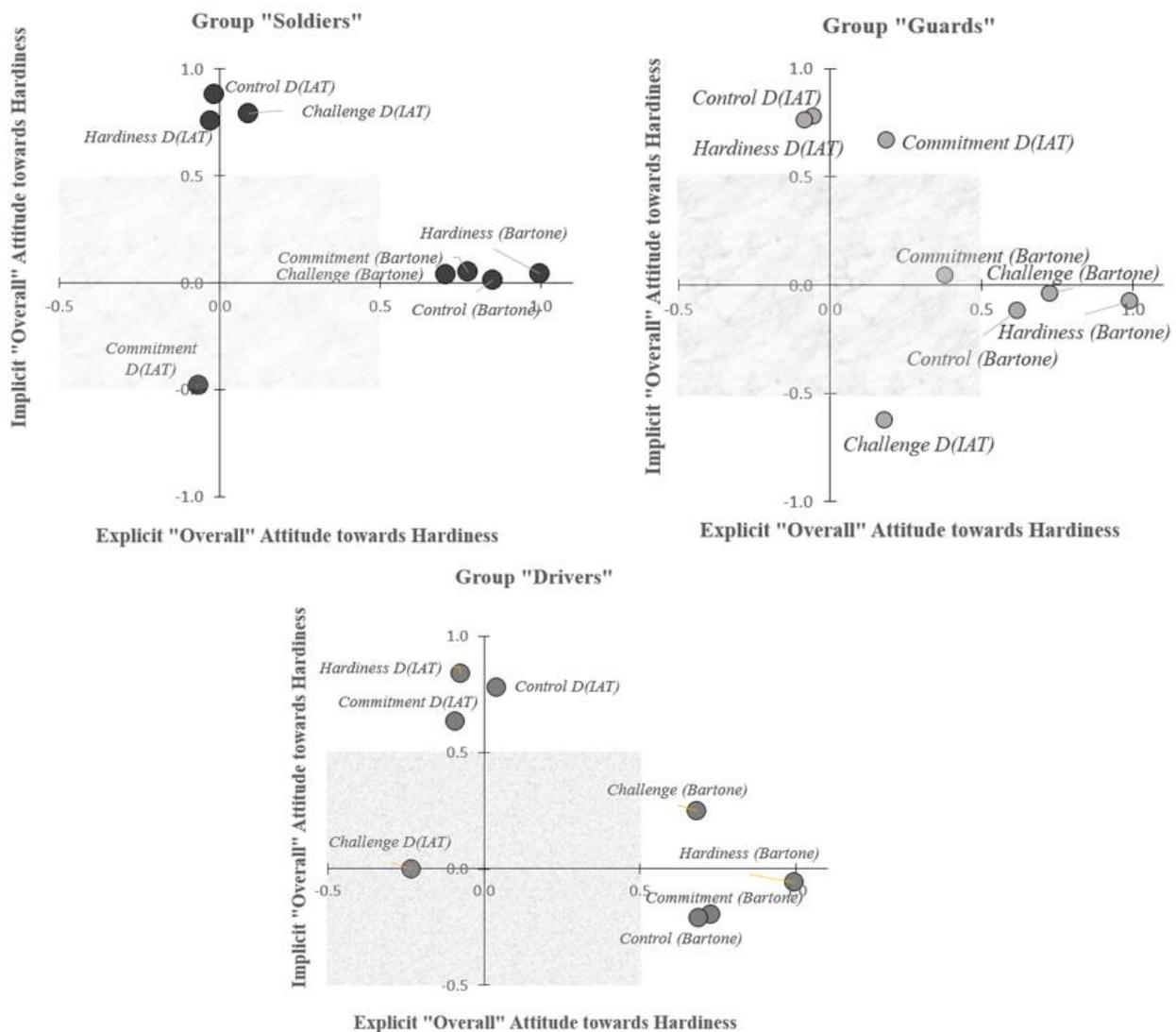


Figure 6. Component Plots in Rotated Space. Explicit and Implicit ‘Overall’ Attitudes towards Hardiness

Figure 7 shows the percentage of variance of the variables that make up the ‘overall’ implicit and ‘overall’ explicit attitudes. These percentages are obtained using a rotated component matrix (Table

3) and for a fixed component (column of the matrix) represent the ratio of the square of the factor loading of a variable to the sum of the squares of all factor loadings of that component.

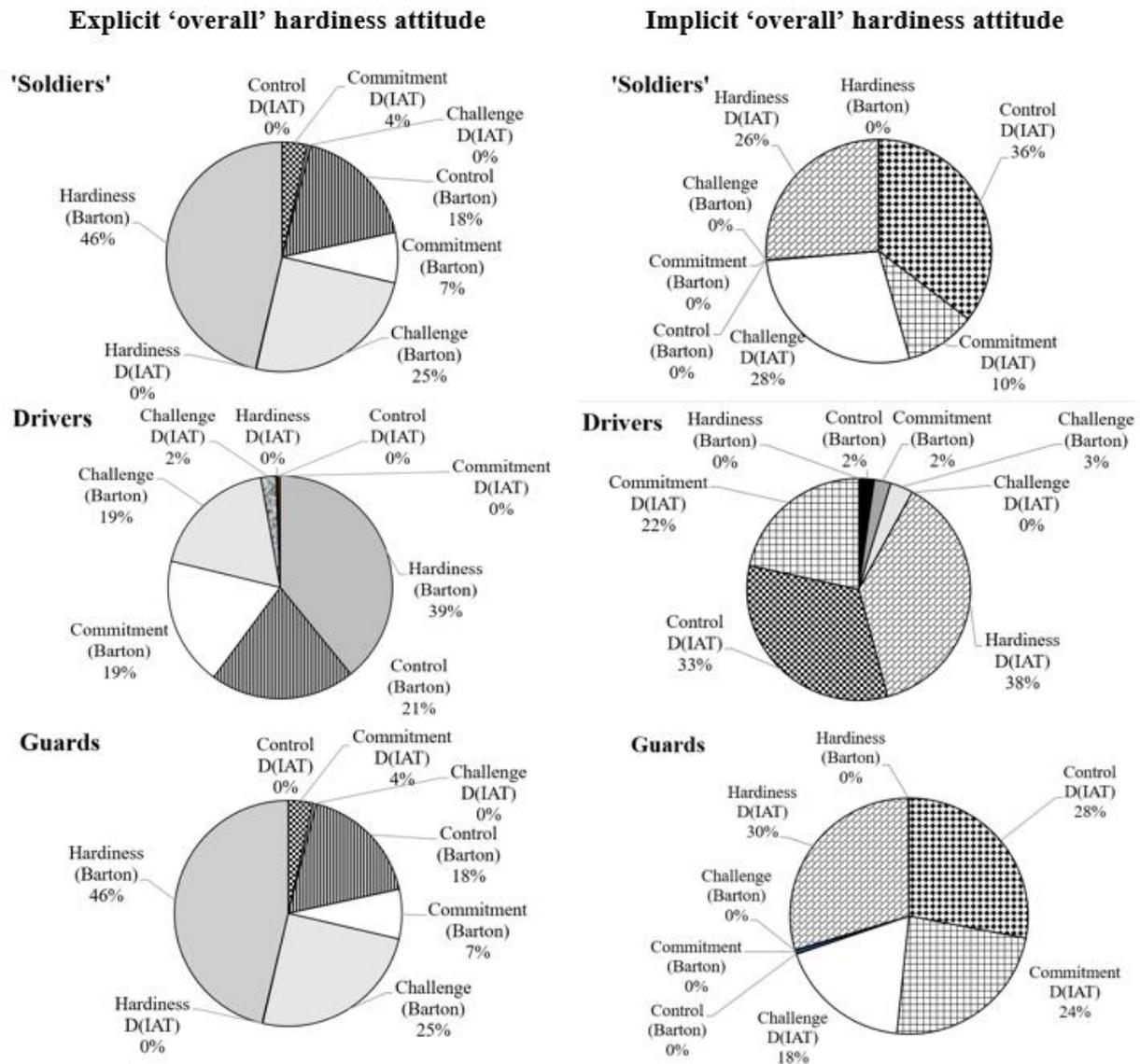


Figure 7. Variance Percentage of Implicit and Explicit 'Overall' Attitudes and their Constituent Variables

Discussion

Answer to the first research question

The differences in implicit and explicit hardiness and its components among research participants, depending on their occupational group, were revealed.

In the group of participants with profession associated with risk and with the unconditional execution of orders ('soldiers'), the large part of the participants showed the implicit negative commitment. The manifestation of commitment in their activities is strictly regulated, limiting the possibility of leadership, awareness of self-worth and value, and the possibility of full integration into the solution of life tasks. Their implicit associations of isolation, detachment, meaninglessness, monotonous life, boredom with attributes with positive affective valence were stronger than with negatively valenced

attributes. Similarly, the implicit associations of commitment, meaningfulness, involvement, content life, concern were more strongly associated with attributes of negative affective valence. 59% of the participants showed negative implicit commitment, i.e. alienation according to Muddi (2004). Such individuals with negative implicit commitment are not involved in an active life, feeling that they are not important or valuable enough. Most of their lives consist of doing things that have no meaning. They do not enjoy their daily activities. Their lives are boring, uninteresting, and unexciting to them. 65% of participants showed an average level of explicit commitment. And only 8% of the participants have the low level of explicit commitment.

The large part of the security guards, whose work presupposes the presence of stressful situations, and, accordingly, personal qualities that help withstand stress, (e.g. the ability to use physical strength and aggression) as well as the large part of long-distance lorry drivers showed negative implicit challenge, i.e. security according to Muddi (2004). Their implicit associations of stability, consistency, reliability, safety, commonplaceness together with attributes with positive affective valence were stronger than with negatively valenced attributes. Similarly, the implicit associations of dynamism, changes, risk, uncertainty, search were more strongly associated with attributes of negative affective valence. Most participants in the groups of guards and drivers are implicitly unprepared for changes, especially for unexpected ones. They do not like to make changes to their normal activities. They are afraid of changes. They are incapable of perceiving life situations as a challenge. This is evidently a consequence of their professional activities, in which sudden changes may lead to danger, which they may not have time to react to. Explicitly, they stay more optimistic.

Professional suitability of some individuals can be judged by the results of the implicit tests, e.g., a participant with very negative implicit control (vs. powerlessness) is unlikely to help his team members win competitions. Similarly, 'soldiers' with negative implicit commitment are unlikely to sacrifice their lives in a battle; drivers with negative implicit challenge are unlikely to be able to find a way out in an emergency situation; guards with negative implicit challenge are unlikely to be able to find the right way out in the event of sudden danger.

Answer to the second research question

There is a partial implicit-explicit correspondence with effect sizes from small to medium between the results of measurements of hardiness and its components using the appropriate IAT experimental procedures and self-reporting procedures. This correspondence is more pronounced and has the near to large effect size for the long-distance lorry drivers.

The correspondence between the results of implicit and explicit measurements can be checked either by using correlation coefficients or by counting the number of matches. The results of the second method are more reliable. An analysis of numerous empirical studies conducted in recent years points to conflicting judgments about the understanding of correlations between implicit and explicit dimensions of the same psychological construct (Gawronski et al., 2020).

According to the authors, the use of correlation coefficients requires careful correlation analysis, taking into account variables that might influence the relationship. Non-linear effects should also be taken into account. The relationship may not be correlated at all. Therefore, the formal calculation of correlation coefficients may lead to incorrect conclusions. At least, different variables and associated different subsets of participants, as well as experimental conditions that influence the correspondence of implicit and explicit measurement results need to be taken into account (cf. Fazio & Olson, 2003; Rudman, 2013; Urbane et al., Plotka et al., 2021a; Plotka et al., 2021b; Plotka et al., 2019; Plotka et al., 2018; Vinogradova et al., 2018, Plotka et al., 2016).

In the present study, implicit-explicit correspondence depends on the occupational group of the participants. Formal calculation of correlation coefficients found implicit-explicit consistency, inconsistency, and uncertain consistency. However, calculating the number of matches changes the situation a lot.

The lowest number of matches (12%-26%) was found in the group of 'soldiers'. The use of correlation coefficients for hardiness and 3Cs revealed only uncertain consistency.

A low number of matches (8%, 11%, 19% for commitment, hardiness, control respectively) was also shown in the group of 'guards'. For commitment, consistency was found with a small effect size; for hardiness, a statistically significant inconsistency with an effect size close to the medium was stated, and for the remaining constructs, an uncertain consistency was revealed.

The highest number of matches (63%, 73%, 78% for control, hardiness, commitment respectively) was found in the drivers' group. It is possible that this is because long-distance lorry drivers have a greater possibility for introspection, which may increase awareness of previously unconscious (sub) implicit representations. This may lead to increased correspondence between explicit and implicit measures (Hofmann et al., 2005). Although correlation coefficients for hardiness and challenge revealed inconsistency. Commitment and control showed uncertain consistency, which can only be explained by the fact that correlation analysis was not carried out thoroughly enough.

A rather high number of matches (48%, 52%, 56% for commitment, hardiness, control respectively) were also found in the group of footballers. For control, consistency was revealed with a low effect size, and for commitment, inconsistency with an effect size between small and medium was shown. For hardiness and challenge, there is uncertain consistency.

Contradictory results show a comparison of participants' distributions for the levels of implicit and explicit variables (Figure 1).

Some of the participants have different scores on the explicit and implicit variables, which can be explained by the specifics of their occupations, which are risky, as their activities regulate their behaviour and limit the manifestations of hardiness aspects, e.g., commitment. This regulation may affect the intrinsic implicit determinants of actual behaviour, but it does not limit the representation of desired behaviour as measured by the explicit method.

The results obtained in the present study support Fazio and Olson's (2003) suggestion that there are experimental conditions under which consistency between implicit and explicit measurements can exist.

Answer to the third research question

The common factors underlying the relationship between implicit and explicit hardiness and its components are the "implicit 'overall' hardiness attitude" and the "explicit 'overall' hardiness attitude".

The "implicit 'overall' hardiness attitude" in the **drivers' group** consists of 93% associations and 7% propositions. The "explicit 'overall' hardiness attitude" composition contains 2% associations and 98% propositions.

The "implicit 'overall' hardiness attitude" in the group of **'soldiers'** consists of 100% associations and 0% propositions. The "explicit 'overall' hardiness attitude" composition contains 4% associations and 96% propositions.

The "implicit 'overall' hardiness attitude" in the **guards' group** consists of 100% associations and 0% propositions. The "explicit 'overall' attitude" composition contains 4% associations and 96% propositions.

It was revealed that the greatest contribution to "explicit 'overall' hardiness attitudes" in the groups of 'soldiers', guards and drivers is made by explicit hardiness. The greatest contribution to the "implicit 'overall' hardiness attitude" in the groups of guards and drivers is made by implicit hardiness, in the group of 'soldiers' – by implicit control (Table 4).

The variables "Explicit 'overall' hardiness attitude" and "Implicit 'overall' hardiness attitude" constructed using factor analysis are independent: the correlation between them is equal to zero. The hypothesis can be put forward that 'overall' implicit and 'overall' explicit attitudes towards hardiness are independent constructs.

According to a meta-analysis (Hoffman et al., 2005), psychological constructs that can be assessed by implicit and explicit measures may be completely independent. Implicit measures can be used to assess aspects of a psychological construct that cannot be assessed using explicit measures. The combined use of implicit and explicit measures not only provides additional information about the adequacy of measurements using both measures, but also leads to a deeper understanding of the construct under study (Rudman, 2013).

There are many theories and studies of implicit-explicit duality in the attitudes literature, an overview of which is presented in the study (Gawronski & Brannon, 2019). There are quite a few psychological phenomena in which the independence of explicit and implicit attitudes is revealed and is not revealed.

The independence of explicit and implicit 'overall' attitudes was observed in research on self-esteem theory, where the hypothesis of 'overall' attitudes independence was also considered (Plotka et al., 2016), in research on self-esteem (Pietschnig et al., 2018), and in a study of general implicit and explicit attitudes towards domestic and foreign food brands (Urbane et al., 2021).

A limitation of this study was that it did not control for mediator variables for correspondence of measurement and that it did not investigate the association of attitudes with the participants' personality traits, the same ones in all four groups.

The prospect for further research is to look at other occupational groups of participants.

Conclusions

The study was conducted for four groups of participants whose occupations are associated with risk: with occupations associated with risk and with the unconditional execution of orders ('soldiers'), security guards, long-distance lorry drivers, and professional football players from one of the top football league teams. Measurements were made using specially designed four modifications of the classical IAT and the self-report procedure DRS-15. The study showed that there are differences in implicit and explicit attitudes towards hardiness and its components in groups of participants from different occupations. Most guards and long-distance lorry drivers revealed a negative implicit challenge. The majority of 'soldiers' were found to have negative attitudes towards the commitment. The vast majority of drivers showed matches of the measurements results, which can be explained by their professional possibility for introspection. The independence of implicit and explicit 'overall' attitudes toward hardiness, and their content, is also shown.

The aim of the study was achieved and the answers to the research questions were obtained.

Although a study of implicit and explicit attitudes has already been carried out for each of the groups, there has not been a study of all occupational groups at once.

The results can be used to determine professional suitability, because they provide implicit estimates that can be obtained relatively easily and quickly.

Acknowledgements

We are glad to express our thanks to Nadezda Serenz (M.A. Linguistics) for the support in English.

References:

1. Bartone, P. T. (1995). *A short hardiness scale*. The American Psychological Society Annual Convention.
2. Bartone, P. T., Roland, R. R., Picano, J. J. & Williams, T. J. (2008). Psychological hardiness predicts success in US Army Special Forces candidates. *International Journal of Selection and Assessment*, 16, 78-81.
3. Dimofte, C.V. (2010) Implicit Measures of Consumer Cognition: A Review. *Psychology and Marketing*, 27, 921-937.
4. Fazio, R. H., & Olson, M. A. (2003). Implicit measures in social cognition research: Their meaning and use. *Annual Review of Psychology*, 54, 297-327.

5. Gawronski, B., & Payne, B. K. (Eds.). (2010). *Handbook of implicit social cognition: Measurement, theory, and applications*. The Guilford Press.
6. Gawronski, B., & Brannon, S.M. (2019). Attitudes and the Implicit-Explicit Dualism. In: D. Albarracín & B. T. Johnson (Eds.). *The handbook of attitudes* (2nd edition). Taylor & Francis
7. Gawronski, B., De Houwer, J., & Sherman, J. W. (2020). Twenty-five years of research using implicit measures. *Social Cognition*, 38(Suppl), S1–S25.
8. Greenwald, A.G., McGhee, D.E., & Schwartz, J. L.K. (1998). Measuring individual differences in implicit cognition: The Implicit Association Test. *Journal of Personality and Social Psychology*, 74, 1464-1480. <http://dx.doi.org/10.1037/0022-3514.74.6.1464>
9. Hofmann, W., Gawronski, B., Gschwendner, T., Le, H. & Schmitt, M. (2005). A meta-analysis on the correlation between the implicit association test and explicit self-report measures. *Personality and Social Psychology Bulletin*, 31(10), 1369-1385. <https://doi.org/10.1177/0146167205275613>.
10. Kobasa, S.C. (1979). Stressful life events, personality, and health: An inquiry into hardiness. *Journal of Personality and Social Psychology*, 37(1), 1–11. doi:10.1037/0022-3514.37.1.1
11. Maddi, S.R. (2002). The story of Hardiness: Twenty years of theorizing, research, and practice. *Consulting Psychology Journal: Practice and Research*, 54, 173-185. Doi 10.1037/1061-4087.54.3.173
12. Maddi, S.R. (2004). Hardiness: An operationalization of existential courage. *Journal of Humanistic Psychology*, 44(3), 279–298. doi:10.1177/0022167804266101
13. Maddi, S.R. (2007). The story of hardiness: Twenty years of theorizing, research, and practice. In A. Monat, R. S Lazarus, & G. Reevy (Eds.), *The Praeger handbook on stress and coping* (pp. 327–340). Praeger Publishers/Greenwood Publishing Group. DOI:10.1037/1061-4087.54.3.173
14. Maddi, S.R. (2013). *Hardiness Turning Stressful Circumstances into Resilient Growth*. Springer Briefs in Psychology, XI.
15. Petty, R.E., Fazio, R.H. & Briñol P. (2009). Attitudes: Insights from the new wave of implicit measures (85-117). In B. Gawronski, F. Strack, & G.V. Bodenhausen, *Attitudes and cognitive consistency: the role associative and propositional processes*. Psychology Press.
16. Pietschnig, J., Gittler, G., Stieger, S., Forster, M., Gadek, N., Gartus, A., Kocsis-Bogar, K., Kubicek, B., Lüftenegger, M., Olsen, J., Prem, R., Ruiz, N., Serfas, B., & Voracek, M. (2018). Indirect (implicit) and direct (explicit) self-esteem measures are virtually unrelated: A meta-analysis of the initial preference task. *PLoS ONE* 13(9), 1-19. DOI:10.1371/journal.pone.0202873
17. Plotka, I., Shaplavskaya, J., Blumenau, N., Igonin, D., & Kunavin, J. (2013). The study of Hardiness with Implicit – Association Test and Self-assessment procedure in risky professions. Oral presentation at the International Scientific and Practice Conference “Business. Society. Human”, National Research University, – Higher School of Economics, Russia, Moscow. <http://bsh.hse.ru/program>.
18. Plotka, I., Shaplavskaya, J., Blumenau, N., & Gajevska, T. (2015). Research in hardiness of security guards with Implicit Association Test and self-evaluation procedures. In L. Malinovska (Ed), *Proceedings of 14-th International Scientific Conference Engineering for Rural Development Jelgava, Latvia, 20-22.05.2015 V.14* (pp.735-741). Latvia University of Agriculture Faculty of Engineering. <http://tf.llu.lv/conference/proceedings2015/>
19. Plotka, I., Blumenau, N., Igonin, D., & Vinogradova, Z. (2021). Research in context effects of graded affective valence videos on results of measurements of implicit attitudes towards risky driving. In L. Malinovska & V. Osadcuks (Eds.), *20th International Scientific Conference Engineering for Rural Development Proceedings 26-28.05.2021 Jelgava, Latvia: Vol. 20* (pp. 1244-1259). Latvijas University of Life Sciences and Technologies. Faculty of Engineering. DOI: 10.22616/ERDev.2021.20.TF272
20. Plotka, I., Igonin, D., Shaplavskaya, J., Kruzite, D., & Blumenau, N. (2017). Long-distance truck drivers coping strategies and hardiness: self-assessment procedure and implicit association test. In V. Lubkina, S. Usca, & A. Zvaigzne (Eds.), *Society. Integration. Education. Proceedings of the International Scientific Conference May 26th-27th, 2017, V.I* (pp. 617-638). Rezeknes Academy of Technologies. <http://dx.doi.org/10.17770/sie2017vol1.2337>
21. Plotka, I., Blumenau, N., Ozola, E., Pogildjakova, S., & Drozdova, J. (2016). Research of self-es-

- teem of youth using implicit association test and self-reported procedures. In V. Lubkina, S. Usca, & A. Zvaigzne (Eds.), *Society. Integration. Education. Proceedings of the International Scientific Conference May 27th-28th, 2016, V.I* (pp. 483-497). Rezeknes Academy of Technologies. DOI: <http://dx.doi.org/10.17770/sie2016vol1.1511>
22. Plotka, I., Igonin, D., & Blumenau, N. (2016). Implicit Attitudes and Measurements: Effect of Context. *International Business: Innovations, Psychology and Economics*, 7(2(12)), 7-150. http://www.kuryba.lt/failai/zurnalai/2016_2.pdf
 23. Plotka, I., Simane-Vigante, L., & Blumenau, N. (2018). Implicit association Self-concept test in studying of violence-related cognitions. *Social psychology and society*, 9, (3), 176-186. doi:10.17759/sps.2018090317.
 24. Plotka, I., Blumenau, N., Igonin, D., & Bolshakova, A. (2019). Research of relationships between implicit and explicit healthy or unhealthy food related cognitions. In V. Lubkina, S. Usca, & A. Zvaigzne (Eds.), *Proceedings of the International Scientific Conference "Society. Integration. Education"*. May 26-27, 2019, Vol. I, pp. 97-121. Rezekne: Rezeknes Academy of Technologies. <https://doi:10.17770/sie2019vol7.3888>.
 25. Plotka, I., Blumenau, N., Igonin, D., & Vinogradova, Z. (2021). Research in context effects of graded affective valence videos on results of measurements of implicit attitudes towards risky driving. In L. Malinovska & V. Osadcuks (Eds.), *20th International Scientific Conference Engineering for Rural Development Proceedings 26-28.05.2021 Jelgava, Latvia: Vol. 20* (pp. 1244-1259). Latvijas University of Life Sciences and Technologies. Faculty of Engineering. DOI: 10.22616/ERDev.2021.20.TF272
 26. Rudman L.A. (2011). *Implicit measures for social and personality psychology*. Sage. doi: 10.4135/9781473914797
 27. Rudman, L. A. (2013). Sources of Implicit Attitudes. *Current Direction in Psychological Science*, 13, 79-82. DOI:10.1111/j.0963-7214.2004.00279.x
 28. Schlosberg, H. (1952). *The description of facial expressions in terms of two dimensions*. *Journal of Experimental Psychology*, 44(4), 229–237. doi:10.1037/h0055778
 29. Šaplavska, J. (2013). Research of hardiness using explicit and implicit measures (on the basis of professions related to risk). (Summary of the thesis for obtaining the doctoral degree in psychology (specialty: Social Psychology)). Daugavpils University. https://healthdocbox.com/Psychology_and_Psychiatry/78905691-Mg-psych-jelena-saplavska.html.
 30. Šaplavska, J., & Plotka, I. (2014). Research of hardiness using explicit and implicit measures (on the basis of professions related to risk). *International Business: Innovations, Psychology, Economics, research papers*, 5, 1 (8), 27–41.
 31. Urbane, B., Plotka, I.D., Blumenau, N.F., & Igonin, D.A. (2021). Measuring the affective and cognitive bases of implicit and explicit attitudes towards domestic and foreign food brands. In V. Dislere (Ed.), *Rural environment. Education. Personality. Jelgava, 7-8 May 2021. Vol.14*, (pp. 191-199). Latvia University of Life Sciences and Technologies. DOI:10.22616/REEP.2021.14.024
 32. Vinogradova, Z., Plotka, I., Smirnova, I., Blumenau, N., & Igonin, D. (2018). Study of attitudes towards the use of mobile phones while driving with implicit association tests and self-assessment procedures. In V. Lubkina, S. Usca, & A. Zvaigzne (Eds.), *Proceedings of the International Scientific Conference "Society. Integration. Education" May 26-27, 2018, vol. 7*, (pp. 291-307). Rezeknes Academy of Technologies, Latvia. <https://doi.org/10.17770/sie2018vol1.3397>