



# Psychological profiles associated with positive and negative risk-taking in adults

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## Abstract

Although risk is often considered in the context of maladaptive behaviors, risks can also be positive, allowing individuals to pursue meaningful goals in a socially accepted way. In this study, we were interested in examining psychological profiles associated with positive and negative risk-taking in adults ( $N=275$ , ages 19–71 years,  $M=39.25$ ;  $SD=13.73$ ) using latent profile analysis. Specifically, we examined whether distinct profiles of psychological characteristics such as future time perspective, tolerance to ambiguity, and sensitivity to reward and punishment are differentially associated with positive and negative risk-taking. We used the Future Time Perspective Scale (FTPS), the Multiple Stimulus Types Ambiguity Tolerance Scale (MSTAT-II), the Short Version of the Sensitivity to Punishment and Sensitivity to Reward Scale (SPSRQ-SF), the Positive Risk-Taking Scale (PRTS), and the Negative Risk-Taking Scale (NRTS). Findings yielded two profiles: individuals in the first profile, characterized by lower sensitivity to punishment and higher tolerance to ambiguity, future time perspective, and sensitivity to reward, endorsed greater positive and negative risk-taking. Conversely, individuals in the second profile, characterized by heightened sensitivity to punishment and lower tolerance to ambiguity, future time perspective, and sensitivity to reward, endorsed lower positive and negative risk-taking. The study contributes to previous findings by identifying additional psychological characteristics that may be associated with both positive and negative risk-taking in adults.

**Keywords** Positive risk-taking · Negative risk-taking · Future time perspective · Tolerance to ambiguity · Sensitivity to reward and punishment

## Introduction

Risk is a normal and essential part of everyday life. In the most basic sense, risk-taking is engaging in any behavior with a wide range of possible desirable and undesirable outcomes (Figner & Weber, 2011), with high-risk behaviors being those with the potential for the greatest harm such as injury or death (Duell & Steinberg, 2020). Within this broad definition of risk are categories of risk behaviors, some of which are *positive* (i.e., socially acceptable and beneficial to wellbeing), and others *negative* (i.e., antisocial

and dangerous). Positive risk-taking has become a subject of intense consideration (Duell & Steinberg, 2019, 2021) and research (Duell & Steinberg, 2020; Fryt et al., 2021, 2022; Patterson et al., 2022) in recent years, although it is not new to psychology (e.g. Fisher & Smith, 2004; Hansen & Breivik, 2001). Nevertheless, most of the empirical work on positive and negative risk-taking has been done with adolescent samples (Duell & Steinberg, 2021). Extending this research to adults is of great social importance as it can help define what drives adults to take positive and negative risks and how to promote positive instead of negative risk-taking at different stages of life.

## Positive and negative risk-taking

Not all risk behaviors are perceived as undesirable. Although negative risks are potentially harmful to one's well-being and antisocial (e.g. getting in the car with a drunk driver, binge drinking, stealing), positive risks are beneficial to an individual's well-being and socially acceptable (e.g.

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initiating friendships, applying for promotion, standing up for one's beliefs) (Duell & Steinberg, 2019, 2021). The authors note that not all risks can be clearly classified as positive or negative. There are behaviors that are more ambiguous in terms of social acceptability. For example, protesting for civil rights may result in detention by the police, but it may also be accepted as leading to positive change. There are also cultural differences in the perception of which risks are positive and which are negative. However, it is reasonable to expect that in most urbanized societies certain risks are considered desirable and others undesirable (e.g. trying new sports vs. getting drugs; for a detailed discussion, see Duell & Steinberg, 2021).

Unlike negative risk-taking, positive risk-taking enables people to explore their environments and pursue meaningful goals in a socially accepted way. However, similar to negative risk-taking, positive risk-taking yields the potential for both rewards and costs. Initiating a friendship with a new coworker or asking someone new on a date, for example, yields the potential benefit of building new relationships, but it also holds the risk of experiencing rejection and embarrassment. Applying for a leadership role or entering a competition has both the possibility of winning and failing. To get the benefit of the risk, people must be willing to do things they may not like or at which they may fail (Duell & Steinberg, 2019). Thus, engagement in positive risk-taking is not simply a function of being a prosocial person. There must also be tolerance or inclination for risk (Duell & Steinberg, 2019).

### Psychological factors associated with positive and negative risk-taking

Despite the theoretical differences between positive and negative risk-taking, research shows that they are positively correlated (Duell & Steinberg, 2020; Fischer & Smith, 2004; Fryt et al., 2022; Hansen & Breivik, 2001). Thus, we can expect that people who take positive risks (e.g. running for a leadership role at work) also take negative risks to some extent (e.g. getting drugs at a party). Such correlations can be explained by the fact that different types of risk are driven by a shared risk propensity (Frey et al., 2017).

Research also indicates that positive and negative risk-taking have some shared and unique psychological correlates. For example, both are associated with sensation seeking (Duell & Steinberg, 2020; Patterson et al., 2022), which suggests that people who take positive and negative risks share a common search for new and exciting stimuli. Only negative risk-taking is associated with impulsivity (Duell & Steinberg, 2020), which suggests that many negative risks may be associated with a preference for immediate rewards or the tendency to act before thinking. Also, only positive risk-taking is associated with extraversion (Patterson et al.,

2022), which may suggest that positive risk-taking reflects outgoing, highly social proclivities.

In spite of the aforementioned studies, research on the shared and unique psychological correlates of positive and negative risk-taking is sparse. This study aimed to expand on prior literature by examining other factors hypothesized to influence individuals' motivations to take positive and negative risks. Such factors include future time perspective, which may influence risk-taking aimed at achieving long-term goals (Delaney et al., 2021), tolerance to ambiguity, which may increase risk-taking that is motivated by exploration or wanting to try new things (Tymula et al., 2012), and sensitivity to reward and punishment, as risk behavior involves the possibility of both rewards and losses (Fryt & Szczygieł, 2021).

Future time perspective (FTP) is a cognitive-motivational trait referring to whether people perceive their future time as open-ended or limited, and how many opportunities and plans they see ahead (Carstensen et al., 1999; Lang & Carstensen, 2002). The more people perceive their remaining time as limited, the fewer opportunities and plans they see ahead (and the lower their FTP is). Negative risks are often thought to be in the service of fulfilling emotional, short-term goals (e.g. the pleasure of driving fast), whereas it has been speculated that positive risks may be motivated by longer-term goals (Duell & Steinberg, 2019). However, this supposition has yet to be examined empirically.

Given that adulthood is a time during which time begins to be perceived as limited (Lang & Carstensen, 2002; Strough et al., 2016), it is likely that future time perspective is relevant to adults' motivations to take risks (Lang & Carstensen, 2002). When people see many opportunities and time ahead, they may feel that risks are worth taking. When they perceive future time and opportunities as limited, they may avoid risks to preserve what they have (Delaney et al., 2021). Also, considering findings that limited FTP is associated with a greater preoccupation with negative events (Strough et al., 2016), it may be that limited FTP reduces engaging in new or exciting activities, including positive and negative risks (e.g. going to a party alone, driving while intoxicated). Altogether, prior research suggests that FTP may be associated with risk-taking in adulthood.

Tolerance to ambiguity (TA) is another cognitive-motivational trait relating to peoples' attitudes towards novel, complex, and unpredictable stimuli (McLain, 2009). Although the dominant response to this type of stimuli is aversion (McLain, 2009), research indicates that people high in TA are more extroverted and open to new experiences (Caliğiuri & Talique, 2012), which may include risk-taking. In other words, tolerance to ambiguity may enhance risk-taking because it affords people with the willingness to try new things, even if the outcome is uncertain. Indeed, TA is responsible for increased risk-taking in conditions where the

consequences of risks are unknown (Tymula et al., 2012). However, research suggests that adults are willing to take more risks when the outcomes of those risks are explicitly known rather than unknown (Tymula et al., 2012). Even though TA decreases in adulthood (Tymula et al., 2013), adults who are above average on TA may evince higher levels of risk-taking than their below-average on TA peers. Whether tolerance to ambiguity is uniquely associated with positive or negative risks, however, is currently unknown.

Sensitivity to reward (SR) and to punishment (SP) are conceptualized as behavioral manifestations of Gray's Behavioral Activation System and Behavioral Inhibition System responsible for the approach and avoidance motivation (Cooper & Gomez, 2008). As risk behavior involves the possibility of both rewards and losses, high sensitivity to reward and low sensitivity to punishment may enhance risk propensity in adults (Lane & Cherek, 2000). Higher SR has been linked to both negative (e.g., greater substance use) and positive (e.g., extreme sports, performing) risks and prosocial behavior (Wood et al., 2013), whereas higher SP is associated with less endorsement of negative risks such as substance use (e.g. Kahn et al., 2018). Recently, one of the cross-sectional studies on young adults suggested that higher SR is associated with greater positive and negative risk-taking and lower SP is associated with greater negative risk-taking (Fryt & Szczygieł, 2021). Developmental research has shown that adults compared to adolescents tend to be less sensitive to rewards and more sensitive to punishments (Cauffman et al., 2010). Although this psychological profile may promote less negative risk-taking, it is still important that adults maintain a propensity to take positive risks such as initiating friendships, going up for promotions at work, and learning new skills (Morgan & Andrews, 2016).

Altogether, considering what we already know about the distinct correlates of positive and negative risk-taking, it may be that some adults endorse high levels of positive risk-taking whereas others engage in high levels of negative risk-taking. It is also quite likely that many adults endorse both patterns of risk behavior, as we know that different types of risk are driven by a shared risk propensity (Frey et al., 2017). To this end, we are interested in factors associated with positive and negative risk-taking in adults, particularly future time perspective, tolerance to ambiguity, and sensitivity to reward and punishment. Specifically, we are interested in examining whether distinct profiles of these psychological characteristics are differentially associated with positive and negative risk-taking.

## Aims of the present study

Given the dearth of literature on positive and negative risk-taking among adult populations, we used a latent profile analysis to identify profiles of individuals based on scores

for future time perspective, tolerance to ambiguity, and sensitivity to reward and punishment, and examine the association between profile membership and risk behavior. We also explored whether covariates such as age, gender, general health, professional activity, social activity, and satisfaction with life were associated with the probability of profile membership.<sup>1</sup> Altogether, our study aim was intended to help identify whether profiles of psychological characteristics can uniquely identify and distinguish between adult positive versus negative risk-takers.

## Method

### Participants

Two hundred and seventy-five participants (203 women, 72 men) ages 19–71 ( $M = 39.25$ ;  $SD = 13.73$ ) took part in the study. Participant distribution across age cohorts is presented in Table A in the Appendix. The sample included White, Polish adults living in both large and small towns, with 3.27% of participants describing their education as vocational, 25.09% as secondary, and 71.64% as higher (which means ongoing or completed bachelor's or master's studies). All participants provided written informed consent.

### Procedure

The research was approved by the University Ethics Committee. The sample was recruited on social media and participated in the study online. Participants were assured anonymity and the opportunity to ask questions (by e-mail), withdraw from the study at any time, and receive information about their results. Participants first answered questions regarding their general health and professional and social activity in the last year. Then, they

completed questionnaires measuring positive risk-taking, negative risk-taking, sensitivity to reward and punishment, tolerance to ambiguity, future time perspective, and satisfaction with life. The survey lasted 20–25 min and there were no rewards for participation.

### Measures

Questions asked at the beginning of the survey concerned the assessment of three variables: (1) participants' general health ("How would you rate your health in the last year

<sup>1</sup> Given this study was conducted following the SARS-COV-2 pandemic, we included factors such as general health, professional activity, social activity, and satisfaction with life as covariates to account for changes in activity, health, and well-being during this time.

on a scale from 1 – very bad to 10 – very good?”), (2) professional activity (“How would you rate your professional activity in the last year on a scale from 1 – I did not work to 10 – I worked a lot?”), and (3) social activity (“How would you rate your social activity in the last year on a scale from 1 – I met people very rarely to 10 – I met people very often?”). A higher score in each question means better general health, greater professional work to do, and more social activity, respectively. The questions were structured in such a way as to capture the subjective assessment of participants’ activity during the pandemic. Although the restrictions due to the pandemic in Poland were small during the study period, participants may have felt that the amount of work they were doing and the amount of socializing had changed (in different ways).

### Positive Risk-Taking Scale (PRTS)

To assess positive risk-taking, we used the self-report scale developed by Duell and Steinberg (2020) and translated by Fryt and Szczygiel (2021). The scale consists of 14 behaviors presented in Table B in the Appendix. Because the scale was originally designed for adolescents and young adults, we made slight modifications to make the items appropriate for adults who have completed their education. First, we changed the item: “Tried out for a team or auditioned for a play when you were not sure that you would be picked,” to: “Applied for a job, project or participated in a competition when you were not sure that you would be selected”. Second, we made minor modifications to three items: “Ran for a leadership role *at work* (instead of *in school*)...”; “*Started learning something that* (instead of: *Taken a class in a subject*) you knew nothing about or that seemed challenging”; and “Started a friendship with someone new when you were not sure how *others* (instead of: *your other friends*) would react”. Participants rated how often they engaged in each risk over the last year,<sup>2</sup> using a 5-point scale from 1 – “never” to 5 – “very often”. The sum of points to all items is a frequency score of positive risk-taking (PRTS), where higher scores indicated more frequent positive risk-taking (Cronbach’s  $\alpha = 0.83$ ).

### Negative Risk-Taking Scale (NRTS)

To assess negative risk-taking, we selected 23 behaviors from a questionnaire developed for the purpose of previous studies (Czernecka et al., 2018). The selected behaviors are

<sup>2</sup> This study was conducted during the SARS-COV-2 pandemic. To minimize potential biases in participants’

access to risk behaviors, participants rated how often they took risks over the last year instead of the last six months (as in the original version of the PRTS scale).

presented in Table B in the Appendix. Participants rated how often they engaged in each risk over the last year<sup>3</sup> using a 5-point scale from 1 – “never” to 5 – “very often”. As with the PRTS, the sum of points to all items is a frequency score of negative risk-taking (NRTS), where higher scores indicated more frequent negative risk-taking (Cronbach’s  $\alpha = 0.82$ ).

### Short Version of the Sensitivity to Punishment and Sensitivity to Reward Scale (SPSRQ-SF)

We used the questionnaire of Cooper and Gomez (2008) adapted by Wytykowska et al. (2014) that measures Gray’s Behavioral Inhibition System (BIS), which was used as a proxy for sensitivity to punishment and avoidance motivation, and Behavioral Activation System (BAS), which was used as a proxy for sensitivity to reward and approach motivation. The questionnaire consisted of 24 yes/no statements (e.g. “Do you avoid unfamiliar places if you can?”, “Do you like to compete and do your best to win?”). The sum of points to all items in the BIS subscale indicated sensitivity to punishment (SP) and the sum of points to all items in the BAS subscale indicated sensitivity to reward (SR). The Cronbach’s  $\alpha$  of the SP scale was 0.87; for the SR scale, it was 0.65.

### Multiple Stimulus Types Ambiguity Tolerance Scale (MSTAT-II)

To assess tolerance to ambiguity, we used the scale developed by McLain (2009) and adapted by Lachowska and Ludwikowska (2017). It consists of 13 statements relating to individuals’ orientation towards new, unfamiliar, uncertain, illogical, or ambiguous stimuli (e.g. „I prefer familiar situations to new ones”). Participants rated to what extent they agreed with various statements using a scale from 1 – “definitely disagrees”, through 3 – “neither agrees nor disagrees”, to 5 – “definitely agrees”. The sum of points to all items in the scale is an indicator of tolerance to ambiguity where higher scores indicate greater tolerance to ambiguity (Cronbach’s  $\alpha = 0.88$ ).

### Future Time Perspective Scale (FTPS)

We used the scale developed by Carstensen and Lang (1996) and adapted by Przepiorka et al. (2020) to assess future time perspective in terms of the socioemotional selectivity theory (Carstensen et al., 1999). The scale consists of 9 statements

<sup>3</sup> As with the PRTS, participants rated how often they took risks over the last year instead of the last six months (as in the original version of the NRTS).

relating to subjective perception about the amount of time remaining in life (e.g. “Many opportunities await me in the future”). Participants rated to what extent various statements were true for them, using a 7-point scale from 1 – “very untrue” to 7 – “very true”. The sum of points to all items is an indicator of future time perspective where higher scores indicate higher future time perspective (Cronbach’s  $\alpha=0.91$ ).

**Satisfaction with Life Scale (SWLS)**

To assess satisfaction with life, we used the scale developed by Diener et al. (1985) and adapted by Jankowski (2015). Participants rated to what extent they agreed with five statements about their satisfaction with life (e.g., “In most ways my life is close to my ideal.”) using a 7-point scale from 1 – “I definitely don’t agree” to 7 – “I definitely agree”. The sum of points to all items indicated life satisfaction, where higher scores indicated greater life satisfaction (Cronbach’s  $\alpha=0.89$ ).

**Results**

Before hypothesis testing, we conducted a confirmatory factor analysis to test whether positive and negative risk-taking were unidimensional or distinct constructs. Results (see Appendix) confirmed that the two-dimensional model is significantly better than the unidimensional. Therefore, we treated positive and negative risk-taking as independent dimensions of risk-taking. We noted that both types of risk are positively and weakly related to each other ( $r=0.37$ ,  $p<0.001$ ), consistent with prior literature (e.g., Duell & Steinberg, 2020).

**Descriptive statistics and correlations**

Descriptive statistics and correlations are presented in Table 1.

Higher positive risk-taking was associated with better general health, greater professional and social activity, higher satisfaction with life, as well as higher sensitivity to reward, tolerance to ambiguity, and future time perspective. In contrast, positive risk-taking was associated with lower sensitivity to punishment. Positive risk-taking was not associated with participant age or gender.

Higher negative risk-taking was associated with greater professional and social activity, as well as higher sensitivity to reward, tolerance to ambiguity, and future time perspective. In contrast, negative risk-taking was associated with lower punishment sensitivity. Negative risk-taking was slightly higher among men than women. Finally, negative

**Table 1** Descriptive Statistics and Pearson’s Correlations Among Primary Study Variables

	M	SD	Range	Sk	K	1	2	3	4	5	6	7	8	9	10	11	12	13	14	
1 Gender <sup>1</sup>																				
2 Age	39.25	13.73	19–71	.41	-.63	.27***														
3 General health	7.65	1.69	2–10	-.81	.45	.03	-.03													
4 Professional activity	7.09	3.00	1–10	-1.00	-.29	.15*	.16**	.33***												
5 Social activity	4.80	2.18	1–10	.19	-.62	-.05	-.04	.24***	.29***											
6 SWLS	23.09	6.58	5–35	-.51	-.03	.02	.01	.49***	.26***	.34***										
7 PRTS	41.40	8.04	21–68	.17	.41	.02	-.07	.15*	.19***	.25***	.29***									
8 NRTS	34.96	7.61	23–72	1.09	2.08	.38***	-.02	.09	.15**	.21***	.11	.37***								
9 SR	4.05	2.24	0–10	.47	-.41	.07	-.20***	.04	.04	.11	.13*	.26***	.34***							
10 SP	5.62	4.08	0–14	.28	-1.05	-.18**	-.26***	-.33***	-.31***	-.24***	-.43***	-.30***	-.18**	-.12*						
11 MSTAT	39.63	8.63	15–62	.04	.06	.16**	.01	.23***	.22***	.13*	.27***	.29***	.20***	.15*	-.47***					
15 FTPTS	37.30	11.56	9–63	-.23	-.19	-.04	-.26***	.37***	.20***	.38***	.60***	.38***	.19**	.19***	-.30***	.34***	.88***	.90***	.78***	

N=275 (203 women, 78 men), <sup>1</sup>women are coded as 0, men as 1. SWLS – satisfaction with life, PRTS – positive risk-taking, NRTS – negative risk-taking, SR – sensitivity to reward, SP – sensitivity to punishment, MSTAT – tolerance to ambiguity, FTPTS – future time perspective

**Table 2** Model Fit Indices for Competing Latent Profile Models

Number of profiles	AIC	BIC	SSaBIC	Entropy	LRT (p-value)	Bootstrapped LRT (p-value)
2	3032.584	3079.602	3038.382	0.736	111.12 (<.001)	-1560.832 (<.001)
3	3003.57	3068.672	3011.597	0.697	27.903 (.184)	-1503.292 (<.001)

Bolded values indicate fit indices for the final model. AIC= Akaike Information Criteria; BIC= Bayesian Information Criteria; SSaBIC= sample size adjusted BIC; LRT= Lo-Mendel Rubin Adjusted Likelihood Ratio Test

risk-taking was not associated with age, general health, or satisfaction with life.

### Latent profile analysis

#### Profile identification

We conducted a latent profile analysis using Mplus Version 8.4 (Muthén & Muthén, 2017) to identify profiles of individuals based on scores for future time perspective, tolerance to ambiguity, sensitivity to reward, and sensitivity to punishment. To identify the optimal number of profiles, we examined the Akaike Information Criteria (AIC), Bayesian Information Criteria (BIC), and sample-size adjusted BIC (SSaBIC) fit indices to compare models estimating between two- and three-profile solutions. Smaller AIC, BIC, and SSaBIC values indicate better model fit (Duell et al., 2022). We also evaluated the Lo-Mendel Rubin Adjusted Likelihood Ratio Test (LRT) and entropy. A significant LRT indicates that a solution with *k* number of profiles fits better than a solution with *k*-1 profiles (Nylund et al., 2007). Higher entropy values suggest greater accuracy of individual classification into profiles (minimum entropy of 0.8 is recommended; Muthén, 2020).

Results of the latent profile analysis supported a 2-profile solution (see Table 2 for model fit indices). Note that the default specification for Mplus is equal variances between latent profiles. The first profile (*Profile 1*, *n* = 113) was characterized by below-average levels of tolerance to ambiguity, sensitivity to reward, and future time perspective, and above-average levels of sensitivity to punishment. The second profile (*Profile 2*, *n* = 162) was characterized by above-average levels of tolerance to ambiguity, sensitivity to reward, and future time perspective, and below-average levels of sensitivity to punishment. Table 3 reports the means and standard errors for each of the profile indicators between the two profiles (see Fig. 1 for a graphical representation).

#### Predictors of profile membership

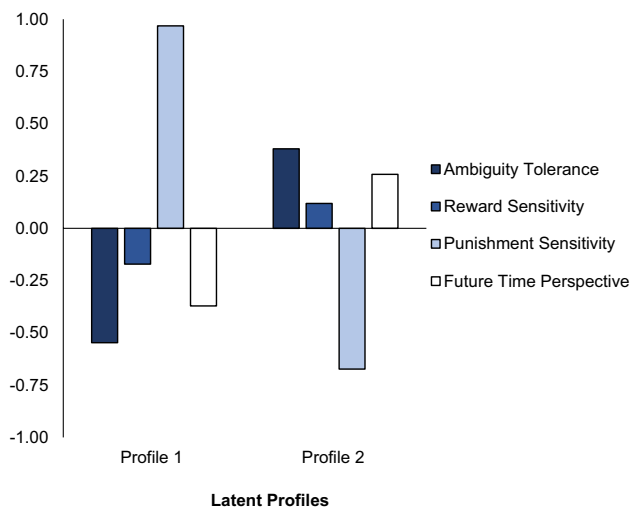
To explore factors associated with profile membership, multinomial logistic regression was conducted using the

R3Step procedure within Mplus (Asparouhov & Muthén, 2014). The associations between covariates including age, gender, general health, professional activity, social activity, satisfaction with life, and profile membership were examined. Results indicated that older age (Odds Ratio (OR) = 0.397, SE = 0.127, *p* < 0.001), male gender (OR = 0.392, SE = 0.214, *p* = 0.004), better general health (OR = 0.131, SE = 0.111, *p* < 0.001), and greater satisfaction with life (OR = 0.299, SE = 0.116, *p* < 0.001) were associated with higher odds of being in *Profile 2* than *Profile 1*. Professional activity (OR = 0.626, SE = 0.235, *p* = 0.111) and social activity (OR = 0.592, SE = 0.294, *p* = 0.164) did not affect the odds of profile membership.

**Table 3** Means and Standard Errors for Latent Profile Indicators and Mean Differences in Positive and Negative Risk-Taking Between Profiles

Variable	Profile 1		Profile 2		<i>c</i> <sup>2</sup> (p-value)
	<i>M</i>	<i>SE</i>	<i>M</i>	<i>SE</i>	
<b>A. Profile Indicators</b>					
Tolerance to ambiguity	-0.547	0.093	0.38	0.09	
Sensitivity to reward	-0.171	0.085	0.119	0.093	
Sensitivity to punishment	0.968	0.107	-0.673	0.072	
Future time perspective	-0.371	0.105	0.258	0.088	
<b>B. Profile Outcomes</b>					
Positive risk-taking	38.204	0.702	43.628	0.713	25.197 (<.001)
Negative risk-taking	32.869	0.624	36.497	0.711	11.919 (.001)

Section A reports standardized means and standard errors of the profile indicators for *Profile 1* and *Profile 2*, respectively. Section B reports unstandardized means and standard errors of positive and negative risk-taking between the latent profiles. *c*<sup>2</sup> indicates results from a chi-square difference test of the risk-taking means between *Profile 1* and *Profile 2*



**Fig. 1** Profile Membership and Standardized Means for Profile Indicators

### Profile membership and risk-taking

Finally, we employed the BCH procedure in Mplus (Asparouhov & Muthen, 2021) to examine mean-level differences in positive and negative risk-taking between the profiles. Results indicated that individuals in *Profile 1* endorsed significantly lower positive and negative risk-taking than individuals in *Profile 2*. Table 3 reports the means of positive and negative risk-taking between groups, as well as results from a chi-square difference test of the equality of means.

## Discussion

### Profile characteristics

To promote health and well-being in adulthood, it is important both to mitigate negative taking (e.g., binge drinking) and encourage positive risk-taking (e.g., initiating friendships). Identifying the psychological characteristics associated with risk-taking among adults offers information about what may motivate adults to engage in positive and negative risks. Positive and negative risk-taking, as well as the psychological factors associated with it, have so far been studied in adolescents, but not in adults. This study expands our understanding of what drives adults to take positive and negative risks by examining whether distinct profiles of psychological characteristics such as future time perspective, tolerance to ambiguity, and sensitivity to reward and punishment are differentially associated with positive and negative risk-taking in adults ages 19–71 years. We also explored associations between covariates including age,

gender, general health, professional activity, social activity, satisfaction with life, and profile membership.

The findings from latent profile analysis suggested that a psychological profile characterized by lower sensitivity to punishment and higher tolerance to ambiguity, future time perspective, and sensitivity to reward is associated with greater positive and negative risk-taking. Conversely, a psychological profile characterized by heightened sensitivity to punishment and lower tolerance to ambiguity, future time perspective, and sensitivity to reward is associated with lower positive and negative risk-taking. Interestingly, this means that we did not identify profiles that distinguish between individuals who take positive versus negative risks. These findings support the notion that risk behavior—whether positive or negative—is driven by a domain-general propensity for risk (Frey et al., 2017).

Positive risk-taking has been theorized as enabling people to pursue meaningful goals in a socially accepted way (Duell & Steinberg, 2021). In adulthood, having goals that are worth the risk may be linked to the future time perspective (Carstensen et al., 1999). Prior work has shown that older adults who see fewer opportunities in their future avoid taking certain risks (Delaney et al., 2021). Our person-centered study adds to this knowledge that individuals who report higher future time perspective endorse higher levels of both positive and negative risk-taking. This result may indicate that individuals who see the future as open-ended and full of opportunities and plans perceive many risks as more worth taking. Further, perhaps individuals take risks in the service of long-term goals, rather than taking risks to maximize their well-being in the here and now, as would be the case for individuals who have a limited future time perspective (Carstensen et al., 1999; Strough et al., 2016). Future studies will have to investigate the direction of these effects (e.g., high future time perspective may increase risk-taking or taking risks may increase future time perspective) and explore possible associations with well-being.

Previous research has shown that tolerance to ambiguity is associated with greater risk-taking on experimental tasks (e.g. Tymula et al., 2012). Findings from this person-centered study expand on this work by demonstrating that tolerance to ambiguity is associated with greater positive and negative risk-taking in the real world. Tolerance to ambiguity is associated with many positive aspects of individuals' psychological functioning such as satisfaction with life and positive affect (Bardi et al., 2009), proactivity (Bors et al., 2010), openness to experience (Caligiuri & Talique, 2012), and prosocial behavior (Vives & FeldmanHall, 2018). In line with these findings, our study suggests that tolerance to ambiguity is one of the key factors distinguishing between risk-averse versus risk-prone individuals. This result may indicate that many positive and negative risks are driven

by the willingness to do new, complex, and unpredictable things.

Findings from this study also showed that sensitivity to punishment is associated with both positive and negative risk-taking. Furthermore, the greatest difference between the identified profile variables was in the level of sensitivity to punishment. Prior works suggested that high sensitivity to punishment is associated with negative risk-taking or substance use (Fryt & Szczygieł, 2021; Kahn et al., 2018). Negative risks are often perceived as leading to serious negative consequences, but it should be noted that positive risks can also lead to negative outcomes (e.g. standing up for one's beliefs may result in criticism or rejection). In line with this notion, the results of our study indicate that both positive and negative risks may require a high tolerance for loss. Indeed, individuals with higher sensitivity to punishment endorsed lower levels of positive and negative risk-taking. We can speculate that individuals in the profile characterized by high sensitivity to punishment take the negative consequences of risks seriously and are averse to decisions with the potential for such negative outcomes.

As for the covariates included in the latent profile analysis, we found that older age and male gender were associated with higher odds of being in *Profile 2* (associated with greater risk-taking) than in *Profile 1*. These findings are in line with prior works showing that young adults are not necessarily the ones who take the most risks (e.g. Mata et al., 2015). They are also partially in line with the results of prior studies showing that men take more negative (but not positive) risks than women (Fryt et al., 2022). Furthermore, the finding that better general health and greater satisfaction with life were associated with higher odds of being in *Profile 2* (associated with greater risk-taking) than in *Profile 1* suggested that risk-taking, like tolerance to ambiguity (Bardi et al., 2009) may be positively associated with well-being. Granted, future research will have to investigate the direction of these effects (e.g., people who are in better health are probably more willing to take risks).

### Limitations and future research direction

Despite the new and interesting results, our study also has limitations. Our sample was biased towards women and people with higher education, which limits the generalizability of the findings. As positive risk-taking often serves positive life goals (e.g. acquisition of new skills, career development), it is possible that higher educated people have more opportunities to take positive risks. Also, we cannot exclude the possibility of selection bias, such that positive risk-taking may be more common among people who are familiar with social media and willing to participate in online surveys (as in our sample). The assessment of general health, professional, and social activity was

limited by using a single item for each variable. In future studies, it will be useful to examine more robust measures of these constructs as key correlates of positive and negative risk-taking (rather than correlates of risk-taking profile). Finally, despite our efforts to control factors that may have influenced the variables studied during the pandemic, we acknowledge that the presence of the pandemic likely had significant impacts on participants' responses (e.g., tolerance to ambiguity may have been especially salient during the pandemic). In spite of these limitations, the findings from our study offer a useful starting point for examining diverse patterns of risk behavior across different stages of adulthood.

Although the findings from this study identified psychological characteristics shared between positive and negative risk-taking, there are likely many psychological factors not accounted for in this study that distinguish between these behaviors, including impulsivity (Duell & Steinberg, 2020; Patterson et al., 2022), agreeableness and extraversion (Patterson et al., 2022). As this study took a person-centered approach to understand risk behavior in adulthood, it is important for future work to complement these findings with variable-centered approaches that identify factors influencing risk behavior. Such factors may include opportunity (e.g., adults with familial obligations may have fewer opportunities to take risks) and cultural norms (e.g., cultural values around consuming alcohol). Also, in future work, it is worth determining how positive and negative risk-taking is perceived and how specific motivations and opportunities for risk-taking vary across individuals. Specifically, it is important to examine how people assess possible gains and losses of positive and negative risks, and how the perception of whether it is worth taking risks varies with age and subjective perception of time.

### Conclusion

Altogether, this study contributes to previous findings by identifying additional psychological characteristics that may be associated with both positive and negative risk-taking in adults. Although we initially set out to identify characteristics distinguishing between positive and negative risk-takers, results from this study have identified a general profile of risk-taking propensity among adults. This is important because it suggests that positive and negative risk-taking may be driven to some extent by the same motivations. Ultimately, we hope the findings from this study lay the foundation for future work that helps define how to promote positive instead of negative risk-taking at different stages of life.



## Informed consent

All participants provided written informed consent.

## Conflict of interest

The authors declare no conflict of interest.

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**Data availability** All data have been made publicly available at the OSF repository and can be accessed at: <https://osf.io/ja2u8/>

## Declarations

**Ethical approval** The research was approved by the Ethical Committee of the Institute of Psychology, Pedagogical University of Krakow (Approval number: 09/2/2021).

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## References

- Asparouhov, T., & Muthén, B. O. (2021). Auxiliary variables in mixture modeling: Using the BCH method in Mplus to estimate a distal outcome model and an arbitrary second model. *Mplus Web Notes*: No. 21, Version 11. Retrieved October 5, 2022, from <https://www.statmodel.com/examples/webnotes/webnote21.pdf>
- Asparouhov, T., & Muthén, B. O. (2014). Auxiliary variables in mixture modeling: Three-step approaches using Mplus. *Structural Equation Modeling*, 21, 329–341. <https://doi.org/10.1080/10705511.2014.915181>
- Bardi, A., Guerra, V., & Ramdeny, G. (2009). Openness and ambiguity intolerance: Their differential relations to well-being in the context of an academic life transition. *Personality and Individual Differences*, 47(3), 219–223. <https://doi.org/10.1016/j.paid.2009.03.003>
- Bors, D., Gruman, J. A., & Shukla, S. (2010). Measuring tolerance of ambiguity: Item polarity, dimensionality, and criterion validity. *European Review of Applied Psychology-Revue Européenne De Psychologie Appliquée*, 60, 239–245. <https://doi.org/10.1016/j.erap.2010.07.001>
- Caligiuri, P., & Tarique, I. (2012). Dynamic cross-cultural competencies and global leadership effectiveness. *Journal of World Business*, 47(4), 612–622. <https://doi.org/10.1016/j.jwb.2012.01.014>
- Carstensen, L., Isaacowitz, D., & Charles, S. (1999). Taking time seriously. A theory of socioemotional selectivity. *American Psychologist*, 54, 165–181. <https://doi.org/10.1037/0003-066x.54.3.165>
- Carstensen, L. L., & Lang, F. R. (1996). *Future Time Perspective Scale (FTP)*. [Database record]. APA PsycTests. <https://doi.org/10.1037/t31314-000>
- Cauffman, E., Shulman, E. P., Steinberg, L., Claus, E., Banach, M. T., Graham, S., & Woolard, J. (2010). Age differences in affective decision making as indexed by performance on the Iowa Gambling Task. *Developmental Psychology*, 46, 193–207. <https://doi.org/10.1037/a0016128>
- Cooper, A., & Gomez, R. (2008). The development of a short form of the sensitivity to punishment and sensitivity to reward questionnaire. *Journal of Individual Differences*, 29, 90–104. <https://doi.org/10.1027/1614-0001.29.2.90>
- Czernecka, K., Fryt, J., Szczygieł, M., La Torre, A., & Smoleń, T. (2018). Many face(s) of young people's risk-taking: Individual and situational determinants. *Current Issues in Personality Psychology*, 6(2), 112–121. <https://doi.org/10.5114/cipp.2018.72268>
- Delaney, R. K., Strough, J., Shook, N. J., Ford, C. G., & Lemaster, P. (2021). Don't risk it. Older adults perceive fewer future opportunities and avoid social risk-taking. *International Journal of Aging & Human Development*, 92(2), 139–157. <https://doi.org/10.1177/0091415019900564>
- Diener, E., Emmons, R. A., Larsen, R. J., & Griffin, S. (1985). The Satisfaction with Life Scale. *Journal of Personality Assessment*, 49, 71–75. [https://doi.org/10.1207/s15327752jpa4901\\_13](https://doi.org/10.1207/s15327752jpa4901_13)
- Duell, N., & Steinberg, L. (2019). Positive risk taking in adolescence. *Child Development Perspectives*, 13(1), 48–52. <https://doi.org/10.1111/cdep.12310>
- Duell, N., & Steinberg, L. (2020). Differential correlates of positive and negative risk taking in adolescence. *Journal of Youth and Adolescence*, 49, 1162–1178. <https://doi.org/10.1007/s10964-020-01237-7>
- Duell, N., & Steinberg, L. (2021). Adolescents take positive risks, too. *Developmental Review*, 62, 100984. <https://doi.org/10.1016/j.dr.2021.100984>
- Duell, N., Christophe, K. N., & Martin Romero, M. Y. (2022). Risk taking profiles among college students: An examination of health-risk taking, anti-racism action, and college functioning. *Journal of American College Health*, 3, 1–9. <https://doi.org/10.1080/07448481.2022.2077636>
- Figner, B., & Weber, E. U. (2011). Who takes risk, when and why? Determinants of risk taking. *Current Directions on Psychological Science*, 20(4), 211–216. <https://doi.org/10.1177/0963721411415790>
- Fischer, S., & Smith, G. T. (2004). Deliberation affects risk-taking beyond sensation seeking. *Personality and Individual Differences*, 36, 527–537. <https://doi.org/10.1177/0963721411415790>
- Frey, R., Pedroni, A., Mata, R., Rieskamp, J., & Hertwig, R. (2017). Risk preference shares the psychometric structure of major psychological traits. *Science Advances*, 3(10), e1701381. <https://doi.org/10.1126/sciadv.1701381>
- Fryt, J., & Szczygieł, M. (2021). Predictors of Positive and Negative Risk-Taking in Adolescents and Young Adults: Similarities

- and Differences. *Europe's Journal of Psychology*, 17(1), 17–30. <https://doi.org/10.5964/Fejop.2169>
- Fryt, J., Szczygieł, M., & Duell, N. (2021). Positive and negative risk-taking in adolescence: Age patterns and relations to social environment. *New Directions for Child and Adolescent Development*, 179, 127–146. <https://doi.org/10.1002/cad.20431>
- Fryt, J., Szczygieł, M., & Duell, N. (2022). Positive and negative risk-taking: Age patterns and relations to domain-specific risk-taking. *Advances in Life Course Research*, 54(4), 100515. <https://doi.org/10.1016/j.alcr.2022.100515>
- Hansen, E. B., & Breivik, G. (2001). Sensation seeking as a predictor of positive and negative risk behaviour among adolescents. *Personality and Individual Differences*, 30, 627–640. [https://doi.org/10.1016/S0191-8869\(00\)00061-1](https://doi.org/10.1016/S0191-8869(00)00061-1)
- Jankowski, K. S. (2015). Is the shift in chronotype associated with an alteration in well-being? *Biological Rhythm Research*, 46, 237–248. <https://doi.org/10.1080/09291016.2014.985000>
- Kahn, R. E., Chiu, P. H., Deater-Deckard, K., Hochgraf, A. K., King-Casas, B., & Kim-Spoon, J. (2018). The interaction between punishment sensitivity and effortful control for emerging adults' substance use behaviors. *Substance Use and Misuse*, 53(8), 1299–1310. <https://doi.org/10.1080/10826084.2017.1407790>
- Lachowska, B., & Ludwikowska, K. (2017). Wyniki wstępnej walidacji Polskiej wersji Skali Tolerancji Niejednoznaczności Wielorakich Typów Bodźców [Results of the preliminary validation of the Polish version of the Multiple Stimulus Types Ambiguity Tolerance Scale]. *Roczniki Psychologiczne*, 20(4), 855–874.
- Lane, S. D., & Cherek, D. R. (2000). Analysis of risk taking in adults with a history of high risk behavior. *Drug and Alcohol Dependence*, 60, 179–187. [https://doi.org/10.1016/S0376-8716\(99\)00155-6](https://doi.org/10.1016/S0376-8716(99)00155-6)
- Lang, F. R., & Carstensen, L. L. (2002). Time counts: Future time perspective, goals, and social relationships. *Psychology & Aging*, 17, 125–139. <https://doi.org/10.1037/0882-7974.17.1.125>
- Mata, R., Josef, A., & Hertwig, R. (2015). Propensity for risk taking across the life span and around the globe. *Psychological Science*, 27(2), 231–243. <https://doi.org/10.1177/0956797615617811>
- McLain, D. L. (2009). Evidence of the properties of an ambiguity tolerance measure: The Multiple Stimulus Types Ambiguity Tolerance Scale–II (MSTAT–II). *Psychological Reports*, 105(3), 975–988. <https://doi.org/10.2466/pr0.105.3.975-988>
- Morgan, S., & Andrews, N. (2016). Positive risk taking: From rhetoric to reality. *The Journal of Mental Health Training, Education and Practice*, 11, 122–132. <https://doi.org/10.1108/JMHTEP-09-2015-0045>
- Muthén, B. O. Mplus Discussion >> What is a good value of entropy. Retrieved August 24, 2020, from <https://www.statmodel.com/discussion/messages/13/2562.html?1237580237>. Published November 21, 2008
- Muthén, L. K., & Muthén, B. O. (2017). *Mplus: Statistical Analysis with Latent Variables: User's Guide (Version 8)*.
- Nylund, K. L., Asparouhov, T., & Muthén, B. O. (2007). Deciding on the number of classes in latent class analysis and growth mixture modeling: A Monte Carlo simulation study. *Structural Equation Modeling*, 14, 535–569. <https://doi.org/10.1080/10705510701575396>
- Patterson, M. W., Pivnick, L., Mann, F. D., Grtozinger, A. D., Monahan, K. C., Steinberg, L., Oosterhoff, B., Tackett, J. L., Tucker-Drob, E. M., & Harden, K. P. (2022). A mixed-methods approach to refining and measuring the construct of positive risk taking in adolescence. *Journal of Research on Adolescence. Online First*. <https://doi.org/10.1111/jora.12807>
- Przepiorka, A., Jankowski, T., & Sobol, M. (2020). Is future time perspective multidimensional? The future time perspective scale in a polish sample. *European Journal of Psychological Assessment*. <https://doi.org/10.1027/1015-5759/a000603>
- Strough, J., Bruine de Bruin, W., Parker, A. M., Lemaster, P., Pichayayothin, N., & Delaney, R. (2016). Hourglass half full or half empty? Future time perspective and preoccupation with negative events across the life span. *Psychology & Aging*, 31(6), 558–573. <https://doi.org/10.1037/pag0000097>
- Tymula, A., Rosenberg-Belmaker, L. A., Roy, A. K., Ruderman, L., Manson, K., Glimcher, P. W., & Levy, I. (2012). Adolescents' risk-taking behavior is driven by tolerance to ambiguity. *Proceedings of the National Academy of Sciences of the United States of America*, 109, 17135–17140. <https://doi.org/10.1073/pnas.1207144109>
- Tymula, A., Rosenberg Belmaker, L. A., Ruderman, L., Glimcher, P. W., & Levy, I. (2013). Like cognitive function, decision making across the life span shows profound age-related changes. *Proceedings of the National Academy of Sciences of the United States of America*, 110(42), 17143–17148. <https://doi.org/10.1073/pnas.1309909110>
- Vives, M. L., & FeldmanHall, O. (2018). Tolerance to ambiguous uncertainty predicts prosocial behavior. *Nature Communications*, 9(1), 1–9. <https://doi.org/10.1038/s41467-018-04631-9>
- Wood, A. P., Dawe, S., & Gullo, M. J. (2013). The role of personality, family influences, and prosocial risk-taking behavior on substance use in early adolescence. *Journal of Adolescence*, 36, 871–881. <https://doi.org/10.1016/j.adolescence.2013.07.003>
- Wytykowska, A., Białaszek, W., & Ostaszewski, P. (2014). Psychometryczne właściwości polskiej wersji Krótkiej Skali Wrażliwości na Kary i Nagrody (SPSRQ-SF Cooper i Gomez, 2008) Psychometric parameters of the Polish short version of sensitivity to punishment and reward scale. *Studia Psychologiczne*, 52(2), 28–39. <https://doi.org/10.2478/v10167-010-0083-6>

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