Adolescent identity styles and avatar perception: examining the link between identity formation and virtual representation[1]

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Abstract: Identity formation is a fundamental developmental task during adolescence, significantly influenced by how individuals are judged by others. In today's digital age, such judgements increasingly occur in virtual settings, where the focus often shifts from the user to their virtual representation, or avatar. One of the most relevant frameworks for understanding the process of identity formation is Michael Berzonsky's social-cognitive model of identity formation, which identifies three distinct identity processing styles: informational, normative, and diffuse-avoidant. This study explores whether correlations exist between adolescent identity styles and external judgements of their avatars. The sample consisted of 130 adolescents (75 females, 55 males), aged between 15 to 17 years. The research participants were instructed to create their own avatars and subsequently control their movements within an arcade game. Following this, the participants completed the Identity Style Questionnaire to determine their identity processing style. Field experts then evaluated the adolescents' avatars based on several dimensions: masculinity/femininity of the nickname, unconventionality of the nickname, masculinity/femininity of the character, style of clothing (extravagance), attractiveness, friendliness, intelligence, sociability, and trustworthiness of the character, as well as character's activeness and openness to experience. The results revealed significant correlations between the informational and normative identity styles and the avatars' physical and psychological attributes as evaluated by experts. These findings provide valuable insights from a developmental psychology perspective and hold practical implications for interdisciplinary collaborations between psychologists and developers, particularly in designing educational and therapeutic computer games.
Keywords: adolescence, avatar, computer game, identity styles, identity

1. Introduction

1.1. Identity

Identity formation is a fundamental developmental task during adolescence (Kroger, 2003). Identity provides answers to essential questions such as 'Who am I?', 'Where do I belong?', and 'How do I fit (or fit in)?' (Oyserman, 2001). Classical approaches to identity development, as posited by Erikson (1963) and Marcia (1980), conceptualise identity formation through the lens of crises experienced by young people. An alternative perspective on identity formation is offered by Berzonsky (1992), who shifts the focus away from an understanding of the identity formation process through the lens of the crises experienced. According to Berzonsky, individuals process self-relevant information in diverse ways and arrive at decisions and solutions pertaining to Self through distinct strategies. Based on these action strategies, the researcher identified three identity processing styles: informational, normative, and diffuse-avoidant. The framework proposed by Berzonsky (1992; 2016) is currently regarded as one of the most effective in capturing the essence of individual identity (Moshman, 2011).

Individuals with the informational identity style play an active role in the construction of their self, both in the present and with a view toward the future (Berzonsky, 2016). They 'actively seek out, process, and evaluate self-relevant information'. They are undaunted by the prospect of self-discovery and are prepared to undergo a process of self-identity modification. They adopt a sceptical

stance with regard to their own views. Such individuals are characterised by their rational and critical way of thinking and by their openness to diverse values and ideas.

In contrast, individuals with the normative identity style seek to maintain their existing identity structure (Berzonsky, 2016). They adopt norms, standards, and expectations established by significant reference groups (Berzonsky et al., 2011; Berzonsky, 2016). Concurrently, these individuals demonstrate a marked resistance to alternative beliefs, ideas, and values. They do not tolerate ambiguity. Their key values are security, tradition, stability, certainty, and social order (Berzonsky et al., 2011).

By contrast, individuals with the diffuse-avoidant identity style demonstrate a lack of engagement with the identity formation process (Berzonsky, 2016). They tend to procrastinate and avoid decisions related to their Self. Hedonism and power serve them as key motivators (Berzonsky et al., 2011). The decisions and actions of those individuals are often guided by external factors and circumstances, demands and expectations, potential consequences, and immediate social contexts (Berzonsky, 2016).

Identity formation does not occur in isolation; it is profoundly shaped by how individuals are judged by others. A person's self-perception is influenced by external perceptions (Cooley, 1962/1964; as cited in Szpitalak & Polczyk, 2015) and social interactions (Mead, 1934; as cited in Szpitalak & Polczyk, 2015). For adolescents in particular, peer opinions carry significant weight (Gorrese and Ruggieri, 2013; Jiang et al., 2015; Gruenenfelder-Steiger et al., 2016). These opinions can influence adolescents' self-perception (Kerpelman and Pittman, 2001; Rosen et al., 2013) and their capacity for self-acceptance (Tafarodi and Swann, 1995). In today's digital age, opinions and judgements increasingly occur within virtual environments (Jong and Drummond, 2016; Vossen et al., 2017; Meeus et al., 2019). In such cases, it is not the physical individual who becomes the direct object of judgement, but rather their virtual representation, or avatar. (representations of themselves created by them in virtual space)

1.2. Perception of others

The study of avatar perception represents a relatively nascent yet rapidly evolving area of research. At its core lies the premise that, in the physical world, individuals engage in forming impressions of others based on observed characteristics and behaviours. One of the factors influencing such judgements is clothing. Research has demonstrated that attire significantly affects perceptions of an individual's charisma (Brem and Niebuhr, 2021), particularly when clothing choices deviate from established social norms governing specific styles (Maran et al., 2021). Additionally, the colour of clothing plays a pivotal role. For instance, black and red clothing colours imply higher body attractiveness and slimmer body size ratings (Sidhu et al., 2021). Sandu (2021) posits that colours and styles of clothing individuals choose are closely linked to their worldview or thinking. Forsythe et al. (1985) observed that female job applicants wearing more masculine attire received more favourable hiring recommendations. Forsythe (1987) further demonstrated that women dressed in masculine clothing conveyed managerial traits typically associated with masculinity, as opposed to those in more traditionally feminine attire.

A second crucial factor influencing perceptions is the masculinity-femininity construct. Thompson and O'Sullivan (2013) found that women rated men with highly masculine facial features as more desirable for both short- and long-term romantic partnerships. Dixson and Brooks (2013) reported similar findings: men with full beards and pronounced masculine characteristics were perceived as better fathers capable of protecting and investing in offspring, thereby increasing their suitability as romantic partners. Conversely, in his studies, Lanter (2008) found that 'the female participants reported more romantic interest in a target male with a combination of masculine and feminine characteristics and roles'. Fraccaro et al. (2010) showed that men exhibit a general preference for feminised versions of both women's faces and voices. However, this preference is less pronounced in older men (Marcinkowska et al., 2017). The masculinity-femininity dimension also relates to help-seeking behaviours. McCusker and

Galupo (2011) found that heterosexual men seeking therapeutic assistance for depression were evaluated as more feminine compared to those who refrained from seeking help (this finding didn't concern homosexual men). Fleischmann et al. (2016) demonstrated that wearing a feminine outfit, compared to neutral attire, increased perceived femininity but led to lower ratings of computer skills and unfavourable attributions regarding success and failure in a computer task.

Perceived attractiveness represents another influential cue in forming impressions of others. Jackson et al. (1995) showed that attractive people were judged to possess higher intellectual competence. Similarly, Langlois et al. (2000) showed that both attractive children and adults are judged and treated more positively than their unattractive counterparts. Moreover, in certain circumstances, physical attractiveness can also influence altruistic behaviour: West and Brown (1975) observed that a physically attractive female solicitor received greater donations under low-severity emergency conditions compared to an unattractive solicitor. Individuals who are perceived to be more physically attractive are judged to be more trustworthy (Shinners, 2009), enjoy higher workplace rewards (Fruhen et al., 2015), and are more likely to be hired (Baert and Decuypere, 2014). Behrend et al. (2012) reported that job candidates with more attractive male or female avatars received more favourable interview ratings.

Trustworthiness also plays a critical role in impression formation. Research has shown that individuals perceived as trustworthy receive better remuneration conditions (Fruhen et al., 2015). Sheldon (2009) demonstrated that trust among online users promotes greater self-disclosure. Hira and Bhogal (2020) found that trust negatively predicts Facebook-related jealousy in heterosexual romantic relationships. Nayar and Koul (2020) confirmed a significant 'effect of trust on the relationship between social intimacy and the success of online dating'. Additionally, Rice et al. (2015) observed that individuals perceived as trustworthy were rated as more sociable.

Another essential dimension of perception is intelligence. Perceived intelligence has significant implications for relationship building. Agadullina (2020) found that individuals perceived as highly intelligent were more likely to elicit a willingness to form relationships, even in the presence of negative traits, such as sexist behaviour. Webster and Driskell Jr. (1983) similarly demonstrated a strong association between perceived intelligence and physical attractiveness. Moreover, perceptions of intelligence correlate with ratings of emotional stability, extraversion, openness to experience, and conscientiousness (Mõttus et al., 2008).

1.3. Similarities and differences in the evaluation of people and avatars

Avatars, like humans, are observed by users, and beliefs about them are formed based on these observations. For instance, the intensity of pain experienced by an avatar can be inferred from its facial expressions (Meister et al., 2021). In a study by Del Aguily et al. (2021), participants accurately recognised all emotions presented by avatars, including joy, anger, sadness, fear, disgust, and surprise. The avatars were presented on a screen from a range of distances (from 35 to 115 cm), yet the distance did not significantly influence participants' judgements. Interestingly, a notable trend emerged: negative emotions of avatars were recognised more accurately at longer distances, whereas positive emotions were better identified at shorter distances. Neuroscientific studies reveal that observing an anxiety expression activates the amygdala, irrespective of whether the expression is presented by a human or an avatar (Kegel et al., 2020). Fysh et al. (2021) observed that recognition of avatar faces, whether familiar or unfamiliar, created from photographs was comparable to the recognition of human faces.

However, notable discrepancies exist between the perception of avatars and humans. Kegel et al. (2020) found that observing fearful human expressions elicited stronger responses than fearful avatar expressions in cortical structures such as the anterior and posterior superior temporal sulcus (STS) and the inferior frontal gyrus (IFG). Furthermore, Balas and Pacella (2017) demonstrated that credibility ratings were both less favourable and less precise for artificial faces than for real human faces. Wang et al. (2013) identified significant inconsistency in judgements

when participants viewed ghoulish avatars. These avatars evoked negative emotions, which researchers suggest led to distorted perceptions. Another factor contributing to inconsistencies in judgement is the fact that avatars are not always designed to resemble their creators. Machneva et al. (2021) demonstrated a lack of correlation between perceptions of avatars as trustworthy and the trustworthiness of their creators, despite a high degree of agreement among research participants regarding the avatars' trustworthiness.

1.4. Review of literature on avatar evaluation

Several studies indicate a relationship between avatars' physical characteristics and the perceptions of their abilities and personality traits. Evaluations of an avatar's empathy and dominance are influenced by both the avatar's clothing (e.g., a nursing scrub, military uniform, or casual attire) and the degree of openness of the posture (Küster et al., 2019). Female avatars, in particular, were perceived as more empathetic and less dominant when wearing nursing scrubs and exhibiting open postures, which in turn enhanced their perceived competence. Wang et al. (2013) demonstrated that avatars with wider faces were perceived as less aggressive than those with narrower faces. However, for male avatars, wider faces were associated with reduced attractiveness. Wohlrab et al. (2009) conducted a comparative analysis of avatars with and without tattoos, revealing that tattooed avatars were perceived as more experienced, more adventurous and thrill-seeking, having had more sexual partners, and demonstrating less inhibition. Weibel et al. (2010) found that avatars with larger pupils and slower blinking rates were perceived as more sociable and more attractive.

Studies suggest that perceptions of one trait of an avatar often serve as a basis for inferring other traits. Bélisli and Bodur (2010) observed that avatars with blonde hair or avatars who possessed virtual property in a game were perceived as more extraverted than those with dark hair or no virtual property. Perceived friendliness in avatars seems to correlate positively with perceived amicability and attractiveness but negatively with perceived height (Li et al., 2018). In their study, Nowak and Rauh (2005) found that the avatar rated as the most feminine was also judged as the most attractive. In the ranking of avatars, this avatar ranked sixth in terms of credibility, yet considerably lower in terms of similarity to the research participants, and was less likely to be selected as a representation. The most masculine avatar was rated as the most anthropomorphic[2] and the second most likely avatar to be selected but ranked sixth in terms of credibility. Overall, avatars perceived as more attractive were judged to be more credible, similar to participants, and more likely to be chosen as representations. Nowak and Rauh (2008) extended these findings, showing that perceptions of an avatar's femininity-masculinity influenced ratings of anthropomorphism, which, in turn, affected perceptions of the avatar's credibility and the person it represented.

The physical resemblance of avatars to actual humans, otherwise known as anthropomorphism, plays an important role in the perception of avatars. Nowak and Rauh (2005) and Dubosc et al. (2021) highlight a preference for anthropomorphic avatars among participants. Świderska and Küster (2018) explored attributions of mental abilities (such as experiencing emotions, agency, consciousness, and pain) to avatars. The avatars were either human-like or robot-like and approximately half of them exhibited visible injuries. Their study revealed that avatars exhibiting visible injuries were perceived to possess more mental abilities, regardless of whether they were human-like or robot-like. A further study demonstrated that greater anthropomorphism in avatars correlated with increased perceived attractiveness (Dubosc et al., 2021). In their study, Nowak and Rauh (2005) presented research participants with thirty avatars, which they categorised into human-like female character, human-like male character, animal, and object groups. Participants were requested to rank the avatars based on several characteristics, including the degree of anthropomorphism (the physical resemblance of the images to an actual hu-

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2   The concept of anthropomorphism, defined as the physical resemblance of avatars to actual humans, plays a crucial role in avatar evaluation (Nowak and Rauh, 2005).

man), androgyny (masculinity and femininity), credibility, likeness, attractiveness, and likelihood of being selected. The findings revealed that the five avatars perceived as the most credible, most similar to the research participants, and with the highest probability of being selected as participants' representations were human-like avatars. In contrast, an avatar representing a green lizard was ranked as the least attractive, least credible, most dissimilar to the participants, and least preferred choice.

The avatars are subject to evaluation by other players. They elicit initial impressions from an audience much like humans. The avatars' physical appearance and material possessions serve as cues for inferring abilities and personality traits. One trait is used as a basis for inferring another. While some of these perceptions may be accurate, others may be distorted or inconsistent. Nevertheless, this does not negate the fact that individuals evaluate others based on their avatars. The evaluation of avatars as virtual representations holds particular relevance in adolescent populations, for whom virtual environments are significant spaces for identity formation. Avatars created by adolescents are subject to evaluation by peers, which can, in turn, influence the development of a sense of identity in young people.

2. Own research

2.1. Aim of the research

The social environment plays a pivotal role in identity formation during adolescence. For adolescents, how they are perceived by others holds particular significance (Antheunis and Schouten, 2011). The judgements made by individuals with whom the adolescent share significant relationships exert a substantial influence on their response to the question 'Who am I?' (Kerpelman and Pittman, 2001; Rosen et al., 2013). Evaluations received in the digital realm have become especially important (Jong and Drummond, 2016). In virtual environments, individuals are assessed indirectly through their avatars. Such evaluations may pertain to both physical and psychological characteristics. In the

physical world, people are often evaluated based on dimensions such as masculinity/femininity (Fraccaro et al., 2010; Thompson and O'Sullivan, 2013), attractiveness (Jackson et al., 1995; Langlois et al., 2000), trustworthiness, sociability (Nayar and Koul, 2020; Rice et al., 2015), intelligence (Agadullina, 2020), and their clothing style (Sandu, 2021; Brem and Niebuhr, 2021). These same dimensions were therefore applied to the avatars examined in this study. Additional dimensions were incorporated into the model to account for the unique nature of virtual identities. These include the unconventionality of avatars' nicknames, given their role as a salient element of identity in virtual settings (Conrad et al., 2011), friendliness, reflecting the importance of interpersonal relationships as a motive for engaging in gaming (Williams et al., 2008; Frostling-Henningsson, 2009), openness to experience, given that virtual settings provide opportunities for self-identity experimentation (Hussain and Griffiths, 2008; Paik and Shi, 2013), and activeness, to address the perception of gamers as passive individuals (Domahidi and Quandt, 2015). However, it remains unclear whether a relationship exists between adolescents' identities in real life and the way their avatars are perceived in virtual settings. This ambiguity led to the formulation of three research questions: one primary and two subsidiary questions:

Q1:   Is there, and what is the nature of, the relationship between adolescents' identities and others' evaluations of their avatars?

Q1a: Is there, and what is the nature of, the relationship between adolescents' identities and others' evaluations of their avatars' physical characteristics?

Q1b: Is there, and what is the nature of, the relationship between adolescents' identities and others' evaluations of their avatars' psychological characteristics?

2.2. Methodology

2.2.1. Research participants

The sample consisted of 130 adolescents (75 females and 55 males). The participants were secondary school students, aged between 15 and 17 years (M = 16.53; SD = 0.60). Participants were drawn from a range of class profiles, with the exception of IT-focused classes, which were excluded to minimise any disproportionate focus on game mechanics. All research participants reported engaging in computer gaming at least once in their lives. Gaming frequency varied as follows: 14.6% reported no current gaming activity, 27.6% played less than once per month, 12.4% played once per month, 16.9% played once per week, 18.5% played several times per week, and 10% played daily.

2.3. Tools

Characterium computer game – an arcade-style computer game specifically designed and developed for use in the context of this research project. Each participant played the game by embodying an avatar they had created. The game required players to navigate a virtual environment by jumping onto moving beams and avoiding falls (see: Figure 1).
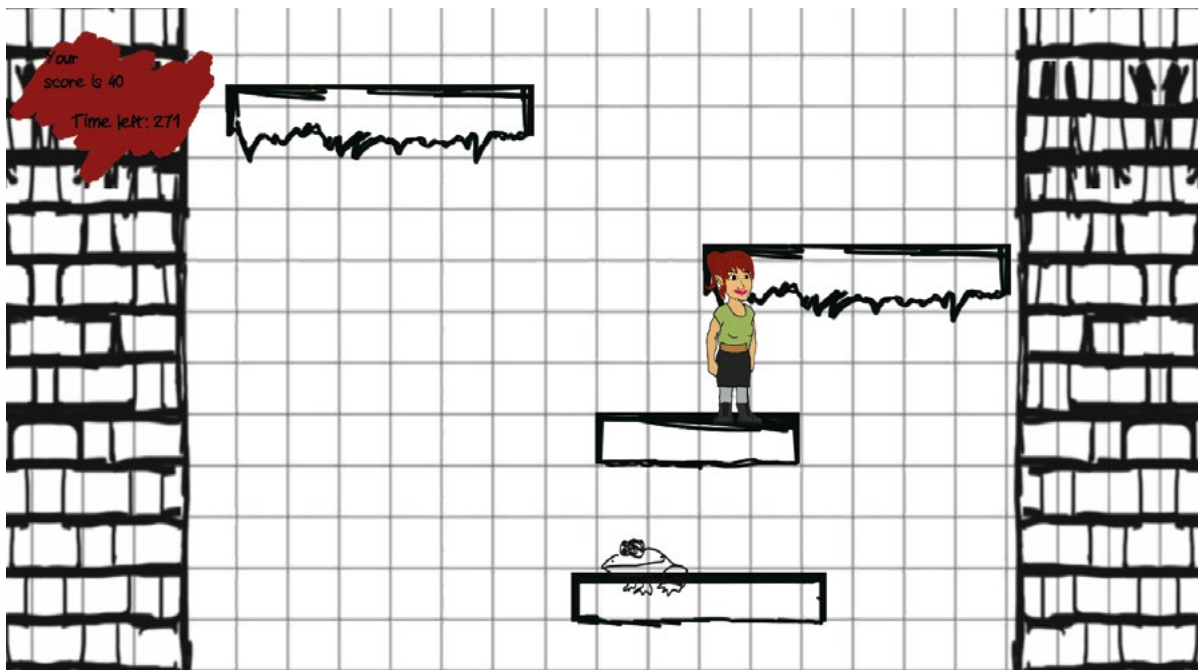

Figure 1. A screenshot from the Characterium computer game.

Figure 2. Examples of avatars created by adolescents

Table 1. Avatar evaluation sheet for field experts

	Please rate each nickname and each character on eleven dimensions on a scale from -2 to 2, where:	
	-2 indicates rating the nickname/ character as:	2 indicates rating the nickname/ character as:
Masculinity vs femininity of the nickname	Characteristically masculine (according to traditional notions of gender)	Characteristically feminine (according to traditional notions of gender)
Conventionality vs unconventionality of the nickname	Highly ordinary, typical	Highly sophisticated, atypical
Masculinity vs femininity of the character	Exhibits a pronounced set of (traditionally) masculine characteristics	Exhibits a pronounced set of (traditionally) feminine characteristics
Unattractiveness vs attractiveness of the character	Very physically unattractive, not considered to be part of the beauty canon	Very physically attractive, considered to fall within the beauty canon
Hostility vs friendliness of the character	Very hostile	Very friendly
Classic vs extravagant style of clothing	Dressed in a very ordinary, unsophisticated, simple way	Dressed in a very unusual, elaborate, fancy, original way
Unsociability vs sociability of the character	Very uncomfortable with socialising	Very keen on socialising
Lack of trust vs trust in the character	Very untrustworthy on important issues	Very trustworthy on important issues
Passiveness vs activeness of the character	A markedly passive approach to leisure activities	A markedly active approach to leisure activities
Closed-mindedness vs openness to experience	Very closed to experiencing new things	Very open to experiencing new things
Low vs high level of intelligence	Of very low intelligence	Of very high intelligence

Players earned points by successfully landing on beams and lost points when falling. Beam velocity increased progressively over the game duration. Controls consisted of the space bar (jump) and two arrow keys (move left or right). The game was played for five minutes. The objective was to accumulate the highest possible score within the time limit. The process of avatar creation occurred in several stages. Players were first required to select their avatars' gender (female or male), age, nickname, and skin colour (from four shades). Next, players customised their avatars' facial features, hairstyle, silhouette, clothing, and footwear. Options, with the exception of silhouette, were gender-specific to simulate real-world avatar design processes. Then, participants allocated 500 points across ten competencies (e.g., bravery, courage). Notably, these attributes did not influence in-game performance. Figure 2 provides examples of avatars created by participants.

Evaluations by field experts: The images of the created avatars were evaluated by a panel of nine field experts, all of whom declared having prior experience with avatar-based computer games. The evaluation process involved viewing a presentation containing 264 slides. The first four slides introduced sample avatars and nicknames to familiarise the experts with the evaluation criteria. The subsequent 130 slides displayed participants' nicknames, while the remaining ones featured their avatars. The experts received printed evaluation criteria (see: Table 1) and detailed instructions outlining the procedure.

The following variables were assessed:

· Physical dimensions of the avatars, which included masculinity-femininity and unconventionality of the nickname, masculinity-femininity, attractiveness, activeness, and extravagance of clothing style – the average score obtained for each dimension, calculated on the basis of the evaluations by the field experts. Each expert rated each dimension of each avatar on a scale ranging from -2 to 2. The scores for each dimension ranged from -2 to 2. A higher score indicated a higher degree of femininity and unconvention-

ality in the avatar's nickname, as well as a higher degree of perceived femininity, attractiveness, activeness, and extravagance of attire.

· Psychological dimensions of the avatars, which included friendliness, sociability, openness to experience, trustworthiness, and intelligence – the average score obtained for each dimension, calculated on the basis of the evaluations by the field experts. Each expert rated each dimension of each avatar on a scale ranging from -2 to 2. The scores for each dimension ranged from -2 to 2. A higher score indicated a higher degree of friendliness, sociability, openness to experience, trustworthiness, and intelligence of avatars.

The Identity Style Questionnaire (Senejko and Łoś, 2015) is an adaptation of the Revised Identity Style Inventory (ISI-5; Berzonsky et al., 2013) designed to measure three distinct identity processing styles. The tool consists of 48 statements, 36 of which constitute three diagnostic scales: informational identity processing style, normative identity processing style, and diffuse-avoidant identity processing style. The remaining items form a fourth scale measuring commitment. Research participants were asked to indicate the extent to which each statement applied to them on a scale of 1 (definitely does not apply to me) to 5 (definitely describes me). The severity of each identity style was determined by summing the scores obtained from the diagnostic questions pertaining to that particular style. Scores for each of the three subscales range from 9 to 45, with higher scores indicating greater intensity of a given style. In the studies of the Polish version of the questionnaire (Senejko and Łoś, 2015), Cronbach's alpha reliability coefficients were 0.77 for the informational style scale of 9 items (such as 'When facing a life decision, I try to analyse the situation in order to understand it.'); 0.68 for the normative style scale of 9 items (such as 'I think it is better to adopt a firm set of beliefs than to be open-minded.'); 0.71 for the diffuse-avoidant style scale of 9 items (such as 'I am not really thinking about my future now, it is still a long way off.'). The reliability analysis conducted during the validation of the tool in the current study demonstrated acceptable consistency for the identity style

subscales. Cronbach's alpha coefficients were 0.68 for the informational style scale, 0.68 for the normative style scale, and 0.69 for the diffuse-avoidant style scale. Although the identity style scale coefficients obtained in the present study were lower than those reported in the Polish adaptation, they remained within an acceptable range for research.

2.3.1. Procedure

This procedure formed part of a broader research project funded by the Polish National Science Centre. Prior to commencing the study, permission was obtained from the Director of the relevant institution (school or boarding school) to recruit participants and conduct the research. Each adolescent took part in the study individually. Participation in the study was entirely voluntary, and no remuneration was provided. As all participants were minors, both the adolescents and their parents or legal guardians were required to provide written consent and sign GDPR compliance forms.In the beginning, the research participants were instructed to create their own avatars and subsequently control them within a computer game. After the gameplay session, participants were asked to complete a series of questionnaires, including the Identity Style Questionnaire. The entire procedure lasted approximately one hour. The research project received ethical approval from the Ethics Committee of the Institute of Psychology at Jagiellonian University (KE/05/032020).

3. Results

To address the research questions, statistical analyses were conducted using the IBM SPSS Statistics 25 software. Firstly, an analysis of basic descriptive statistics and a Shapiro-Wilk test were conducted. Results are presented in Table 2. The level of statistical significance adopted for all analyses was set at $\alpha = 0.05$.

Subsequently, a concordance analysis was conducted using Kendall's W coefficient to determine the level of agreement among the field experts. The field experts assessed the avatars across two dimensions:

Table 2. Basic descriptive statistics of variables measured by scales and questionnaires, and Shapiro-Wilk test results

Variables measured	N	M	Me	SD	Sk.	Kurt.	Min.	Max.	W	p
Identity Style Questionnaire										
Informational identity processing style	130	33.52	33.50	4.91	0.01	-0.67	23.00	44.00	0.98	0.099
Normative identity processing style	130	24.63	25.00	5.47	-0.04	-0.55	13.00	38.00	0.99	0.341
Diffuse-avoidant identity processing style	130	23.85	23.50	5.85	0.17	-0.58	11.00	37.00	0.98	0.164

Table 3. Concordance analysis of field experts – Kendall's W for the evaluation of eleven avatar dimensions

Traits assessed	Kendall's W	$\chi^2(129)$	p
Femininity of the nickname	0.75	875.85	<0.001
Unconventionality of the avatar's nickname	0.51	589.25	<0.001
Femininity of the character	0.68	784.49	<0.001
Style of clothing (extravagance)	0.31	364.95	<0.001
Attractiveness of the character	0.28	326.96	<0.001
Friendliness of the character	0.21	211.56	<0.001
Intelligence of the character	0.19	196.51	<0.001
Sociability of the character	0.23	209.33	<0.001
Trust in the character	0.21	221.10	<0.001
Activeness of the character	0.13	149.90	0.101
Openness to experience	0.17	171.23	0.008

physical traits (masculinity-femininity and unconventionality of the nickname, masculinity-femininity, attractiveness, activeness, and extravagant clothing style of the avatar) and psychological traits (friendliness, sociability, openness to experience, trustworthiness, and intelligence of the avatar). A concordance analysis was conducted using Kendall's W coefficient to determine the level of agreement among the field experts regarding their evaluations of the avatars. Detailed results of the analysis are presented in Table 3.

As evidenced by the data presented in the table, concordance among the field experts was statistically significant for all dimensions except for activeness. This indicates a lack of agreement among the experts. Consequently, this dimension will not be included in subsequent analyses. The remaining results were found to be statistically significant. The highest concordance

was observed for the assessment of the femininity of the nickname (W = 0.75), the femininity of the character (W = 0.68), and the unconventionality of the avatar's nickname (W = 0.51). The remaining dimensions yielded lower concordance values, ranging between 0.17 to 0.31.

To examine the relationship between adolescents' identity styles and others' evaluations of their avatars' physical and psychological characteristics, Pearson's r correlation coefficients were calculated.

3.1. Adolescents' identity styles and others' evaluations of their avatars' physical characteristics

The first stage of the analysis investigated the correlation between adolescents' identity styles and others' evaluations of their avatars' physical characteristics. To this end, Pearson's r correlation analyses were conducted. Results are presented in Table 4.

As evidenced by the data presented in the table, a correlation was identified between adolescents' identity styles and others' evaluations of their avatars' physical characteristics. The results revealed a negative and weak correlation between the informational identity processing style and the extravagance of clothing style. This suggests that adolescents who exhibited a stronger informational identity processing style tended to create avatars whose attire was perceived as less extravagant. Moreover, a negative and weak correlation was observed between the normative identity processing style and the femininity of the avatar's nickname, the femininity of the character, and the attractiveness of the character. This suggests that the stronger the normative identity processing style

Table 4. Correlation between participants' identities and others' evaluations of their avatars' physical characteristics

Traits assessed		Informational identity processing style	Normative identity processing style	Diffuse-avoidant identity processing style
Femininity of the avatar's nickname	Pearson's r	0.13	-0.27	-0.08
	significance	0.132	0.002	0.359
Unconventionality of the avatar's nickname	Pearson's r	0.00	0.09	0.06
	significance	0.995	0.319	0.472
Femininity of the character	Pearson's r	0.09	-0.28	-0.11
	significance	0.327	0.001	0.196
Extravagant style of clothing	Pearson's r	-0.21	-0.02	0.15
	significance	0.014	0.830	0.092
Attractiveness of the character	Pearson's r	0.15	-0.22	-0.14
	significance	0.096	0.011	0.113

Table 5. Correlations between research participants' identities and others' evaluations of their avatars' psychological characteristics

Traits assessed		Informational identity processing style	Normative identity processing style	Diffuse-avoidant identity processing style
Friendliness of the character	Pearson's r	0.11	-0.17	-0.10
	significance	0.195	0.055	0.249
Intelligence of the character	Pearson's r	-0.03	-0.19	-0.03
	significance	0.701	0.030	0.742
Sociability of the character	Pearson's r	0.18	-0.07	-0.11
	significance	0.038	0.430	0.203
Trust in the character	Pearson's r	0.12	-0.25	-0.11
	significance	0.190	0.005	0.229
Openness to experience	Pearson's r	0.03	-0.09	-0.09
	significance	0.699	0.327	0.336

was in research participants, the less feminine (the more masculine) their avatars and nicknames and the less attractive their characters were perceived to be.

3.2. Adolescents' identities and others' evaluations of their avatars' psychological characteristics

In the next phase of the analysis, the relationship between adolescents' identity styles and others' evaluations of their avatars' psychological characteristics was examined. To this end, Pearson's r correlation coefficients were calculated. Results are presented in Table 5.

A correlation analysis revealed significant relationships between adolescents' identity styles and the evaluations of their avatars' psychological characteristics. The results indicated a weak and positive correlation between the informational identity processing style and the sociability of the character. This suggests that as the prominence of the informational identity style increased in participants, their avatars were perceived as more sociable. A negative and weak correlation was observed between the normative identity processing style and the intelligence and trustworthiness of the character. In other words, higher intensity of the normative identity style corresponded with lower ratings for intelligence and trustworthiness of avatars.

3.3.   Discussion of findings

The primary aim of this study was to explore the relationship between adolescents' identity styles and others' evaluations of their avatars. It is essential to acknowledge that the perception of avatars by others may be influenced by a variety of factors, including the evaluator's motivations, experiences, and biases. Importantly, the perception of avatars as embodying certain traits does not necessarily imply intentional representation by their creators. For instance, an avatar perceived as sociable may not have been deliberately designed to exhibit this characteristic. Such interpretations would only hold validity if it could be conclusively demonstrated that avatars accurately reflect the adolescents' real-life identities and that the evaluations are entirely objective. However, these assumptions remain unverifiable. Nevertheless, avatars, as interactive components of virtual settings, are inherently subject to judgement by others.

The degree of concordance among the field experts was not high in this study, with greater concordance observed when assessing avatars' physical characteristics compared to psychological traits of avatars. This finding suggests that the experts were more in agreement on the traits easily discernible from physical appearance (such as attractiveness), whereas the traits that could be observed through interaction with the individual over an extended period (such as sociability) were evaluated more variably. In consideration of these findings, it can be proposed that the perception process of avatars mirrors the perception of humans in real life. Physical appearance often serves as an initial indicator of certain attributes, while psychological characteristics are inferred based on behavioural observations in various situations. In the absence of such interactions, the assessment of psychological traits becomes notably more challenging. Some researchers argue that avatars are perceived in a manner comparable to humans (e.g., Del Aguily, González-Gualdy, Játivy et al., 2021; Fysh, Trifonova, Allen, McCall, Burton, and Bindemann, 2021), whereas others highlight notable differences in the perception of avatars (e.g., Balas and Pacella, 2017; Kegel, Brugger, Frühholz et al., 2020). The findings of the current study lend support to the hypothesis that the perception of avatars aligns closely with that of humans.

Given the correlational nature of this study, it is not possible to determine causal directions for the observed relationships. Nevertheless, these findings offer a foundation for understanding and anticipating how adolescents may be perceived and treated in virtual environments. Due to the limited amount of studies on avatar perception, any hypotheses must necessarily draw upon data concerning the perception of humans in real-life contexts. It is crucial, however, to acknowledge that an individual's perception of a trait in real life may not always directly translate into their perception of that trait in virtual settings.

The results of this study indicate that as participants' informational identity style became more pronounced, their avatars were rated as less extravagantly dressed and more sociable. Conversely, as the severity of their normative identity style increased, their avatars and nicknames were described as less feminine (and more masculine), and the characters were rated as less attractive, intelligent, and trustworthy. No statistically significant relationships were identified for the diffuse-avoidant identity processing style.

The findings revealed that as the intensity of the informational identity style of the participants increased, there was a corresponding decrease in the perceived extravagance of their avatars. The perception of humans in real life through the lens of their attire has been demonstrated to influence the evaluation of several characteristics, including charisma (Brem and Niebuhr, 2021), attractiveness (Sidhu et al., 2021), worldview (Sandu, 2021), and professional competence (Forsythe et al., 1985; Forsythe, 1987). It can be inferred that adolescents with a pronounced informational identity style are perceived as adhering to more traditional norms in appearance, potentially limiting perceptions of charisma or deviation from established worldviews. The findings also revealed that as the intensity of the informational identity style of the participants increased, there was a corresponding increase in the perceived sociability of their avatars. The perceived sociability of individuals affects their perceived

trustworthiness (Rice, Winter and Tokarski, 2015). It may be posited that adolescents who exhibit a more pronounced informational identity processing style will be better equipped to form more meaningful connections with other users.

As regards the normative identity processing style, it was found that as the intensity of this style increased in adolescents, their avatars and nicknames were described as less feminine (and more masculine), and the characters were rated as less attractive, intelligent, and trustworthy. In real life, femininity in women can elicit greater romantic interest from men (Fraccaro et al., 2010) but may be associated with reduced perceptions of professional competence (Fleischmann et al., 2016). This may indicate that as the intensity of the normative identity processing style in female adolescents increases, they are more likely to utilise virtual environments for professional purposes and less likely to engage there for the formation of intimate relationships. Research indicates that women tend to prefer masculine characteristics (Dixson and Brooks, 2013) or a combination of masculine and feminine characteristics (Lanter, 2008) in men. In light of the aforementioned data, it can be posited that adolescents with a stronger normative identity processing style will encounter fewer challenges in forming intimate connections in virtual settings. Attractiveness significantly influences perceptions across multiple domains, including employability (Behrend et al., 2012), intelligence (Jackson et al., 1995) and trustworthiness (Shinners, 2009), as well as elicit a greater willingness from others to provide them with assistance (West and Brown, 1975). It may therefore be hypothesised that adolescents exhibiting a high intensity of the normative identity processing style may experience greater difficulty in coping with professional contexts in virtual settings, and be less likely to receive assistance during crises. Individuals who are perceived as intelligent are more likely to engage in intimate relationships with others (Agadullina, 2020), are judged to be more attractive (Webster and Driskell Jr., 1983) and 'emotionally stable, extraverted, open to new experiences, and conscientious' (Mõttus et al., 2008). It may be posited that the more intense the normative identity processing style in adolescents, the more difficult it will be

for them to form connections with others in virtual settings and the more negatively their personality will be perceived, which may subsequently impact their ability to form and maintain relationships. Individuals who are perceived as trustworthy are more likely to be offered professional opportunities (Fruhen et al., 2015) and to form social relationships (Sheldon, 2009; Hira and Bhogal, 2020). Arguably, the more intense the normative identity processing style in adolescents, the less the virtual world will be an appropriate place for them to address work-related issues and establish relationships.

Two critical points arise from the findings. Firstly, the relationship between an identity processing style and the perceived intensity of an avatar's trait may not consistently align with the individual's self-characterisation in real life. To illustrate, the findings of this study indicate a correlation between the prominence of the informational identity processing style and a reduction in the perceived extravagance of avatars' attire. Conversely, individuals with an informational identity processing style demonstrate openness to new ideas and values (Berzonsky, 2016). It may therefore be anticipated that they would be more inclined to experiment with their appearance. This inconsistency warrants further investigation into adolescents' self-perception of their avatars. Secondly, in some cases, an individual's identity processing style is linked to an increase in certain traits, the perception of which is context-dependent. For example, the more intense the normative identity processing style, the more the avatars are perceived as masculine (which is desirable in a professional context) and less intelligent (which is not desirable in a professional context). Humans, like avatars, are judged based on a combination of traits and characteristics. It is therefore somewhat reductionist to assume that a single trait perceived necessarily implies a specific behavioural response towards an individual. From the perspective of adolescents, it is essential to consider how perceived characteristics influence functioning in significant areas related to identity formation, such as career and intimate relationships. Furthermore, how adolescents are perceived by others influences their sense of identity.

3.4. Research limitations

This research study is not without limitations. Firstly, the in-game character generator was relatively simplistic and based on a traditional understanding of genders. In the context of exploring one's own identity, adolescents were not afforded an unlimited range of possibilities with regard to the creation of their virtual image. The traditional male-female dichotomy is a pervasive convention in the context of computer games (Blodgett et al., 2007). Secondly, the reliability indices for the scales of the Identity Style Questionnaire (Senejko and Łoś, 2015) were found to be suboptimal (Tavakol and Dennick, 2011). It is therefore recommended that the results be interpreted with caution. Thirdly, the attitude of field experts towards the concept of virtual representations was not assessed. Although these individuals had prior experience of playing computer games with avatars, they may have had negative experiences with avatars, which may have influenced their subsequent judgement. Fourthly, the amount of time dedicated by adolescents to the creation of their avatars was not measured. Such data would have been beneficial in determining the extent to which participants engaged in this activity.

4. Summary and further research directions

The present analysis aimed to determine whether a relationship exists between adolescents' identity styles and the external evaluations of their avatars made by others. Statistically significant relationships were found between research participants' identities and evaluations of their avatars' physical characteristics. With respect to the informational identity processing style, a negative correlation was observed with the extravagance of clothing style. For the normative identity processing style, a negative correlation with the femininity of the avatar and its nickname, as well as with its attractiveness, was established. Moreover, statistically significant relationships were found between research participants' identities and evaluations of their avatars' psychological characteristics. Specifically, the results revealed a positive correlation between an informational identity style and the character's sociability, while a negative correlation was observed between a normative identity style and the character's intelligence and trustworthiness. Future research should endeavour to explore the underlying mechanisms that contribute to these observed correlations. It would be particularly valuable to investigate whether the perception of avatars created by adolescents with distinct identity processing styles aligns with their actual behaviours in real-life contexts. The findings suggest that the ways in which individuals construct their avatars may offer insights into their self-identity. Moreover, it would be of interest to examine whether significant discrepancies arise in the external assessment of avatars associated with individuals exhibiting informational, normative, and diffuse-avoidant identity processing styles. The manner in which adolescents are perceived in virtual environments may influence their capacity to achieve key developmental milestones, such as career path exploration and the formation of intimate relationships.

A deeper understanding of the complex interplay between adolescents' identities and their virtual representations holds considerable potential for psychologists and therapists working with young people. Such professionals may collaborate with software developers to design game character generators that more accurately reflect individuals' identities and aspirations. This tailored approach could serve as a constructive mechanism for facilitating adolescent identity development. Furthermore, adapting game character generators to better meet the specific needs of adolescents may enhance the overall user experience and game perception.

Bibliography

Agadullina, E. (2020). When sexism is not a problem: The role of perceived intelligence in willingness to interact with someone who is sexist. *The Journal of Social Psychology, 161*(3), 287-303. https://doi.org/10.1080/00224545.2020.1819187

Antheunis, M.L., Schouten, A.P. (2011). The effects of other-generated and system-generated cues on adolescents' perceived attractiveness on social network sites. *Journal of computer-mediated communication, 16*(3), 391-406. https://doi.org/10.1111/j.1083-6101.2011.01545.x

Baert, S., Decuypere, L. (2014). Better sexy than flexy? A lab experiment assessing the impact of perceived attractiveness and personality traits on hiring decisions. *Applied Economics Letters, 21*(9), 597-601

Balas, B., Pacella, J. (2017). Trustworthiness perception is disrupted in artificial faces. *Computers in Human Behavior, 77*, 240-248. https://doi.org/10.1016/j.chb.2017.08.045

Behrend, T., Toaddy, S., Thompson, L.F., Sharek, D.J. (2012). The effects of avatar appearance on interviewer ratings in virtual employment interviews. *Computers in Human Behavior, 28*(6), 2128- 2133. https://doi.org/10.1016/j.chb.2012.06.017

Bélisle, J.F., Bodur, H.O. (2010). Avatars as information: Perception of consumers based on their avatars in virtual worlds. *Psychology & Marketing, 27*(8), 741-765. https://doi.org/10.1002/mar.20354

Berzonsky, M.D. (1992). Identity style and coping strategies. *Journal of Personality, 60*(4), 771-788. https://doi.org/10.1111/j.1467-6494.1992.tb00273.x

Berzonsky, M.D., Cieciuch, J., Duriez, B., Soenens, B. (2011). The how and what of identity formation: Associations between identity styles and value orientations. *Personality and Individual Differences, 50*(2), 295-299. https://doi.org/10.1016/j.paid.2010.10.002

Berzonsky, M.D., Soenens, B., Luyckx, K., Smits, I., Papini, D.R., Goossens, L. (2013). Development and validation of the revised Identity Style Inventory (ISI-5): factor structure, reliability, and validity. *Psychological Assessment, 25*(3), 893-904. https://doi.org/10.1037/a0032642

Berzonsky, M.D. (2016) Identity Processes. (In:) R.J.R. Levesque (ed.), *Encyclopedia of Adolescence.* Springer. https://doi.org/10.1007/978-3-319-32132-5_26-2

Blodgett, B.M., Xu, H., Trauth, E.M. (2007). Lesbian, gay, bisexual and transgender (LGBT) issues in virtual worlds. *The Data Base for Advances in Information Systems, 38*(4), 97-99.

Brem, A., Niebuhr, O. (2021). Dress to Impress? On the Interaction of Attire with Prosody and Gender in the Perception of Speaker Charisma. (In:) B. Weiss, J. Trouvain, M. Barkat-Defradas, J.J. Ohala, (eds.), *Voice Attractiveness. Prosody, Phonology and Phonetics*. Springer, Singapore. https://doi.org/10.1007/978-981-15-6627-1_11

Conrad, M., Charles, A., Neale, J. (2011). *What is my avatar? Who is my avatar? The avatar as a device to achieve a goal: perceptions and implications. In Reinventing Ourselves: Contemporary Concepts of Identity in Virtual Worlds.* Springer.

Conrad, M., Charles, A., Neale, J. (2011). What Is My Avatar? Who Is My Avatar? The Avatar as a Device to Achieve a Goal: Perceptions and Implications. (In:) a. Peachey, M. Childs, (eds.), *Reinventing Ourselves: Contemporary Concepts of Identity in Virtual Worlds.* Springer Series in Immersive Environments. Springer, London. https://doi.org/10.1007/978-0-85729-361-9_13

Cooley, C.H. (1902/1964). *Looking-glass self. The production of reality: Essays and readings on social interaction,* 126-128.

Del Aguila, J., González-Gualda, L.M., Játiva, M.A., Fernández-Sotos, P., Fernández-Caballero, A., García, A.S. (2021). How interpersonal distance between avatar and human influences facial affect recognition in immersive virtual reality. *Frontiers in Psychology, 12*. https://doi.org/10.3389/fpsyg.2021.675515

Dixson, B.J., Brooks, R.C. (2013). The role of facial hair in women's perceptions of men's attractiveness, health, masculinity and parenting abilities. *Evolution and Human Behavior, 34*(3), 236-241. http://dx.doi.org/10.1016/j.evolhumbehav.2013.02.003

Domahidi, E., Quandt, T. (2015). "And all of a sudden my life was gone…": A biographical analysis of highly engaged adult gamers. *New media & society, 17*(7), 1154-1169. https://doi.org/10.1177/1461444814521791

Dubosc, C., Gorisse, G., Christmann, O., Fleury, S., Poinsot, K., Richir, S. (2021). Impact of avatar facial anthropomorphism on body ownership, attractiveness and social presence in collaborative tasks in immersive virtual environments. *Computers & Graphics, 101*, 82-92. https://doi.org/10.1016/j.cag.2021.08.011

Erikson, E.H. (1963). *Childhood and society.* New York: Norton.

Fleischmann, A., Sieverding, M., Hespenheide, U., Weiß, M., Koch, S.C. (2016). See feminine – Think incompetent? The effects of a feminine outfit on the evaluation of women's computer competence. *Computers & Education, 95*, 63-74. https://doi.org/10.1016/j.compedu.2015.12.007

Forsythe, S., Drake, M.F., Cox, C.E. (1985). Influence of applicant's dress on interviewer's selection decisions. *Journal of Applied Psychology, 70*(2), 374-378. https://doi.org/10.1037/0021-9010.70.2.374

Forsythe, S.M. (1987). Effect of clothing on perception of masculine and feminine managerial traits. *Perceptual and Motor Skills, 65*(2), 531-534. https://doi.org/10.2466/pms.1987.65.2.531

Fraccaro, P.J., Feinberg, D.R., DeBruine, L.M., Little, A.C., Watkins, C.D., Jones, B.C. (2010). Correlated male preferences for femininity in female faces and voices. *Evolutionary Psychology, 8*(3), 447-461. https://doi.org/10.1177/147470491000800311

Frostling-Henningsson, M. (2009). First-person shooter games as a way of connecting to people: "Brothers in blood". *CyberPsychology & Behavior, 12*(5), 557-562. https://doi.org/10.1089/cpb.2008.0345

Fruhen, L.S., Watkins, C.D., Jones, B.C. (2015). Perceptions of facial dominance, trustworthiness and attractiveness predict managerial pay awards in experimental tasks. *The Leadership Quarterly, 26*(6), 1005-1016. https://doi.org/10.1016/j.leaqua.2015.07.001

Fysh, M.C., Trifonova, I.V., Allen, J. et al. (2022). Avatars with faces of real people: A construction method for scientific experiments in virtual reality. *Behavior Research Methods, 54*, 1461–1475. https://doi.org/10.3758/s13428-021-01676-5

Gorrese, A., Ruggieri, R. (2013). Peer attachment and self-esteem: A meta-analytic review. *Personality and Individual Differences, 55*(5), 559-568. https://doi.org/10.1016/j.paid.2013.04.025

Gruenenfelder-Steiger, A.E., Harris, M.A., Fend, H.A. (2016). Subjective and objective peer approval evaluations and self-esteem development: A test of reciprocal, prospective, and long-term effects. *Developmental Psychology, 52*(10), 1563-1577. https://doi.org/10.1037/dev0000147

Hira, S., Bhogal, M.S. (2020). Predicting Facebook jealousy in romantic relationships: Further support for attachment style and trust. *Current Psychology, 41*(9), 6166-6169. https://doi.org/10.1007/s12144-020-01115-2

Hussain, Z., Griffiths, M.D. (2008). Gender swapping and socializing in cyberspace: An exploratory study. *CyberPsychology & Behavior, 11*(1), 47-53. https://doi.org/10.1089/cpb.2007.0020

Jackson, L.A., Hunter, J.E., Hodge, C.N. (1995). Physical attractiveness and intellectual competence: A meta-analytic review. *Social Psychology Quarterly, 58*(2), 108-122. https://doi.org/10.2307/2787149

Jiang, J., Zhang, Y., Ke, Y., Hawk, S.T., Qiu, H. (2015). Can't buy me friendship? Peer rejection and adolescent materialism: Implicit self-esteem as a mediator. *Journal of Experimental Social Psychology, 58*, 48-55. https://doi.org/10.1016/j.jesp.2015.01.001

Jong, S.T., Drummond, M.J. (2016). Hurry up and 'like'me: immediate feedback on social networking sites and the impact on adolescent girls. Asia-Pacific Journal of Health, Sport and Physical Education, 7(3), 251-267. https://doi.org/10.1080/18377122.2016.1222647

Kegel, L.C., Brugger, P., Frühholz, S., Grunwald, T., Hilfiker, P., Kohnen, O., Loertscher, M., Mersch, D., Rey, A., Sollfrank, A., Steiger,, B, Sternagel, J., Weber, M., Jokeit, H. (2020). Dynamic human and avatar facial expressions elicit differential brain responses. *Social cognitive and affective neuroscience, 15*(3), 303-317. http://dx.doi.org/10.1093/scan/nsaa039

Kerpelman, J.L., Pittman, J.F. (2001). The instability of possible selves: Identity processes within late adolescents' close peer relationships. *Journal of Adolescence, 24*(4), 491-512. https://doi.org/10.1006/jado.2001.0385

Kroger, J. (2003). Identity development during adolescence. (In:) G.R. Adams, M.D. Berzonsky (eds.), *Blackwell handbook of adolescence*, 205-226. Blackwell Publishing.

Küster, D., Krumhuber, E.G., Hess, U. (2019). You are what you wear: Unless you moved — Effects of attire and posture on person perception. *Journal of Nonverbal Behavior, 43*(1), 23-38. https://doi.org/10.1007/s10919-018-0286-3

Langlois, J.H., Kalakanis, L., Rubenstein, A.J., Larson, A., Hallam, M., Smoot, M. (2000). Maxims or myths of beauty? A meta-analytic and theoretical review. *Psychological Bulletin, 126*(3), 390-423. https://doi.org/10.1037/0033-2909.126.3.390

Lanter, J.R. (2008). "Not that there's anything wrong with that...": Perceptions of masculine men and feminine men as a breadwinner or caregiver [unpublished doctoral dissertation]. Miami University.

Li, K., Van Nguyen, H., Cheng, T.C. E., Teng, C.I. (2018). How do avatar characteristics affect avatar friendliness and online gamer loyalty? Perspective of the theory of embodied cognition. *Internet Research, 28*(3), 1103-1121. https://doi.org/10.1108/IntR-06-2017-0246

Machneva, M., Evans, A.M., Stavrova, O. (2021). Consensus and (lack of) accuracy in perceptions of avatar trustworthiness. *Computers in Human Behavior*, 126, 107017. https://doi.org/10.1016/j.chb.2021.107017

Maran, T., Liegl, S., Moder, S., Kraus, S., Furtner, M. (2021). Clothes make the leader! How leaders can use attire to impact followers' perceptions of charisma and approval. *Journal of Business Research, 124*, 86-99. https://doi.org/10.1016/j.jbusres.2020.11.026

Marcinkowska, U.M., Dixson, B.J., Kozlov, M.V., Prasai, K., Rantala, M.J. (2017). Men's preferences for female facial femininity decline with age. *The Journals of Gerontology: Series B, 72*(1), 180-186. https://doi.org/10.1093/geronb/gbv077

McCusker, M.G., Galupo, M.P. (2011). The impact of men seeking help for depression on perceptions of masculine and feminine characteristics. *Psychology of Men & Masculinity, 12*(3), 275-284. https://doi.org/10.1037/a0021071

Mead, G.H. (1934). *Mind, self and society: From the standpoint of a social behaviorist.* University of Chicago press.

Meeus, A., Beullens, K., Eggermont, S. (2019). Like me (please?): Connecting online self-presentation to pre-and early adolescents' self-esteem. *New Media & Society, 21*(11-12), 2386-2403. https://doi.org/10.1177/1461444819847447

Meister, E., Horn-Hofmann, C., Kunz, M., Krumhuber, E.G., Lautenbacher, S. (2021). Decoding of facial expressions of pain in avatars: does sex matter? *Scandinavian Journal of Pain, 21*(1), 174-182. https://doi.org/10.1515/sjpain-2020-0078

Moshman, D. (2011). *Adolescent Rationality and Development: Cognition, Morality and Identity.* Psychology Press, Taylor & Francis Group.

Mõttus, R., Allik, J., Konstabel, K., Kangro, E.M., Pullmann, H. (2008). Beliefs about the relationships between personality and intelligence. *Personality and Individual Differences, 45*(6), 457-462. https://doi.org/10.1016/j.paid.2008.05.029

Nayar, B., i Koul, S. (2020). From likes to love: trust catalysing the digital romantic journey. *Global Knowledge, Memory and Communication, 70*(1/2), 173-186. https://doi.org/10.1108/gkmc-01-2020-0002

Nowak, K.L., Rauh, C. (2005). The influence of the avatar on online perceptions of anthropomorphism, androgyny, credibility, homophily, and attraction. *Journal of Computer-Mediated Communication, 11*(1), 153-178. https://doi.org/10.1111/j.1083-6101.2006.tb00308.x

Nowak, K.L., Rauh, C. (2008). Choose your "buddy icon" carefully: The influence of avatar androgyny, anthropomorphism and credibility in online interactions. *Computers in Human Behavior, 24*(4), 1473-1493. https://doi.org/10.1016/j.chb.2007.05.005

Oyserman, D. (2001). Self-concept and identity. (In:) A. Tesser, N. Schwarz (eds.), *Blackwell handbook of social psychology*, 499–517. Blackwell Press.

Paik, P.C.H., Shi, C.K. (2013). Playful gender swapping: user attitudes toward gender in MMORPG avatar customisation. *Digital Creativity, 24*(4), 310-326. https://doi.org/10.1080/14626268.2013.767275

Rice, S., Winter, S.R., Tokarski, R. (2015). How trust in commercial airline pilots is affected by their perceived sociability: A mediation analysis. *Collegiate Aviation Review, 33*(2), 1-15. https://doi.org/10.22488/OKSTATE.18.100501

Rosen, L.H., Principe, C.P., Langlois, J.H. (2013). Feedback seeking in early adolescence: Self-enhancement or self-verification? *The Journal of Early Adolescence, 33*(3), 363-377. https://doi.org/10.1177/0272431612441070

Sandu, N. (2021). *Is it trendy or it is your mindset?* (From:) hhttp://repository.utm.md/handle/5014/16471 (access: 20.07.2024).

Senejko, A., Łoś, Z. (2015). Właściwości polskiej adaptacji Inwentarza Stylów Tożsamości (ISI-5) Michaela Berzonsky'ego i współautorów. *Psychologia Rozwojowa, 4*(20), 91-104. https://doi.org/10.4467/20843879PR.15.024.4467

Sheldon, P. (2009). „I'll poke you. You'll poke me!" Self-disclosure, social attraction, predictability and trust as important predictors of Facebook relationships. *Cyberpsychology: Journal of Psychosocial Research on Cyberspace, 3*(2)

Shinners, E. (2009). Effects of the "what is beautiful is good" stereotype on perceived trustworthiness. *UW-L Journal of Undergraduate Research, 12*, 1-5.

Sidhu, N., Qualter, C., Higgs, E., Guo, K. (2021). What colour should I wear? How clothing colour affects women's judgement of other women's body attractiveness and body size. *Acta Psychologica, 218*, 103338. https://doi.org/10.1016/j.actpsy.2021.103338

Szpitalak, M., Polczyk, R. (2015). *Samoocena: geneza, struktura, funkcje i metody pomiaru.* Wydawnictwo Uniwersytetu Jagiellońskiego.

Świderska, A., Küster, D. (2018). Avatars in pain: visible harm enhances mind perception in humans and robots. *Perception, 47*(12), 1139-1152. https://doi.org/10.1177/0301006618809919

Tafarodi, R.W., Swann, W.B., Jr. (1995). Self-linking and self-competence as dimensions of global self-esteem: initial validation of a measure. *Journal of Personality Assessment, 65*(2), 322-342. https://doi.org/10.1207/s15327752jpa6502_8

Tavakol, M., Dennick, R. (2011). Making Sense of Cronbach's Alpha. *International Journal of Medical Education, 2*, 53-55. https://doi.org/10.5116/ijme.4dfb.8dfd

Thompson, A.E., O'Sullivan, L.F. (2013). The relationship between men's facial masculinity and women's judgments of value as a potential romantic partner. *The Canadian Journal of Human Sexuality, 22*(1), 5-12. https://doi.org/10.3138/cjhs.929

Vossen, H.G., Koutamanis, M., Walther, J.B. (2017). An experimental test of the effects of online and face-to-face feedback on self-esteem. *Cyberpsychology: Journal of Psychosocial Research on Cyberspace, 11*(4). https://doi.org/10.5817/CP2017-4-1

Wang, Y., Geigel, J., Herbert, A. (2013). Reading personality: Avatar vs. human faces. (In:) *Proceedings of Humaine Association.* Conference on Affective Computing and Intelligent Interaction, 479-484. IEEE

Webster Jr, M., Driskell Jr, J.E. (1983). Beauty as status. *American Journal of Sociology, 89*(1), 140-165. https://doi.org10.1086/227836

Weibel, D., Stricker, D., Wissmath, B., Mast, F.W. (2010). How socially relevant visual characteristics of avatars influence impression formation. *Journal of Media Psychology, 22*(1), 37–43. https://doi.org/10.1027/1864-1105/a000005

West, S.G., Brown, T.J. (1975). Physical attractiveness, the severity of the emergency and helping: A field experiment and interpersonal simulation. *Journal of Experimental Social Psychology, 11*(6), 531-538. https://doi.org/10.1016/0022-1031(75)90004-9

Williams, D., Yee, N., Caplan, S.E. (2008). Who plays, how much, and why? Debunking the stereotypical gamer profile. *Journal of Computer-Mediated Communication, 13*(4), 993-1018. https://doi.org/10.1111/j.1083-6101.2008.00428.x

Wohlrab, S., Fink, B., Kappeler, P.M., Brewer, G. (2009). Differences in personality attributions toward tattooed and nontattooed virtual human characters. *Journal of Individual Differences, 30*(1), 1-5. https://doi.org/10.1027/1614-0001.30.1.1