

ORIGINAL ARTICLE

Impact of Mental Health Problems on Physical Self-Esteem

Simons Johan¹, Van Damme Tine^{1,2},
Delbroek Hanne³, Probst Michel¹

¹Faculty of Kinesiology and Rehabilitation Sciences, Department of Rehabilitation Sciences, KU Leuven, O & N IV, Bus 1510, B 3000 Leuven, Belgium

²University Psychiatric Centre, Campus Leuven, Gasthuisberg, Child & Adolescent Psychiatry, Herestraat 49, B 3000 Leuven, Belgium

³University Psychiatric Centre, Campus Leuven, Gasthuisberg, Child & Adolescent Psychiatry, Herestraat 49, B 3000 Leuven, Belgium

Johan.simons@kuleuven.be,

Michel.probst@kuleuven.be,

Tine.vandamme@kuleuven.be

Hanne.delbroek@uzleuven.be

Introduction

In Belgium one out of five children and adolescents have mental health problems (Geestelijk, Gezond & Vlaanderen, 2015). In this population major and common psychological problem seems to be low self-esteem. Despite that adolescence is a critical period in life, little research is done on body esteem in adolescence.

Abstract

The primary objective of this study was to investigate self-esteem and physical self-esteem in adolescents with a psychiatric disorder. Additionally, the association between self-esteem and physical self-perception in those adolescents was evaluated. The third objective was to examine the impact and co-morbidity of psychiatric disorders on self-esteem and physical self-esteem. The total sample encompassed a clinical group (n=161) and a control group (n=161) matched to age and gender. The Physical Self-Description Questionnaire (PSDQ) was employed to assess self-esteem and physical self-esteem. Compared to healthy controls, patients demonstrated significantly lower self-esteem and physical self-perceptions. Both aspects seemed highly correlated in adolescents with a psychiatric disorder. Above and beyond the effect of gender the combination with oppositional defiant disorder/conduct disorder was a good predictor for most subscales of physical perception. Given the low self-esteem of adolescents with a psychiatric disorder, and the high correlation between self-esteem and physical self-perception in those adolescents, movement and physical activity must be incorporated in every program at a psychiatric unit.

Keywords: Mental health, Self-esteem, Physical self-esteem, Adolescents.

This article is distributed under the terms of the Creative Commons Attribution 4.0 License (<https://creativecommons.org/licenses/by-nc-nd/4.0/>) which permits to share — copy and redistribute the material in any medium or format.



One of the major problems in the area of self-esteem research is the lack of a clear definition. Sometimes, a distinction is made between self-concept, interpreted as what one thinks about one's self, and self-esteem interpreted as the positive or negative evaluation of one's self (how one feels about himself). Marsh, Parade and Ayotte (2004), state that researchers have commonly used the terms self-concept and self-esteem interchangeable in mental health research. Self-esteem may be defined as the totality of perceptions that each person has of himself.

Hence, measurement instruments were based on different definitions and theories (Sypsa & Simons, 2008). Up till now, the most extensively validated model is the multidimensional-hierarchical model. This model was first developed by Shavelson, Hubner and Stanton (1976) and further extended upon by other researchers (e.g. Marsh, Richards, Johnson, Roche & Termayne, 1994). Multidimensional recognition of the self-renders the opportunity to examine physical self as a distinct entity. The physical self-concept (PSC) typifies a construct that incorporates the whole of all perceptions, beliefs, experiences, and assessments directed to one's body (Schipke & Freud, 2012). Shavelson, et al. (1976) proposed the PSC as part of an organized, multifaceted, hierarchical, stable, developmental, evaluative, and differentiable general self-concept. Within the model of Shavelson et al. (1976), general self-concept represents the apex. The first sublevel consists of an academic part and a non-academic part. PSC is located within the non-academic part of the model and the physical self-concept in this model is also viewed as multidimensional (Fox, 1997; Marsh et al., 1994). The hierarchical structure of physical self-concept suggests a top-to-bottom hierarchy, where global physical self-concept is at the apex and actual behaviors (such as health, physical activity, etc.) are at the bottom.

4

This article is distributed under the terms of the Creative Commons Attribution 4.0 License (<https://creativecommons.org/licenses/by-nc-nd/4.0/>) which permits to share — copy and redistribute the material in any medium or format.



Self-esteem and psychiatric disorders

Self-esteem is an important construct that has received considerable attention in the study of mental health problems (Bolognini, Plancherel, Bettschart & Halfon, 1996). Whereas positive self-esteem is considered a basic feature of psychological well-being, low self-esteem is thought to play a critical role in the development of psychopathology (Mann, Hosman, Schaalma & de Vries, 2004). Consequently, adolescents with psychiatric disorders are expected to have lower self-esteem than adolescents without psychiatric disorders. A number of studies have examined the relationships between self-esteem and different psychiatric disorders in children and adolescents (Guillon, Crocq & Bailey, 2003; Simons, Capio, Adriaenssens, Delbroek & Vandebussche, 2012). Research indicated that decreased self-esteem frequently accompanies psychiatric disorders such as in conduct disorders (Maïano, Ninot, Morin & Bilard, 2007), post-traumatic stress disorder (Stern, Lynch, Oates, O'Toole & Cooney, 1995; Saigh, Yasuib, Oberfield & Halamandaris, 2008), anorexia nervosa (Jacobi, Paul, de Zwann, Nutzinger & Dahme, 2004; Erkolahti, Saarijärvi, Ilonen & Hagman, 2002; Probst, Pieters & Verlinden, 2001), depression and anxiety (Sukumaran, Vickers, Yates & Garralda, 2003), attention hyperactivity disorder (Sawyer, Whaites, Rey, Graetz & Baghurst, 2002; Edbom, Lichtenstein, Granlund & Larsson, 2006; Escobar, Soutullo, Hervas, Gastaminza, Polavieja & Gilaberte, 2005; Dittman, Wehmeier, Schacht, Lehman & Lehmann, 2009), and alcohol and drug abuse (Scheier, Botvin, Griffin & Diaz, 2000).

Yet, those findings are tentative for two reasons. First, the evidence to support this argument mainly arises from studies focusing on either internalizing or externalizing disorders (Orth & Robins, 2014). Moreover, studies that have assessed both categories of



disorders did not take into account their frequent co-occurrence (Marsh et al., 2004). Second, the relationship between self-esteem and psychiatric disorders may depend on the operationalization of self-esteem. Up till now, the majority of the studies used a one-dimensional approach of self-concept (e.g., Piers-Harris self-concept scale, Piers & Herzberg, 2002; Rosenberg self-esteem scale, 1965) (Moller & Schnurr, 1995), or self-esteem of a certain group was compared to the norm population. In these studies, low self-esteem has been cited as a major contributing factor for both the onset and the persistence of the disorders. As mentioned previously, due to the use of different definitions and/or instruments, research findings across studies are not consistent. Although most previous studies have focused on global self-worth (Wills, 1994; Donnellan, Trzesniewski, Robins, Moffitt & Caspi, 2005), some studies have focused on one or more domain-specific self-evaluations and showed that these dimensions are related differently to psychiatric disorders (Du Bois & Flay, 2004; Marsh et al., 2004). To better understand the relationship between self-esteem and psychopathology, a multidimensional approach to self-esteem seems important.

Body esteem

Several cross-sectional studies report an association between certain psychiatric disorders and reduced levels of physical activity in adults (Nyboe & Lund, 2012; De Wit, Fokkema, van Straten, Lamers, Cuijpers & Penninx, 2010). Recent research regarding adolescents indicated that adolescents with a psychiatric disorder had a three-fold increased risk of lower levels of physical activity in comparison to normal developing ones. Whereas individuals with mood disorders and Autism Spectrum Disorders (ASD) were the least active, individuals with eating disorders were the most active (Mangerud, Bjkerkeset,

6

This article is distributed under the terms of the Creative Commons Attribution 4.0 License (<https://creativecommons.org/licenses/by-nc-nd/4.0/>) which permits to share — copy and redistribute the material in any medium or format.



Lydersen & Indredavik, 2014). The association between sport participation and self-image is substantial and highly statistically significant (Kirkcaldy, Shephard & Siefen, 2002). There are strong relationships between endurance activity and reported scores for physical and psychological well-being. This is notable, as limitation of physical activity is a common manifestation of depression.

The deleterious effects of body dissatisfaction, such as eating disorders and poor psychological well-being have been well documented in the literature (Quick, Eisenberg, Bucchianeri & Neumark-Sztainer, 2013). But up till now, only limited research is done on physical self-esteem in adolescents with a psychiatric disorder (Simons et al, 2012; Simons, Adriaenssens, Delbroek, & Probst, 2014).

Gender differences

Several studies have demonstrated differences in self-esteem and body-esteem between boys and girls (Demarest & Allen, 2000; Garner, 1997; Kearny-Cooke, 1999; Maïano, Ninot & Bilard, 2004; Muth & Cash, 1997; Smolak, 2004; Van Damme et al., 2014). Adolescent girls tend to evaluate their physical as well as their intellectual capacities in a more negative way and pay more attention to their appearances (Kearny-Cooke, 1999; Muth & Cash, 1997). Smolak (2004) mentioned that girls have more difficulty with being overweight while boys would like to weight more by having more muscles. Additionally girls believe that boys like thin girls and boys believe that girls like well-muscled boys (Demarest & Allen, 2000). A significant number of studies on adolescents have shown that boys have higher perceptions concerning their physical abilities than girls (Asci, 2002; Bowker, Gadbois & Cornock, 2003; Chan, Au, Chan, Kwan & Yiu, 2003; Crocker, Eklund



& Kowalski, 2000; Faria, 2001; Raudsepp & Liblik, 2002; Rudisill, Mahar & Meany, 1993; Shapka & Keating, 2005). Nevertheless, girls' general self-concept does not differ from that of boys; possibly due to perceptions in other areas of self-concept that compensate for the lower physical aspect (Bowker et al., 2003).

A meta-analysis (Kling, Hyde, Showers & Buswell, 1999) of self-esteem studies, has confirmed that girl's self-esteem is moderately, but significantly, lower than boy's (d5.21). Moreover, the average gender difference is greatest during middle adolescence (d5.33), peaking at around 16 years of age. However, this close association between body image and self-esteem is especially problematic for girls growing up in the context of developed mass consumer societies (Becker, Burwell, Herzog, Hamburg & Gilman, 2002).

One objective of this study is exploring the type and severity of self-esteem and body-esteem across different adolescent psychiatric populations. Based on previous research, it is hypothesised that all clinical groups would exhibit lower self-esteem and body-esteem in comparison to typically developing peers. Moreover, it is expected that the profiles will differ between the groups. Secondly, the association between self-esteem and body-esteem will be explored. An additional objective of this study is to examine the extent to which a specific diagnosis contributes to variation in scores.



Methods

Participants

A total of 322 adolescents aged 10-19 years participated in the study. The total sample encompassed a clinical group (n=161) and a control group (n=161) matched to age and gender. The mean age of each group was 176 months (SD=19 months). Each group consists out of 94 girls (mean age=177 months, SD=16.7 months) and 67 boys (mean age=174 months, SD=22.4 months).

Participants from the clinical sample were inpatients from the University Centre for Child and Adolescent Psychiatry in Leuven and were recruited from the unit emergency psychiatry (Belgium). Participants were enrolled through consecutive sampling and were diagnosed according to the DSM-IV-TR criteria (American Psychiatric Association, 2000) by an experienced psychiatrist.

As can be expected in a clinical population, comorbid disorders frequently occurred. Therefore, dummy variables were created for each diagnosis that was given. In total, seventeen diagnostic categories were identified, namely Reactive Attachment Disorder, Learning Disability, Oppositional Defiant Disorder/Conduct Disorder (ODD/CD), Post-traumatic Stress Disorder (PTSD), Sexual problems, Autism Spectrum Disorder (ASD), Developmental Coordination Disorder (DCD), Adaptive Disorder, Depression, Identity Problems, Parent-child Problems, Attention Deficit Hyperactivity Disorder (ADHD), Anorexia Nervosa, Gilles de la Tourette Syndrome, Somatoform Problems, Bipolar Disorder, and Psychosis. The overview of all diagnostic categories is presented in Table 1. Due to the low occurrence rate of some diagnostic categories, it would

9

This article is distributed under the terms of the Creative Commons Attribution 4.0 License (<https://creativecommons.org/licenses/by-nc-nd/4.0/>) which permits to share — copy and redistribute the material in any medium or format.



be impossible to make meaningful inferences. Therefore only the nine diagnostic groups, marked with an asterisk in Table 1 were included.

Table 1 Overview of the number of patients in the different diagnostic categories

Psychiatric diagnosis	number
Reactive Attachment Disorder*	24
Learning disability	4
Oppositional defiant disorder/conduct disorder (ODD/CD)*	30
Post-traumatic stress syndrome (PTSS)*	23
Sexual problems	1
Autism spectrum disorder (ASD)*	22
Developmental coordination disorder (DCD)	3
Adaptive disorder*	32
Depression*	58
Identity problems*	22
Parent-child problems*	21
Attention deficit hyperactivity disorder (ADHD)*	19
Anorexia nervosa	2
Gilles de la Tourette syndrome	5
Somatoform problems	1
Bipolar disorder	1
Psychosis	1

Note: The categories with an asterisk behind were used in the stepwise linear regression

The control group comprised 161 typically developing adolescents. Participants were recruited from earlier studies through schools and participated on voluntary basis. Exclusion criteria were defined as follows: (a) a history of psychopathology, (b) physical disability.



Assessment

The Physical Self-Description Questionnaire (PSDQ) is comprised of 9 factors or scales specific to physical self-concept (Activity, Appearance, Body Fat, Coordination, Endurance, Flexibility, Health, Sport and Strength), and two global scales – Global Physical Esteem and Global Self Esteem. Each scale includes 6 or 8 items; each item is presented as a declarative statement to which subjects may respond using a 6-point true-false scale (Marsh, Richards, Johnson, Roche & Tremayne, 1994). The PSDQ was originally developed for adolescents. However, research across a wide variety of Australian samples confirms its appropriateness for wider application (Marsh, 1998 cited in Marsh, Marco & Abcy, 2002).

It has been demonstrated that the PSDQ has good reliability (Marsh, 1996a; Marsh et al, 1994), a well-defined, replicable factor structure as shown by confirmatory factor analysis (CFA) (Marsh, 1996b; Marsh et al, 1994), a factor structure that is invariant over gender as shown by multiple group CFA (Marsh et al., 1994), good test-retest stability over both the short and longer term (Marsh, 1996b) and, convergent and discriminant validity as shown by an MTMM study of responses to three Physical Self-concept instruments (Marsh et al., 1994).

The construct validity of PSDQ has also been confirmed in its correlations with related external criteria. In a study involving 192 high school students, all 23 external measures selected, including physical activity, body composition, strength, flexibility, were significantly related to one of the PSDQ scales (Marsh, 1996a). Moreover, it has been

11

This article is distributed under the terms of the Creative Commons Attribution 4.0 License (<https://creativecommons.org/licenses/by-nc-nd/4.0/>) which permits to share — copy and redistribute the material in any medium or format.



shown that the Physical Ability self-concept is significantly related to physical activity levels, sport participation, physical fitness and body mass. The Physical Appearance is only related to body mass (Marsh & Jackson, 1986; Marsh & Peart, 1988). These results support a multidimensional perspective of self-concept, confirm the discreteness of the various domains such as Physical Self-Concept and the need for domain specific rather than omnibus instruments to assess them. In this study, the Dutch translation of de PSDQ with demonstrated reliability and validity was used (Simons & Theunissen, 2005).

Procedure

Ethics approval was granted by the Ethics Committee of the KU Leuven, Faculty of Kinesiology and Rehabilitation Sciences and the University hospital. The study was explained orally and in writing to parents and participants. All participants signed informed consents forms, in addition to their parents or caregivers. The PSDQ was administrated on individual basis by an experienced psychomotor therapist in the clinic where they resided. For the control group the instrument was a part of a larger assessment protocol in a regular school.

Statistical Analysis

All analyses were run using Statistica 12 (www.Statsoft.com). Statistical significance was set at $p < .05$. There were no missing data for any of the variables. Paired t-tests were used to assess differences between the results of the clinical group and their typically developing counterparts. Effect sizes were calculated as d and interpreted in accordance with the guidelines from Cohen (1991); trivial (0 – 0.19), small (0.20 – 0.49), medium (0.50 – 0.79)



and large (0.80 and greater). The association between the perception of self-esteem and physical self was explored, using a Pearson correlation.

Lastly, a stepwise linear regression approach was employed to examine the extent to which diagnostic category contributes to variation in self-esteem and body-esteem scores. In the analyses, gender and nine indicator variables that indicated all nine diagnostic categories (Reactive Attachment Disorder, ODD/CD, PTSD, ASD, Adaptive Disorder, Depression, Identity Problems, Parent-child Problems and ADHD) were added to the model. Each time, the percentage of variance explained by the newly added variables in terms of the R^2 change, with regard to the model with only gender was recorded. The significance of the change in model fit was tested using an F-test. To ensure no assumptions were violated, the following model checks were performed: normality of the residuals, linearity of continuous variables, multicollinearity and homoscedasticity.

Results

Group comparisons

The results from the group comparisons are presented in Table 2.



Table 2 Differences in scores between psychiatric adolescents (n=161) and matched typically developing adolescents (n=161)

	Psychiatric inpatients		Typically developing adolescents		t-value	p-value	SE
	Mean	SD	Mean	Sd			
Global Self esteem	3,59	1,36	4,60	0,94	-7,357	,000	-1,07
Global Physical self-esteem	3,45	1,63	4,43	1,26	-6,654	,000	-0,78
Health	4,20	1,02	4,58	0,95	-3,509	,001	-0,40
Coordination	3,71	1,16	4,29	0,93	-4,964	,000	-0,62
Activity	3,25	1,52	3,97	1,34	-4,653	,000	-0,54
Body Fat	4,01	1,56	4,49	1,48	-3,124	,002	-0,32
Sport competence	3,64	1,51	4,01	1,24	-2,618	,01	-0,30
Appearance	3,21	1,39	4,02	1,15	-5,624	,000	-0,70
Strength	3,71	1,35	3,86	1,10	-1,180	,240	-0,14
Flexibility	3,55	1,35	4,03	1,22	-3,254	,001	-0,39
Endurance	3,19	1,52	3,49	1,35	-2,032	,044	-0,22

As expected, the typically developing adolescents obtained significantly higher self-reported scores on global self-esteem ($p \leq .0001$) and physical self-esteem ($p \leq .0001$) in comparison to the psychiatric inpatients. These results were also applicable for all subscales, with exception of strength. On this subscale the difference was not significant ($p = .24$). Whereas, the effect size was large for Global self-esteem and medium for physical self-esteem, coordination, motor activity and appearance, the effect size was smaller for the other scales.



When comparing the results (Table 3) adolescents with a disruptive behaviour report a higher global self-esteem and global physical self-esteem in comparison to the controls. Similarly, this is also true for the subscales body fat, sport competence, appearance, strength, flexibility and endurance.

In agreement with the expectations, self-reported measures were very low on all scales for individuals with a depression and individuals with identity problems. On the contrary, adolescents with PTSD scored higher than the controls for strength. Additionally, individuals with ASD scored the highest for strength and flexibility.

Table 3 Mean and standard deviation for controls and five diagnostic groups

	Girls (n=94) M±SD	Boys (n=67) M±SD	ODD/CD (n=17) M±SD	Depression (n=44) M±SD	Identity (n=15) M±SD	PTSS (n=13) M±SD	ASD (n=14) M±SD	Controls (n=162)
Global Self esteem	3,12±1,27	4,26±1,21	4,79±1,13	3,12±1,32	3,14±1,41	3,89±1,13	4,24±1,15	4,60±0,94
Global Physical self-esteem	2,75±1,34	4,42±1,51	4,90±1,32	2,97±1,41	3,02±1,50	3,37±1,51	4,19±1,30	4,43±0,95
Health	3,96±0,95	4,53±1,02	4,50±1,07	4,03±1,01	4,05±0,84	4,16±1,09	4,42±1,18	4,58±0,95
Coordination	3,37±1,12	4,18±1,05	3,79±1,22	3,50±1,20	3,44±0,87	3,73±1,05	4,19±0,96	4,29±0,93
Activity	2,84±1,36	3,83±1,57	3,45±1,42	2,77±1,50	2,89±1,39	3,29±1,64	3,80±1,62	3,97±1,34
Body Fat	3,61±1,52	4,57±1,44	4,72±1,11	4,13±1,56	4,37±1,65	3,53±1,49	3,86±1,84	4,49±1,48
Sport competence	3,06±1,40	4,43±1,32	4,60±1,50	3,03±1,37	3,38±1,34	3,71±1,46	3,71±1,44	4,01±1,24
Appearance	2,71±1,24	3,91±1,28	4,10±1,40	2,76±1,34	3,07±1,35	3,27±1,38	4,01±1,30	4,02±1,15
Strength	3,28±1,21	4,30±1,33	4,42±1,04	3,23±1,33	2,89±1,23	4,24±1,34	4,60±1,17	3,86±1,10
Flexibility	3,43±1,31	3,72±1,40	4,12±1,54	3,16±1,22	3,51±1,41	3,50±1,18	4,19±1,17	4,03±1,22
Endurance	2,60±1,33	4,02±1,38	3,99±1,48	2,82±1,40	2,99±1,48	2,96±1,46	3,49±1,56	3,49±1,35

Correlation between the perception of self-esteem and physical self-esteem

The correlations are presented in Table 4. Although the associations are systematically higher in the clinical population in comparison to the control group, the majority of the correlations are in a similar range. Results indicate a high association

15

This article is distributed under the terms of the Creative Commons Attribution 4.0 License (<https://creativecommons.org/licenses/by-nc-nd/4.0/>) which permits to share — copy and redistribute the material in any medium or format.



between the perception of self-esteem and global physical-esteem, and appearance in the clinical population. All the subscales correlate moderately with self-esteem, except the subscale reflecting perception of health.

Table 4 Pearson correlations between self-esteem and physical self-esteem in psychiatric adolescents (N=161) and typical developing counterparts (N=161)

	Psychiatric adolescents	Normal developing adolescents
Global Physical self-esteem	.80*	.62*
Health	.28*	.14
Coordination	.59*	.46*
Activity	.42*	.30*
Body Fat	.47*	.47*
Sport competence	.65*	.41*
Appearance	.77*	.71*
Strength	.56*	.41*
Flexibility	.48*	.34*
Endurance	.52*	.35*

*Significant at the .001 level

Stepwise linear regressions

To examine the extent to which diagnostic category and gender contribute to variation in body-esteem scores, a stepwise linear regression analyse was performed.



Table 5 Stepwise linear regression with diagnostic groups

	R ²	Adjusted R ²	R ² change	B	SE	β	t
Global Self esteem							
Step 1	.172	.166***					
gender				1.14	.19	.414***	5.741
Step 2	.218	.208***	.046**				
gender				1.052	.196	.383***	5.38
ODD/CD				.755	.248	.217**	3.048
Step 3	.238	.224***	.021*				
gender				1.012	.195	.368***	5.197
ODD/CD				.627	.253	.180*	2.48
Depression				-.424	.205	-.150*	-2.071
Step 4	.264	.245***	.026*				
gender				.973	.193	.354***	5.050
ODD/CD				.549	.251	.158*	2.184
Depression				-.514	.206	-.182*	-2.503
Identity problems							
Global Physical							
Step 1	.256	.251***					
gender				1.669	.226	.506***	7.399
Step 2	.308	.299***	.052***				
gender				1.558	.221	.473***	7.062
ODD/CD				.959	.279	.230***	3.435
Health							
Step 1	.077	.071***					
gender				.569	.157	.277***	3.634
Step 2	.100	.089*	.024*				
gender				.523	.157	.254***	3.333
ODD/CD				.404	.199	.155*	2.033
Coordination							
Step 1	.118	.112***					
gender				.803	.174	.343***	4.609
Activity							
Step 1	.102	.097***					
gender				.984	.231	.320***	4.256
Fat							
Step 1	.093	.087***					
gender				.960	.238	.305***	4.037
Sport competence							
Step 1	.198	.193***					
gender				1.370	.219	.445***	6.262
Step 2	.259	.249***	.061***				
gender				1.258	.213	.408***	5.897
ODD/CD				.972	.270	.249***	3.599
Appearance							
Step 1	.182	.177***					
gender				1.198	.201	.427***	5.957
Step 2	.225	.216***	.043**				
gender				1.119	.198	.399***	5.646
depression				-.603	.203	-.209**	-2.963
Strength							
Step 1	.138	.132***					
gender				1.015	.201	.371***	5.038
Step 2	.181	.171***	.043**				
gender				.931	.199	.340***	4.676
ODD/CD				.729	.252	.210**	2.891
Step 3	.210	.195***	.029*				
gender				.960	.197	.351***	4.885
ODD/CD				.704	.249	.203**	2.833
PTSS				.656	.274	.170*	2.394
Step 4	.235	.215***	.025*				
gender				.864	.199	.316***	4.354
ODD/CD				.722	.245	.209**	2.944
PTSS				.718	.272	.186**	2.640
ASS				.642	.283	.164*	2.268
Flexibility							
Step 1	.043	.037**					
ODD/CD				.713	.268	.206**	2.658
Step 2	.077	.066**	.035*				
ODD/CD				.716	.264	.207**	2.711
ASD				.732	.300	.187*	2.444
Endurance							
Step 1	.215	.210***					
gender				1.426	.216	.464***	6.597

Multiple linear regression Note. *p<.05, **p<.01, ***p<.001

Global Self-esteem

Gender explains 16.6% of the variance in the global Self-esteem scale. Upon adding diagnostic groups to the model, the total variance explained increased to 24.5% with the diagnostic groups accounting for a significant amount of additional variance, compared to the model with gender alone (R^2 Change=.026; $p=.05$). Thus, above and beyond the effect of gender, oppositional defiant disorder/conduct disorder, identity problems and depression were significant predictors of the global self-esteem.

Global Physical esteem

Gender has a significant effect on the global physical esteem and accounts for 25.1% of the variance. Adding the variable diagnosis produced a model that explained 29.9% of the variance and the change in R^2 with regard to the initial model was significant (R^2 Change=.052; $p \leq .0001$). Above and beyond the effect of gender, oppositional defiant disorder/conduct disorder was a significant predictor of Global physical esteem.

Health

Gender has a significant effect on Health and accounts for 7.1% of the variance. Adding the variable diagnosis produced a model that explained 8.9% of the variance and the change in R^2 with regard to the initial model was significant (R^2 Change=.024; $p \leq .05$). Above and beyond the effect of gender, oppositional defiant disorder/conduct disorder was a significant predictor of Health.



Coordination

Gender has a significant effect on coordination and accounts for 11.2% of the variance ($p \leq .0001$).

Activity

Gender has a significant effect on activity and accounts for 9.7% of the variance ($p \leq .0001$).

Body Fat

Gender has a significant effect on body fat and accounts for 8.7% of the variance ($p \leq .0001$).

Sport competence

Gender has a significant effect on sport competence and accounts for 19.3% of the variance. Adding the variable diagnosis produced a model that explained 24.9% of the variance and the change in R^2 with regard to the initial model was significant (R^2 Change=.061; $p \leq .0001$). Above and beyond the effect of gender, oppositional defiant disorder/conduct disorder was a significant predictor of sport.

Appearance

Gender has a significant effect on Appearance and accounts for 17.7% of the variance. Adding the variable diagnosis produced a model that explained 21.6% of the variance and the change in R^2 with regard to the initial model was significant (R^2



Change=.043; $p \leq .001$). Above and beyond the effect of gender, oppositional defiant disorder/conduct disorder was a significant predictor of Appearance.

Strength

Gender has a significant effect on Strength and accounts for 13.2% of the variance. Adding the variable diagnosis produced a model that explained 21.5% of the variance and the change in R^2 with regard to the initial model was significant (R^2 Change=.215; $p = .05$). Above and beyond the effect of gender, oppositional defiant disorder/conduct disorder, PTSD, ASD were significant predictors of Strength.

Flexibility

Gender has a significant effect on Flexibility and accounts for 3.7% of the variance. Adding the variable diagnosis produced a model that explained 6.6% of the variance and the change in R^2 with regard to the initial model was significant (R^2 Change=.035; $p = .05$). Above and beyond the effect of gender, oppositional defiant disorder/conduct disorder was a significant predictor of Flexibility.

Endurance

Gender has a significant effect on Endurance and accounts for 21.0% of the variance ($p \leq .0001$).

Discussion

The first goal of the present study was to compare the self-esteem perception and the physical self-perceptions of adolescents remaining on a psychiatric emergency unit and

20

This article is distributed under the terms of the Creative Commons Attribution 4.0 License (<https://creativecommons.org/licenses/by-nc-nd/4.0/>) which permits to share — copy and redistribute the material in any medium or format.



their typical developing counterparts. The finding supports the hypothesis of this study. The adolescents remaining on an emergency psychiatric unit scored significantly lower on self-esteem and physical self-esteem, with exception of strength that did not yield a significant difference. The difference between both groups was large in terms of effect size for self-esteem and medium for global physical self-esteem. This is in agreement with the results of previous studies (Bolognini et al, 1996; Silverstone & Salsali, 2003; Jacobi et al., 2004; Maïano et al., 2007; Simons et al., 2012; Simons et al., 2014). However, the question remains if the adolescents developed a lower self-esteem and physical self-perception due to the presence of a psychiatric disorder. Or, reversely, that they already had a lower self-esteem and on this basis developed a psychiatric disorder. When comparing the results of the adolescents within the different diagnostic groups, adolescents with ODD/CD and ASD did not present themselves lower self-esteem and global physical self-esteem. On one hand this is rather strange, but this is probably due to the fact that co-occurrence was not taken into account in this analysis. From clinical experience it is known, that adolescents with ODD/CD often suffer from comorbid ADHD and adolescents with ASD often suffer from comorbid ASD. Another aspect that might be of influence is the perception of the male adolescents, as it is most likely that they overestimate themselves. Nevertheless, an association between childhood and adolescent conduct disorders with an increased mortality risk has been observed in numerous population based cohort studies (Maughan, Stafford, Shah & Kuh, 2014; Odgers, Caspi, Broadbent et al , 2007; Sourander, Klomek, Niemelä, Haavisto, Gyllenberg et al, 2009).

Boys consistently scored higher than girls for self-esteem, general physical self-concept and all the subscales for all the clinical groups. This is consistent with previous



findings by Marsh (1989), Marsh et al. (1994), Kling et al (1999) and Sukumaran et al. (2003), Simons et al. (2012) and Simons et al (2014). Despite the consistency in recent literature, the reason why girls report lower self-perception levels is still uncertain. Dion et al. (2015) mentioned that longitudinal studies found that body dissatisfaction increases with age among girls and boys alike. Factors such as cultural expectations and differential opportunities to demonstrate competence could influence physical self-perceptions, and these should be examined in future research because of its negative consequences on mental health.

The lower physical self-concept and the different subdomains in individuals with a psychiatric disorder, might suggest that this is an important aspect of self-esteem during adolescence. The fact that specific domains were affected could have implications for therapy. Ekeland, Heian and Hagen (2005) found evidence that exercise can improve self-esteem in an inexpensive and harmless way. It has been suggested that children with gross motor problems could be less likely to participate in games and sports requiring skills like jumping, running, throwing ball such that they tend to be less physically fit and less active than typically developing children (Cairney, Hay, Faught, Wade & Corna, 2005; Cairney, Hay, Mandigo, Wade & Faught, 2007; Hands & Larkin, 2006; Ussher, Owen, Cook & Whincup, 2007). As such, it is possible that they are at risk of developing low self-concept (Peens, Pienaar & Nienaber, 2008; Piek, Baynam & Barrett, 2006; Poulsen, Ziviani & Cuskelly, 2006; Skinner & Piek, 2001). However, in this study, no differences were found between the clinical and non-clinical group for strength and endurance. From a clinical point of view this seems to be related to the fact that they have the tendency to overestimate



themselves. Further research is needed to determine the underlying reasons for these findings.

Secondly, a high correlation between self-esteem and physical self-esteem was found in the group of adolescents remaining on a psychiatric emergency unit in comparison to the typically developing controls. Moreover, a remarkable strong association between self-esteem and global physical self-esteem and appearance was identified in the clinical population. A moderate correlation was found for all the other subscales. These results suggest that the perception of physical self-esteem is very important in adolescents and especially in those with mental health problems. In a large cross-sectional study of about 2500 British adolescents, lower levels of physical activity were associated with more mental health problems than higher levels of physical activity (Ussher et al, 2007).

It is likely that by enhancing physical fitness, increased physical performance, decreasing body mass and promoting a more favorable body shape and structure, exercise will provide more positive social feedback and recognition from peer groups, and this in turn will improve an individual's self-esteem (Kirkcaldy et al, 2002; Martin-Albo, Nunez, Dominguez, Leon, & Tomas, 2012). The World Health Organization recommends at least 60 minutes of moderate- to vigorous-intensity physical activity daily for children and adolescents between the ages of 5 and 17 years. Vigorous intensity should be included, at least 3 times per week (World Health Organization, 2015).

To the best of our knowledge, this is the first study taking into account the aspect of comorbidity of psychiatric disorders. First of all, gender seems to be the most important variable in determining global self-esteem and global physical self-esteem. This finding is



also present in all subscales of the PSDQ, with the exception of flexibility. Above and beyond the effect of gender the combination of oppositional defiant disorder/conduct disorder, identity problems and depression was a significant predictor for global self-esteem. Above and beyond the effect of gender the combination of oppositional defiant disorder/conduct disorder global physical perception, health, sport competence, appearance, strength and flexibility. Only for the subscale strength the diagnoses oppositional defiant disorder/conduct disorder, PTSD and ASD were good predictors. Gender and depression were good predictors of appearance. This appears to be consistent with expectations that adolescents who are depressed or having identity problems feel unhappy most of the time and often have somatic complaints (De Wit et al, 2010).

Limitations of the study

Despite the fact that the clinical group comprised 161 adolescents and self-esteem and physical self-esteem were measured in a multidimensional way, some limitations should be mentioned. First when addressing differences between diagnostic groups when taking comorbidity into account, each diagnostic group should be large enough in order to be able to include them in the analyses. Instead of matching the clinical group to typically developing group, one could consider to use a much larger representative clinical population. Another aspect of influence is that the groups were matched only on age and gender. Actually, it would be preferable to also include the socio-economical aspect and the body mass index, as it is known that both aspects exhibit an influence on body-esteem (Clay, Vignoles & Dittmar, 2005; Davison & McCabe, 2006; Van den Berg, Mond, Eisenberg, Ackard & Neumark-Sztainer, 2010). Lastly, patients were asked only once to



fill out the questionnaire during the first days of their stay at the psychiatric unit. This could have influenced their answers, because at this moment they maybe feel worse.

Practical implications

First, there is the finding that adolescents with a psychiatric disorder have lower self-esteem and a lower body-perception than their typically developing counterparts. For clinical practice, this is important knowledge. Consequently, in group therapy settings, it is very important to focus on the individual, taking into account the individual needs, difficulties and therapeutic demands. Second, particularly adolescents with a diagnosis of oppositional defiant disorder/conduct disorder and for some aspects individuals with PTSD and ASD are at risk, because they overestimate themselves and are often more aggressive. Therefore, special attention is needed in those adolescents with a combination of the diagnosis of oppositional defiant disorder/conduct disorder and ASD. This notion is further supported by arguments found in the literature, which suggest that on long term they are at risk for suicide (Maughan et al, 2014; Odgers et al, 2007; Sourander et al, 2009). Third, in general, girls have a lower self-esteem and physical self-esteem than boys. This result confirms the findings from the meta-analytic study of Kling et al. (1999). Consequently, special attention is needed for them because the special period of their live. Fourth, given the high correlation between self-esteem and physical self-perception in adolescents, movement and physical activity must be incorporated in every program for those adolescents.



What this paper adds

A low self-esteem and low physical self-esteem was found in comparison to typically developing adolescents. The high correlation between self-esteem and physical self-perceptions in the group of adolescents with a psychiatric disorder is showing that the perception of physical self-esteem is very important in adolescents and especially in those with mental health problems and this regardless the diagnosis. These results support the notion that self-esteem assessment and physical self-esteem assessment should be part of routine clinical practice and also physical therapy. Nevertheless, they are not a critical diagnostic feature of any of the discussed psychiatric disorders.

Compliance with Ethical Standards**Ethical Approval:**

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed consent:

Informed consent was obtained from all individual participants included in the study.

Funding:

Author A, author B, author C, author D declare they have no funding.

Conflict of Interest:

Author A, author B, author C, author D declare they have no conflict of interest.



References

- American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders*, (4 th ed., text revision). Washington, DC: American Psychiatric.
- Asci, F. H. (2002). An investigation of age and gender differences in physical self-concept among Turkish late adolescents. *Adolescence*. Retrieved from: http://www.findarticles.com/p/articles/mi_m2248/is_146_37/ai_89942837.
- Becker, A. E., Burwell, R. A., Herzog, D. B., Hamburg, P., & Gilman, S. E. (2002). Eating behaviours and attitudes following prolonged exposure to television among ethnic Fijian adolescent girls. *British Journal of Psychiatry*, *180*, 509-514.
- Bolognini, M., Plancherel, B., Bettschart, W., & Halfon, O. (1996). Self-esteem and mental health in early adolescence: development and gender differences. *Journal of Adolescent* *19*(3):233-45.
- Bowker, A., Gadbois, S., & Cornock, B. (2003). Sports participation and self-esteem: Variations as a function of gender and gender role orientation. *Sex Roles: A Journal of Research*, *49*(12), 47-58.
- Cairney, J., Hay, J. A., Faight, B. E., Wade, T. J., Corna, L., & Flouris, A. (2005). Developmental coordination disorder, generalized self-efficacy toward physical activity, and participation in organized and free play activities. *Journal of Pediatrics*, *147*, 515-520.
- Cairney, J., Hay, J. A., Mandigo, J., Wade, T. J., Faight, B. E., & Flouris, A. (2007). Developmental coordination disorder and reported enjoyment of physical education in children. *European Physical Education Review*, *13*, 81-98.
- Chan, E. W., Au, E. Y., Chan, B. H., Kwan, M. K., Yiu, P. Y., & Yeung, E. W. (2003). Relations among physical activity, physical fitness, and self-perceived fitness in Hong Kong adolescents. *Perceptual and Motor Skills*, *96*, 787-797.
- Clay, D., Vignoles, V. L., & Dittmar, H. (2005). Body image and self-esteem among adolescent girls: testing the influence of sociocultural factors. *Journal of research on adolescence*, *15*, 4, 451-477.
- Crocker, P. R., Eklund, R. C., & Kowalski, K. C. (2000). Children's physical activity and physical self-perceptions. *Journal of Sports Sciences*, *18*, 383-394.
- Davison, T.E., & McCabe, M. P. (2006). Adolescent body image and psychosocial functioning. *The journal of social psychology*, *146* (1), 15-30.
- De Wit, L. M., Fokkema, M., van Straten, A., Lamers, F., Cuijpers, P., & Penninx, B. W. (2010). Depressive and anxiety disorders and the association with obesity, physical, and social activities. *Depress Anxiety* *27*, 1057-1065.
- Demarest, J., & Allen, R. (2000). Body image: Gender ethnic, and age differences. *Journal of Social Psychology*, *140*, 465-472.



- Dion, J., Blackburn, M. E., Auclair, J., Laberge, L., Veillette, S., Gaudreault, M., Vachon, P., Perron, M., & Touchette, E. (2015). Development and aetiology of body dissatisfaction in adolescent boys and girls. *International Journal of Adolescence and Youth*, 20, 2, 151-166.
- Dittmann, R. W., Wehmeier, P. M., Schacht, A., Lehmann, M., & Lehmkuhl, G. (2009). Self-esteem in adolescent patients with attention-deficit/hyperactivity disorder during open-label atomoxetine treatment: psychometric evaluation of the Rosenberg Self-Esteem Scale and clinical findings. *Attention Deficit Hyperactivity Disorder* 1(2): 187-200.
- Donnellan, M. B., Trzesniewski, K. H., Robins, R. W., Moffitt, T. E., & Caspi, A. (2005). Low self-esteem is related to aggression, antisocial behavior, and delinquency. *Psychol Sci*. 16(4):328-35.
- DuBois, D. L., & Flay, B. R. (2004). The healthy pursuit of self-esteem: A comment on and alternative to the Crocker and Park formulation. *Psychological Bulletin*, 130, 415-420.
- Edbom, T., Lichtenstein, P., Granlund, M., & Larsson, J-O. (2006). Long-term relationships between symptoms of Attention Deficit Hyperactivity Disorder and self-esteem in a prospective longitudinal study of twins. *Acta Paediatrica* 95, 6, 650-657.
- Ekeland, E., Heian, F., & Hagen, K. B. (2005). Can exercise improve self-esteem in children and Young people: A systematic review of randomized controlled trials. *British Journal Sports Medicine*, 39, 792-798.
- Erkolahti, R. K., Saarijärvi, S., Ilonen, T., & Hagman, H. (2002). Self-image of anorexic and bulimic female adolescents. *Nordic Journal of Psychiatry*, 56, 6, 447-450
- Escobar, R., Soutullo, C.A., Hervas, A., Gastaminza, X., Polavieja, P., & Gilaberte, I. (2005). Worse quality of life for children with newly diagnosed attention-deficit/hyperactivity disorder, compared with asthmatic and healthy children. *Pediatrics*.;116(3):e364-369.
- Faria, L. (2001). Harter's self-perception profile for children adapted for use with young Portuguese students. *Perceptual and Motor Skills*, 92, 711-720.
- Fox, K. R. (1997). The physical self and process in self-esteem development. In K. R. Fox (Ed.), *The physical self from motivation to well-being*. Champaign, IL: Human Kinetics.
- Garner, D. M. (1997). The 1997 body image survey results. *Psychology Today*, 30, 30-44.
- Geestelijk gezond vlaanderen (2015).www.geestelijkgezondvlaanderen.be/feiten-cijfers (accessed 11/06/2015).
- Guillon, M.S., Crocq, M. A. & Bailey, P. E. (2003). The relationship between self-esteem and psychiatric disorders in adolescents. *Eur Psychiatry*.;18(2):59-62.
- Hands, B., & Larkin, D. (2006). Physical fitness differences in children with and without motor learning difficulties. *European Journal of Special Needs Education*, 21,447-456.
- Jacobi, C., Paul, T., de Zwann, M., Nutzinger, D. O., & Dahme, B. (2004). Specificity of self-concept disturbances in eating disorders. *International Journal of Eating Disorders*, 35, 204-210.
- Kearny-Cooke, A. (1999). Gender differences and self-esteem. *Journal of Gender Specific Medicine*, 2, 46-52.



- Kirkcaldy, B. D., Shephard, R. J., & Siefen R. G. (2002). The relationship between physical activity and self-image and problem behavior among adolescents. *Soc psychiatry Psychiatri Epidemiol*, 37, 544-550.
- Kling, K. C., Hyde, J. S., Showers, C. J., & Buswell, B. N. (1999). Gender differences in self-esteem: A meta-analysis. *Psychological Bulletin*, 123, 470-500.
- Maïano, C., Ninot, G., & Bilard, J. (2004). Age and gender effects on global self-esteem and physical self-perception in adolescents, *European physical education review* 0, 1, 53-69.
- Maïano, C., Ninot, G., Morin, A. J., & Bilard, J. (2007). Effects of sport participation on the basketball skills and physical self of adolescents with conduct disorders. *Adapted Physical Activity Quarterly*, 24, 178-196.
- Mangerud, W. L., Bjkerkeset, O., Lydersen, S., & Indredavik, M. S. (2014). Physical activity in adolescents with psychiatric disorders and in the general population. *Child and adolescent psychiatry & mental health*, 8:2.
- Mann, M., Hosman, C. M. H., Schaalma, H. P., & de Vries, N. K. (2004). Self-esteem in a broad-spectrum approach for mental health promotion. *Health Education Research, Theory & Practice*, 19, 4, 357-372
- Marsh, H. W. (1989). Age and sex effects in multiple dimensions of self-concept: Preadolescence to early adulthood. *Journal of Educational Psychology*, 81, 417-430.
- Marsh, H. W. (1996a). Physical Self-Description Questionnaire: Stability and discriminant validity. *Research Quarterly for Exercise and Sport*, 67: 249-264.
- Marsh, H. W. (1996b). Construct validity of Physical Self-Description Questionnaire responses: Relations to external criteria. *Journal of Sport and Exercise Psychology*, 18(2): 111-131.
- Marsh, H. W., & Jackson, S. A. (1986). Multidimensional self-concepts, masculinity and femininity as a function of women's involvement in athletics. *Sex Roles*, 15: 391-416.
- Marsh, H. W., & Peart, N. D. (1988). Competitive and cooperative physical fitness training programs for girls: Effects on physical fitness and multidimensional self-concepts. *Journal of Sport and Exercise Psychology*, 10(4): 390-407.
- Marsh, H. W., Marco, I. T., & Abcy, F. H. (2002). Cross-cultural validity of the physical self-description questionnaire: Comparison of factor structures in Australia, Spain, and Turkey. *Research Quarterly for Exercise and Sport*, 73, 257-270.
- Marsh, H. W., Parada, R. H., & Ayotte, V. (2004). A multidimensional perspective of relations between self-concept self-description questionnaire II and adolescent Mental Health Young (Self-report). *Psychological Assessment*, 16, 27-41.
- Marsh, H. W., Richards, G. E., Johnson, S., Roche, L., & Tremayne, P. (1994). Physical Self-Description Questionnaire: Psychometric properties and a multitraitmultimethod analysis of relations to existing instruments. *Journal of Sport and Exercise Psychology*, 16, 270-305.
- Martin-Albo, J., Nunez, J. L., Dominguez, E., Leon, J., & Tomas, J. M. (2012). Relationships between intrinsic motivation, physical self-concept and satisfaction with life: a longitudinal study. *Journal of Sports sciences*, 30: 4, 337-347.



- Maughan, B., Stafford, M., Shah, I., & Kuh, D. (2014) Adolescent conduct problems and premature mortality: follow-up to age 65 years in a national birth cohort. *Psychol Med*, 44(5): 1077-1086.
- Moller, L. C. & Schnurr, G. R. (1995). A comparison of self-esteem measures of attractiveness in a psychiatric population of adolescents: the Piers-Harris and Harter scales. *Journal of social behavior and personality* 10, 2, 445-454.
- Muth, J. L., & Cash, T. F. (1997). Body images attitudes: What difference does gender make? *Journal of Applied Social Psychology*, 27, 1438-1452.
- Nyboe, L., & Lund, H. (2012). Low levels of physical activity in patients with severe mental illness. *Nord J Psychiatry*, 67: 43-46.
- Odgers, C. L., Caspi, A., Broadbent, J. M., Dickson, N., Hancox, R. J., Harrington, H., Poulton, R., Sears, M. R., Thomson, W. M., & Moffitt, T. E. (2007) Prediction of differential adult health burden by conduct problem subtypes in males. *Arch Gen Psychiatry*, 64: 476-84.
- Orth, U., & Robins, R. W. (2014). The development of self-esteem. *Current directions in psychological science*, 23, 5, 381-387.
- Peens, A., Pienaar, A. E., & Nienaber, A. W. (2008). The effect of different intervention programs on the self-concept and motor proficiency of 7- to 9 year-old children with DCD. *Child: Care, Health and Development*, 34, 316-328.
- Piek, J. P., Baynam, G. B., & Barrett, N. C. (2006). The relationship between fine and gross motor ability, self-perceptions and self-worth in children and adolescents. *Human Movement Science*, 25, 65-75.
- Piers, E. V., & Herzberg, D. S. (2002). *Piers-Harris self-concept scale; manual (2nd Ed.)*. Los Angeles, CA: Western Psychological Services.
- Poulsen, A. A., Ziviani, J. M., & Cuskelly, M. (2006). General self-concept and life satisfactions for boys with differing levels of physical coordination: The role of goal orientations and leisure participation. *Human Movement Science*, 25, 839-860.
- Probst, M., Pieters, G., & Vanderlinden, J. (2001). Children's body image concerns and eating disturbance, a review of the literature. *Clinical Psychology Review*, 21, 325-344.
- Quick, V., Eisenberg, M. E., Bucchianeri, M., & Neumark-Sztainer, D. (2013). Prospective predictors of body satisfaction in young adults: 10-year longitudinal findings. *Emerging adulthood*, 1 (4) 271-282.
- Raudsepp, L., & Liblik, R. (2002). Relationship of perceived and actual motor competence in children. *Perceptual and Motor Skills*, 94, 1059-1070.
- Rosenberg, M. (1965). *Society and the adolescent self-image*. Princeton: Princeton University Press.
- Rudisill, M. E., Mahar, M. T., & Meaney, K. S. (1993). The relationship between children's perceived and actual motor competence. *Perceptual and Motor Skills*, 76, 895-906.
- Saigh, P. A., Yasuib, A. E., Oberfield, R., & Halamandaris, P. V. (2008). The self-concept of traumatized children and adolescents with or without PTSD. *Behaviour Research and Therapy*, 46, 1181-1186.



- Sawyer, M. G., Whaites, L., Rey, J. M., Hazell, P. L., Graetz, B. W., & Baghurst, P. (2002). Health-related quality of life of children and adolescents with mental disorders. *J Am Acad Child Adolesc Psychiatry*, 41(5):530-537.
- Scheier, L. M., Botvin, G. J., Griffin, K. W., & Diaz, T. (2000). Dynamic growth models of self-esteem and adolescent alcohol use, *The Journal of Early Adolescence*, 20, 2, 178-209.
- Schipke, D., & Freud, P. A. (2012). A meta-analytic reliability generalization of the physical self-description questionnaire (PSDQ). *Psychology of sport and exercise*, 13, 789-797.
- Shapka, J. D., & Keating, D. P. (2005). Structure and change in self-concept during adolescence. *Canadian Journal of Behavioural Science*, 37, 73-96.
- Shavelson, R. J., Hubner, J. J., & Stanton, G. C. (1976). Self-concept: Validation of construct interpretations. *Review of Educational Research*, 46, 407-441.
- Silverstone P. H., & Salsali, M. (2003). Low self-esteem and psychiatric patients: Part I – The relationship between low self-esteem and psychiatric diagnosis. *Ann Gen Hosp Psychiatry*; 2: 2.
- Simons, J., & Theunissen, I; (2005). Beleving van fysieke competentie bij jongeren aan de hand van de Physical self-description questionnaire [Physical competence perception in adolescents by means of the Physical self-description questionnaire]. In J. Simons (Red.) *Actuele themata uit de psychomotorische therapie . Jaarboek 2005*. Pp 11-35. Leuven/Voorburg: Acco.
- Simons, J., Adriaenssens, P., Delbroek, H., & Probst, M. (2014). Self-esteem and physical self-concept in adolescents on an emergency psychiatric unit. *European psychomotricity Journal*, 6; 37-51.
- Simons, J., Capio, C.M., Adriaenssens, P., Delbroek, H. & Vandenbussche, I. (2012). Self-concept and physical self-concept in psychiatric children and adolescents. *Research in developmental disabilities*, 33, 874-881.
- Skinner, R. A., & Piek, J. P. (2001). Psychosocial implications of poor motor coordination in children and adolescents. *Human Movement Science*, 20, 73-94.
- Smolak, L. (2004). Body image in children and adolescents: Where do we go from here? *Body Image*, 1, 15-28.
- Sourander, A., Klomek, A. B., Niemelä, S., Haavisto, A., Gyllenberg, D., Helenius, H., Sillanmäki, L., Ristkari, T., Kumpulainen, K., Tamminen, T., Moilanen, I., Piha, J., Almqvist, F., Gould, M.S. (2009). Childhood predictors of completed and severe suicide attempts: findings from the Finnish 1981 Birth Cohort Study. *Arch Gen Psychiatry*. 66(4): 398-406.
- Statistica 9 (2010). Tulsa, Oklahoma: StatSoft, Inc.
- Stern, A. E., Lynch, D. L., Oates, R. K., O'Toole, B. I., & Cooney, G. (1995). Self-esteem, depression, behaviour and family functioning in sexually abused children. *J Child Psychol Psychiatry*. 36(6):1077-89.
- Sukumaran, S., Vickers, B., Yates, P., & Garralda, M. E. (2003). Self-esteem in child and adolescent psychiatric patients. *European child & adolescent psychiatry*, 12: 190-197.
- Sypsa, C., & Simons, J. (2008). Questionnaires measuring the physical self in children: A review. *European Psychomotricity Journal*, 1, 61-72.



Ussher, M. H., Owen, C. G., Cook, D. G., & Whincup, P. H. (2007). The relationship between physical activity, sedentary behaviour and psychological wellbeing among adolescents. *Soc Psychiatry Psychiatr Epidemiol.* 42(10):851-856.

Van Damme, L., Colins, O. F., & Vanderplasschen, W. (2014). Gender differences in psychiatric disorders and clusters of self-esteem among detained adolescents. *Psychiatry research*, 220, 991-997.

Van den Berg, P. A., Mond, J., Eisenberg, M., Ackard, D., & Neumark-Sztainer, D. (2010). The link between body dissatisfaction and self-esteem in adolescents: similarities across gender, age, weight status, race/ethnicity, and socioeconomic status, *Journal of adolescent health*, 47, 290-296.

Wills, T. A. (1994). Self-esteem and perceived control in adolescent substance use: Comparative tests in concurrent and prospective analyses. *Psychology of Addictive Behaviors*, 8, 223-234.

World Health Organization (2015). http://www.who.int/dietphysicalactivity/factsheet_young_people/en/(accessed 11.3.2015).

