Additional file 3 References without DSM criteria - Addendum

Reference	Study design	Sample N, age range, gender	Dropout definition HS: High school GED: General Educational Development	Hypotheses	Disorder types	Evaluation of disorders	Confounding factors	Significant results ORadj: adjusted odds ratio CI: confidence interval RR: relative risk	Limitations
Pingault et al. 2011 Québec, Canada	longitudinal, 7 waves	N=2000 6-23 years 1001 male & 999 female	Noncompletion of secondary education	Attention Deficit Hyperactivity Disorder -> educational attainment	Attention Deficit Hyperactivity Disorder (ADHD)	Social Behavior Questionnaire	Gender Birth weight Socioeconomic variables Family structure Parental separation Residential move	46.3% had constantly low symptoms of inattention, whereas 16.8% had constantly high symptoms. For 17.6% symtoms were rising whereas for 19.3% they were declining. Compared with the low symptoms trajectory, the declining trajectory (ORadj=2.67, 95%CI: 1.90-3.75), the rising trajectory (ORadj=3.87, 95%CI: 2.75-5.45) and high inattention group (ORadj=7.66, 95%CI: 5.06-11.58). In contrast, hyperactivity was not significantly related to school dropout when inattention was controlled.	Teacher-report only for symptom assessment.
Gagné et al. [68] 2011 Québec, Canada	longitudinal	N=537 Mean age at t1: 13 years Mean age at t2: 20 years 52% male & 48% female	Not having obtained the the diploma of secondary education and not being registered with a school by the age of 20	Depression -> School experiences -> Dropout	Depressive symptoms	BDI Echelle de l'environnement de classe	Academic results Social affiliation Relationship with teacher Commitment	No significant difference was detected between depressed and non-depressed students regarding their educational attainment:12.6% of depressed students had dropped out of school, compared to 11.2% of non-depressed students. School dropouts had higher scores of depression than students. This difference was even stronger for girls. Depressed students having poor academic results were 5 times more likely to drop out of school than non-depressed students.	Small sample of students diagnosed with a depressive episode The control group of students may included former dropouts who reregistered with school
Frensch et al. 2009 Ontario, Canada	longitudinal, 3 waves **comparison between 2 clinical groups:** RT: youth in residential treatment IFS: youth in intensive family services	N(RT)=106 caregivers & 33 youth N(IFS)=104 caregivers & 35 youth Average age at admission: 11.55 years Average age at follow-up: 14.11 years (RT); 13.65 years (IFS) 79% male & 21% female (RT) 71% male & 29% female (IFS)	Non completion of secondary school		Role performance Delinquency Behavior towards others Mood/emotions (depression & anxiety) Self-harm behavior Substance use Problems in thinking	Child and Adolescent Functional Assessment Scale (CAFAS)		At admission, there were significantly more IFS youth in school than RT youth (95.2% versus 87.6%). At follow-up, among youth 16 or older, the percentages not in school increased to 54.1% for RT youth and 31.6% for IFS youth. Among RT school dropouts, 71% left school by choice, whereas among IFS youth, 53.4% were suspended or expulsed. School dropout was best predicted by juvenile delinquency: for every unit increase in impairment severity, youth were almost 4 times more likely to drop out.	The predictive model of school dropout should be considered with caution as only 35.7% of the sample were over the age of 16 at follow-up.
Trampush et al. [69] 2008 USA	case control study case: ADHD combined type diagnosis in childhood control: no ADHD diagnosis matching: gender, ethnicity, socio-economic status	N=93 16-21 years (mean: 18.81 years) 91% male & 9% female	Noncompletion of HS, pursuing or having completed a GED	ADHD diagnosis in childhood -> HS dropout	ADHD combined type Polysubstance use (marijuana, cocaine, amphetamine, morphine)	Diagnostic Interview Schedule for Children (DISC) CBCL Conner's rating scale Rutgers Drug and Alcohol Questionnaire (RDAQ) & urinalysis	General cognitive functioning Reading ability Contact with biological father	Cognitive functioning (OR=7.3; p<0.001), substance use (OR=3.2; p=0.002) and amount of contact with father (OR=2.4; p<0.01) were significantly related to school dropout. But, none of the factors differentially influenced the risk of dropout in adolescents with ADHD compared to adolescents without ADHD.	Design and sample size did not allow to compare dropouts rates between ADHD adolescents and controls Title and content of the study did not match… Combined measures for substance use (self-report & physiological)
Ou 2008 Chicago, US	longitudinal Chicago Longitudinal Study (CLS)	N=1372 0-24 years 48% male & 52% female **Low income minority youth**	Noncompletion of HS Having a GED Graduating from HS	Educational attainment -> Health outcomes HS graduates are associated with better outcomes than GED recipients, and GED recipients are associated with better out-comes than HS dropouts	Depressive disorder Substance use (alcohol, marijuanan, other illicit drugs)	Derogatis Brief Symptom Inventory, Depression Subscale	Family SES Supportive program participation Early scholastic skills	HS dropouts had significantly more symptoms of depression than GED recipients (marginal effect=9.5% p=0.02). Except for severe depressive symptoms, there was no significant difference between GED recipients and HS graduates. Compared to GED recipients, dropouts reported significantly more substance use since age 16 (marginal effect=13.1%; p<0.005) whereas HS graduates reported significantly less use (marginal effect= -11.8%; p=0.001). Regarding severe substance use, there was no significant difference between GED recipients and HS dropouts.	Correlational results, not causal interpretations Specific sample characteristics Self report data
Bond et al. 2007 Victoria, Australia	longitudinal, 3 waves	N=2400 14-17 years 47% male & 53% female	Noncompletion of year 12 (last year of secondary school)	Social and school connectedness -> Mental health -> Educational attainment	Overall mental health status Substance use	Clinical Interview Schedule Revised (CIS-R)	Social connectedness Interpersonal conflict School connectedness Family structure Parental level of education Language spoken at home	Smoking in year 8 (ORadj=0.43 CI=0.21-0.91) and anxious/depressive symptoms (ORadj=0.68 CI=0.41-1.13) decreased the odds of completing school whereas marijuana and alcohol had no significant association with school completion. Year 8 students with very low school connectedness were more likely to report depressive symptoms and engage in substance use in year 10, and less likely to finish school at all.	Attrition rate of wave 3

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Reschly & Christenson[14] 2006 USA	longitudinal, 2 waves Data from the National Educational Longitudinal Study (NELS)	N=1064 students identified with learning difficulties (LD) N=338 students identified with emtional/behavioral disorders (EBD) N=96 students identified with LD & EBD **Youth with LD and/or EBD**	Non completion of secondary school at wave 2	Engagement (Behavioural, cognitive and psychological) -> School dropout	EBD LD	NCES definitions	SES Grade retention Academic performance	Among students with LD, 26% dropped out of school. Among students with EBD, almost half (49.9%) dropped out, compared to only 14.8% among students without any disability. Among students with EBD, each covariate was a significant predictor of dropout.The strongest behavioural engagement predictor was cutting classes: the odds of dropping out were 3 times greater forevery unit increase. Unexpectedly, higher perceptions of utility of education were associated with an increase in the odds of dropping out. Among students with LD, low SES and grade retention were predictors of school dropout. Idem EBD for cutting classes, whereas higher perceptions of utility decreased the odds. Covariates alone correctly classified a higher number of students without any disability than students with EBD or LD and adding the engagement variables did not improve the classification of students and dropouts among those without disabilities.	Extant database: measures were limited by the design and scope of the study No measures of peer and teacher relationships Selection of students with disabilities: variations by state, overlapping in the skill deficits among categories Used data were dated
Quiroga et al. 2006 Canada	longitudianl, 3 waves	N=139 12-18 years (mean: 15.1; SD:1.7) 57% male & 43% female	Noncompletion of secondary school	Depressive symptoms -> School Dropout	Depressive symptoms	BDI	Gender Age Cognitive skills SES School experience	Depressive symptoms are significantly related to dropout: ORadjusted=1.66. This association varied with gender (p=0.07), with a slightly stronger impact of depressive symptoms on educational attainment among boys (33% who dropped out against 31% among girls).	Small sample size Selection bias (youth with a low SES were overrepresented) Self-report data for depressive symptoms
Farahati et al. 2003 USA	cross-sectional NCS	N=3389 19-54 years 48% male & 52% female	Non completion of HS	Parental metal illness -> School dropout among their children	*Parental disorders:* Major depression Anxiety disorder Alcohol abuse Drug dependence/abuse *Youth disorder:* Depressive disorders Anxiety disorders Alcohol dependence/abuse Drug dependence/abuse Conduct disorder		Gender Age Health status Race Religion Native language Teenage marriage/parenting Family composition Youth disorder Parental education Moves of family Region of residence Type of region National unemployment rate	When controlling for confounding factors and comorbidities, maternal depression increased school dropout among their daughters. Also, girls whose mothers have comorbid anxiety and alcohol disorders had a higher probability of dropout than girls whose mothers did not have those disorders. Interestingly,a father's depression decreased the probability of dropout among his daughters. For men, no significant effects of parental mental illness on dropout were observed in the fullest model. Reporting a psychiatric disorder prior to age 18 significantly increased the probability of dropout for both men and women.	Self-report/ -appreciation of parental mental illness -> bias in recognizing more "silent" disorder types
Hammarström & Janlert 2002 Sweden	longitudinal, 4 waves	N=1044 16-30 years 52% male & 48% female **clinical: school leavers**	Non completion of secondary school	School dropout -> Early unemployment (>= 6 months between ages 16-21) -> Psychiatric disorders	Alcohol consumption Psychological symptoms Daily Smoking Somatic symptoms		Length of unemployment Working class background Health behavior at age 16	School dropouts in early unemployment were significantly more likely to be daily smokers at age 30 than their working peers (ORadj= 3.5 CI=2.0-6.2) for men and for women (ORadj=2.4 CI=1.3-4.3). They also were more likely to to have psychological problems (ORadj=2.6 CI= 1.4-4.7 for men and ORadj=1.9 CI=1.0-3.5 for women respectively) and somatic symptoms (ORadj=1.7 CI=1.0 - 3.0 for men).	Arbitrary definition of cut-off point regarding alcohol consumption The early unemployment group was defined irrespective of later employment -> possible exposure bias
Scanlon et Mellard 2002 Midwest, US	cross-sectional	4 groups considered: 1) HS dropouts with LD/EBD who obtained a GED: N=14 mean age: 19.2 years 2) HS dropouts without LD/EBD who are in adult education: N=90 mean age: 19.13 years 3) HS dropouts with LD/EBD who are in adult education: N=52 mean age: 18.28 years 4) HS students with LD/EBD:	Noncompletion of HS	Learning difficulties -> Dropout Emotional or behavioral disorder-> School dropout	Learning difficulties (LD) Emotional or behavioral disorder (EBD)	Self-report or school records	Educational history School leaving Post-leaving educational and economic experiences Gender Ethnicity Use of special education services	In each of the 3 groups of school dropouts, 71% or more dropped out before completing 11th grade. All 3 dropout groups more frequently reported behaviour or emotional disability-related problems than academic or physical disability problems. However, 1/3 or more of the disability-related samples reported no disability-based influence on their daily activities. More than 90% of participants with disabilities reported having used special education services with the lowest percentage for adult education enrollees.	Due to a small sample size: Representativeness of the samples Results limited to desriptive statistics Self report data
Thornberry et al. 2001 Rochester,New York,USA	longitudinal, 10 waves Rochester Youth Development Study	N=738 adolescents and caregivers Mean age at wave 2: 14.5 years Mean age at wave 9: 17.9 years 73% male & 27% female	Noncompletion of HS by age 20.1 years (wave 10)	Childhood and adolescent maltreatment -> HS dropout	Early childhood maltreatment Late childhood maltreatment Adolescence maltreatment Persistent maltreatment		Gender SES Family composition Race/ethnicity Parental education Community poverty	23% of the sample had dropped out of HS. However, considering the timing of maltreatment, only late childhood maltreatment increased the odds for dropout by 1.81; whereas there was no association observed for early childhood-only maltreatment, adolescence-only maltreatment and persistent maltreatment. All analyses adjusted.	No consideration of PTSD

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James & Lawlor 2001 Ireland	cross-sectional	N=78

15-18 years

40 males & 38 females | Having left school without qualifications
Not having received or completed vocational training
Being at least 6 month in the labou market
Not being enrolled in full time education | School dropout -> Psychological problems | Withdrawn
Somatic complaints
Anxiety/depression
togehther providing an internalizing score
Social problems
Thought problems
Attention problems
Delinquency
Aggression
together providing an externalizing score

Thoughts of suicide and self-harm | Youth Self Report (YSR) | | 19 dropouts (24%) scored above the clinical treshold on the total problem score. 20% reported internalising problems and 30% externalising symptoms.

Logistic regression showed that girls scored significantly higher on internalising scores than males, weheras there was no gender difference for externalising problems.
Furthermore, girls reported significantly more thoughts of of suicide and self-harm than boys. | Self-report data
No confounding factors considered
Small sample size |
| Fergusson et Horwood 1998 Christchurch, New Zealand | Birth cohort, 21 waves

Christchurch Health and Development Study (CHDS) | N=969

0-18 years | Having left school without any qualifications by the age of 18
Having failed to obtain a grade a grade C or better in at least one School Certificate subject | Conduct problems at age 8 -> School dropout & early unemployment

With 2 hypotheses as intervening factors:

Conduct problems lead to impaired learning and educational achievement, which is translated into higher rates of dropout.
The effects of early conduct problems are mediated by adolescent behavioural patterns (substance use, peer affiliations, difficulties with school authority), that affect the student's commitment to educational achievement | Conduct problems

Cannabis use as intervening factor

Alcohol abuse as intervening factor | Rutter questionnaire
Conners questionnaire | Maternal age
Maternal education
Family SES
Family living standards
Child ethnicity
Family placement
Changes of residence
Changes of parents
Parental conflict
Childhood disadvantage
Maternal emotional responsiveness
Maternal avoidance of punishment
Gender
Intelligence (IQ) at age 8
Attentional problems at age 8 | Children in the most disturbed 5% of the cohort had risks of leaving school without qualifications that were 1.8 times (CI=1.1-2.6) the risks of those in the least disturbed 50% of the cohort, and risks of unemployment were 2.2 times (CI=1.3-3.3) higher.Significant confounding factors included: early attentional problems, child IQ, maternal age, family SES, family living standards, parental change and parental conflict.

Even after control for potentially intevening educational variables, the association between early conduct disorder and school dropout remained significant.

Key mediating variables in this association were: peer affiliations (p<0.0001), cannabis use (p<0.05) and suspension from school (p<0.05).
There was no statistically detectable difference between boys and girls. | No significant attrition

Data collection from distinct sources |
| Rylance 1997 USA | longitudinal

National Longitudinal Transition Study of Special Education Students (NLTS) | N=664

18-27 years

77% male & 23% female

Youth with severe emotional disturbances (SED) | Non completion of HS | Risk/protective factors of HS dropout among youth with SED | SED | | Gender
Age
Ethnicity
Parental education
Annual household income
Family composition
Mental health services use
Vocational education
Academic Competency | Nearly 50% of the youth with SED dropped out of HS (330/664).
The independent varibles predicted 35.7% of the overall variance of educational attainment.
A significant association with school dropout was found for parental income, age and competency. | Missing data

Lack of combined analyses |
| Schaufeli 1997 Netherlands | 2 studies:
Study 1: college graduates, longitudinal, 5 waves
Study 2: School-leavers, longitudinal, 2 waves | Study 1: N=635
mean age: 22.8 years
63% male & 37% female

Study 2: N=767
mean age: 16.2 years
49% male & 51% female | Non completion of secondary school or a vocational training | unemployment -> mental health (causation hypothesis)
mental health -> employment (selection hypothesis) | Psychological distress | Symptom Checklist-90 (SCL-90), total score
General Health Questionnaire (GHQ-12) | Gender
Marital status
Type of education
Working in an unpaid job
Financial strain
Self-esteem
Locus of control
Attribution of unemployment
Problem-focused way of coping
Social support
Attitudes towards work and non-work | At time 0, when all intended dropouts were still at school, there was no significant difference in levels of mental health between the 2 groups.
At follow-up 1 year later, unemployment led to a deterioration in mental health (t(13)=2.76; p<0.05) whereas employment or continuing education improved mental health (t(94)=3.12 p<0.01 and t(387)=2.62 p<0.01 respectively) among early school leavers.
Unlike school dropouts, the unemployed college graduates did not suffer from poor mental health, thus the causation hypothesis was only supported for school dropouts. Among college graduates, neither the level of mental health, nor financial strain, nor personality characteristics seemed to play a role in finding a job. | The very small number (N=14) of dropouts who were unemployed did not allow to study determinants of employment among this group

Mental health was generally evaluated with a 12-item questionnaire which did not allow for any differenciation. |
| Oswald & Coutinho 1996 USA | cross-sectional | n.a.

>= 14 years

Youth with severe emotional disturbances (SED) | Non completion of school (un-defined)
1. graduation with diploma
2. graduation with certificate (other than regular diploma)
3. dropout
4. reaching maximum age | State-level child disability, demographic and economic factors -> School dropout | SED | | Geographic region
Ethnicity
Rate of youth identified with SED
State per capita income
State per pupil revenue
Total expenditures per capita
Education expenditure per capita
Elementary and secondary education expenditure per capita | Less than one third of youth with SED graduated with a diploma and 38% graduated with a certificate.
In contrast, the rate at which students with SED dropped out was very high (40%), with important variations among states (9-76%). The dropout rate of students with SED was approx. double those for students with learning difficulties or mental retardation. Only 13% of the variance related to dropping out could be predicted by the demopgraphic, economic and disability variables. | Study of an extant database.

Lack of information on mediator variables. |

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Franklin & Streeter 1995 Texas, US	cross-sectional	N=200 mean age: 17 years 55% male & 45% female **middle class youth who dropped out of HS**	Noncompletion of HS	School, psychological and family correlates of HS dropout	Psychological/behavioral disorders (subscales of HAP)	Hilson Adolescent Profile (HAP) Cassata History Questionnaire Family Adaptability and Cohesion Test of Adult Basic Education (TABE)	School history Demographic background Academic skills Family cohesion Family adaptability Family communication	The 3 most frequent reasons reported for dropout were inability to get along with the classroom environment, authority problems and truancy. in the 9th grade, were underachievers and attended an average of 5 different schools. 46% of the dropouts fell in the clinical range of at least one of the HAP subscales, with drug use, alcohol use, law-society violations and anti-social risk taking as the most frequent risk behaviors. 79.8% of the school dropouts had a history of receiving counseling, mostly for family problems. Indeed, 74% of the sample viewed their families as having moderate to severe dysfunctioning.	Specific sample: only middle class youth who were willing to return to an alternative school Self-report data Descriptive statistics only
Kaplan et al.[4] 1994 Houston, US	longitudinal, 4 waves comparison study: group 1: HS dropouts group2: HS graduates who did not enter college group 3: normally enrolled students	N=4141 n.a. 45.5% male & 54.5% female	Noncompletion of HS Not entering college	HS dropout -> Mental health problems in young adulthood	Global feelings of self-derogation Anxiety Cognitive distraction or disorientation Depression Coping ability Sensitivity to opinions of others Stability of self-feelings		Gender Race Father's educational level Psychological functioning during junior HS	There was a significant association between early psychological dysfunctioning and HS dropout. HS dropouts, compared to graduates but who did not enter college, were significantly more likely to show symptoms of psychological dysfunction in young adulthood, even after controlling for the prior level of psychological dysfunction.	Self-report data Attrition bias