

**A Systematic Literature Review of the Hypomania Check List (HCL-32) for Adolescents:
Relevance of Developmental Stage and Relationship Status during Screening**

**Revisión de Literatura Sistemática Sobre el Uso de la Lista de Cotejo de Hipomanía (HCL-
32) con Adolescentes: Consideraciones sobre la Etapa del Desarrollo y Relaciones
Interpersonales durante la Evaluación**

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Abstract

A systematic literature review was conducted to assess the state of the evidence regarding use of the Hypomania Check List (HCL-32; Angst et al., 2005) with adolescents. Multiple databases were searched in English and Spanish using the terms “HCL-32 OR Hypomania Check List – 32 AND adolescents” and “Lista de Cotejo de Síntomas de Hipomanía AND adolescentes”. Non-peer reviewed studies, duplicates and irrelevant results were excluded. Reference sections of relevant studies were also searched. Eight studies met criteria for inclusion (Pooled sample $n=2245$ nonclinical, 62% female; Age $M_{\text{pooled}}=17.38$, $SD=.66$). Used with adolescents, the HCL-32 had psychometric properties comparable to adults. Non-clinical adolescent samples reported a significant number of risk-taking/irritability symptoms, regardless of gender. One study found that, when compared to an adult sample with bipolar disorder (BD) type II, adolescents in early-stage romantic love (ESIRL, <8 months) reported a comparable level of hypomanic symptoms that subsided with relationship duration (M_{pooled} duration = 10.824 months). Finally, one study with a clinical sample of adolescents with eating disorders ($n=40$) found a significant correlation between bulimia and BD. High heterogeneity across studies prevented a meta-analytic review. However, nonclinical elevations in risk-taking/irritability symptoms and ESIRL-related hypomania highlight the need to consider developmental stage and romantic relationship status while screening for BD. HCL-32 cut-off scores for adolescent populations should also be assessed. A brief screening model for ruling out clinical hypomania from ESIRL in adolescents is proposed.

Keywords: Bipolar disorder, hypomania, HCL-32, adolescent mental health, interpersonal relationships

Resumen

Se completó una revisión de literatura sistemática para evaluar el uso de la “Lista de Cotejo de Síntomas de Hipomanía” (HCL-32) con muestras adolescentes. Se realizó una búsqueda bilingüe (inglés y español) utilizando los términos "HCL-32" OR "Hypomania Check List - 32" AND "adolescents" y "Lista de Cotejo de Síntomas de Hipomanía" AND "adolescentes". También se revisó la sección de referencia de los estudios incluidos ($n=8$ estudios, n muestra acumulada = 2245 adolescentes no-clínicos, 62% féminas; M acumulada edad=17.38, $SD=.66$). El HCL-32 mantuvo las propiedades psicométricas demostradas con muestras de adultos. En 5/8 estudios, los adolescentes en etapas tempranas de enamoramiento (ESIRL; <8 meses de relación) reportaron un alto número de síntomas hipomaniacos que tendió a mermar con el tiempo (M tiempo de merma=10.824 meses). Los adolescentes reportaron un alto número de síntomas de irritabilidad y toma de riesgos, independientemente de estado interpersonal. Por otra parte, un estudio con muestra clínica ($n=40$ adolescentes con trastornos alimenticios) encontró una correlación significativa entre la bulimia y la depresión bipolar. La alta heterogeneidad de los estudios previno el metaanálisis de los resultados. No obstante, se recomienda reconsiderar las puntuaciones de corte óptimas del HCL-32 para adolescentes. Además, aquellos en etapas tempranas de enamoramiento reportan un número de síntomas similar a los adultos con depresión bipolar tipo II, lo cual pudiera resultar en diagnósticos confusos sin el escrutinio necesario. Se propone un modelo de tamizaje para discriminar entre estados de hipomanía clínicos o un estado propio del ESIRL en adolescentes.

Palabras clave: HCL-32, hipomanía, depresión bipolar, salud mental en adolescentes, relaciones interpersonales

A Systematic Literature Review of the Hypomania Check List (HCL-32) for Adolescents: Relevance of Developmental Stage and Relationship Status During Screening

The Hypomania Check List - 32 (HCL-32; Angst et al., 2005) is a self-rated instrument to screen for bipolar disorder (BD) in individuals with depression. It was validated with adult outpatients: An Italian sample (n=186 participants, 61% female; 62 Major Depressive Disorder [MDD], 27 BD-I, 97 BD-II) and a Swedish sample (n=240 participants, 58.8% female; 98 MDD, 75 BD-I, 67 BD-II). In this study, a cut-off score of 14 offered the most balance between sensitivity (80%) and specificity (51%), with a positive predictive power of 73% and a negative predictive power of 61%. Similar results were found for the HCL-32-R2, a revised version of the instrument (Fornaro et al., 2015), where the cut-off score of 14 had an improved sensitivity of 89% and a specificity of 79%. Current mood state is assessed in the HCL-32 with a 7-point Likert scale that ranges from “Much worse than usual” to “Much better than usual”, with little to no impact in self-assessment accuracy (Angst et al., 2005).

The HCL-32 can also be used to screen for clinical hypomania at lower cut-off points, with increased sensitivity and comparable specificity. A cut-off score of 8 effectively screened for hypomania with a sensitivity of 92% and a specificity of 48% (AUC=.76) in a sample of adult Taiwanese outpatients (n=59, 39 female) diagnosed with MDD (Chou et al., 2012). Similarly, Wu et al. (2008) found that a cut-off score of 9 offered higher sensitivity (91%) and acceptable specificity (46%) in a sample of 199 adult Chinese outpatients (Wu et al., 2008). In this regard, lower cut-off points that prioritize sensitivity are best utilized in clinical settings, where the goal is to identify at-risk individuals for timely intervention (Zimmerman & Holst, 2018).

The HCL-32 has two distinct, primary subscales: An “Active/Elated” (A/E) and a “Risk-Taking/Irritability” (RT/I) subscale. The A/E subscale refers to a cluster of symptoms known as “Bright Hypomania”, which include elevated mood, increased activity and flexible thinking (Angst et al., 2005). Conversely, the RT/I subscale, also known as “Dark Hypomania”, is a cluster of items commonly associated with BD functional impairment: increased anger/irritability, hostile or risk-taking behavior (i.e. impulsive spending) and cognitive dysfunction, such as flight of ideas. Irritable hypomanic states tend to be more common in BD and more pervasive in later stages of the illness. With a cut-off score of 3, the RT/I subscale was able to discriminate between BD-I and MDD in one of the validation samples. *However, it failed to consistently discriminate between BD and MDD in the combined sample* (Angst et al., 2005).

There is strong evidence for the validity and reliability of the HCL-32 for screening BD in adults with depression (Meyer et al., 2014). However, most studies with the HCL-32 have been completed with adult samples. This is understandable, as it takes approximately 10 years to for BD to be accurately diagnosed. On the other hand, staging models of BD point to biosocial indicators of the illness at earlier stages. According to Duffy (2012), comorbid neurodevelopmental conditions such as attention deficit and hyperactivity disorder (ADHD), learning disorders, as well as increased anxiety and irritable states are risk factors for BD. A family history of BD is also one of the strongest predictors for BD. Taken together, these factors indicate the need to consistently screen for BD in younger populations. With its good validity and reliability, the HCL-32 is a potentially useful instrument for use with youth, though less is known about its properties with pediatric populations.

Adolescence as a developmental stage is particularly relevant to BD because of its physiological and psychosocial processes. For instance, synaptic pruning – a neuroplastic

process where synaptic pathways are modified *en masse* through apoptosis - can interact with genetic risk and psychological vulnerability factors such as trauma to increase the likelihood of early illness onset. In turn, early illness onset is associated to more severe mood disorder outcomes such as marked functional impairment, recurrent hospitalizations, and increased medical comorbidity (Duffy, 2014). As such, understanding the screening properties of the HCL-32 for adolescent populations and its idiosyncrasies with this population can improve screening and targeted screening and therapeutic targets during the “at-risk” or initial stages. To this end, the goal of this literature review was two-fold: 1) Identify the state of the psychometric evidence for HCL-32 use with adolescents, 2) Identify clinical and psychosocial issues specific to adolescents as identified by the HCL-32.

Method

A systematic database search was conducted from September 2019 to April 2020 in Google Scholar, PubMed, Medline, Psychiatry Online, PSYCHInfo and SCielo, using the following search terms and Boolean operators: "Hypomania Check List - 32" OR "HCL-32" AND "adolescents" OR "Lista de Cotejo de Síntomas de Hipomanía" AND "adolescentes". No clinical diagnosis was specified, or publication date range was set to maximize search results and potential avenues for analysis and discussion. Studies were included if they: 1) Included the HCL-32 in data collection procedures, 2) Samples were restricted to adolescents (Age Range: 13-17 years old), or 3) The HCL-32 was administered during adolescence, be it in a cross-sectional, cross-sectional with multiple time points or longitudinal study). The initial search yielded 960 results. Peer-reviewed articles, abstracts or posters, and studies that assessed modified versions of the HCL-32 were included. Initially, search results that were thematically irrelevant to the search criteria (i.e. referenced but did not actually utilize the HCL-32 during

data collection), non-peer reviewed publications, book chapters, and non-English or Spanish articles were excluded, reducing the total number of studies to 490 articles. Next, repeated results, studies with adults (participants older than 18 years of age) or mixed adolescent-adult samples without distinct categories of either were excluded. Notably, six retrospective, longitudinal studies were excluded during this phase of review because participants completed the HCL-32 as adults. Eight studies were included in the final sample. Pooled means for age were calculated by multiplying the mean age for each study by each sample size and dividing the result by the sum of the sample size. Effect sizes (Cohen's d) for intergroup differences in HCL-32 total scores were calculated according to the method proposed by Thalheimer & Cook (2002). Due to limited availability of the data, effect sizes for three studies were not calculated. A summary table of sociodemographic and review findings can be found in Appendix A.

Results

Study and Cumulative Sample Characteristics

The pooled sample consisted of 2285 predominantly nonclinical and female adolescents (98.2% nonclinical, $n=969$ female, age $M_{\text{pooled}}=17.38$, $SD=.66$). One study had a clinical sample of adolescent inpatients with eating disorders ($n=40$, 1.8% of the total pooled sample). All studies were cross-sectional, and one of these performed a follow-up at 8 months. Studies were classified according to their main outcomes: 1) Psychometric Properties (2/8; cumulative $n=1694$, 57.2% female); 2) Romantic Love Hypomania (5/8; cumulative $n=551$, 65.5% female); and 3) Emotion Dysregulation in Eating Disorders (1/8; $n=40$). While a meta-analysis of the romantic love hypomania studies was initially considered, the high heterogeneity of the sample prevented additional analysis ($Q(7)=181.752$, $\tau^2=19.339$, $I^2=96.149$, $p<.001$).

Narrative Summary of the Findings (n=8)

HCL-32: Psychometric Properties for Adolescent Samples (n=2)

According to Holtmann et al. (2009), the internal factor structure of the HCL-32 was assessed with a sample of 294 nonclinical adolescents (M age range=15.3-20.4 years old). A moderate mean difference in total HCL-32 scores emerged between hypomanic and non-hypomanic adolescent groups (Cohen's $d = 0.58$). Factor analysis produced a three-factor structure: An Active/Elated (A/E) factor and a Risk-Taking/Irritability (RT/I) factor that has two sub-factors: 1) Disinhibited/Stimulation-Seeking (D/SS) and 2) Irritable-Erratic (I-E). Elevated scores in the A/E dimension were associated with higher HCL-32 total scores and disinhibition. High scores in the D/SS and I-E sub-categories were indicative of externalizing problems: substance abuse, attention deficit and hyperactivity disorder (ADHD) and conduct disorder (CD), which can point to early-onset BD (Holtmann et al., 2009).

Similarly, Hosang, Cardno, Freeman & Ronald (2017) conducted assessed the underlying structure of the HCL-16, a shortened version of the HCL-32, with a principal components analysis and tested its validity for screening BD in adolescents ($n=1400$ non-clinical adolescents, M age=17.05, $SD=.88$). The HCL-16 had two factors: A/E and RT/I. RT/I was more strongly related to psychopathology: psychotic experiences, internalizing/externalizing problems, and reduced life satisfaction. However, adolescents with a family history of BD had increased total and A/E scores (Hosang et al., 2017).

HCL-32: Differentiation of Romantic Love from BD Hypomania (n=5)

According to Brand et al. (2007), this cross-sectional study with 107 non-clinical adolescents (M age=17.98, $SD=1.33$) assessed the effect of romantic relationships on mood and

behavior ($n=60$ adolescents recently in love; 47 longer-lasting romantic relationships or single). Participants with psychiatric disorders were excluded (see Table 2). Strong and significant mean differences ($MD=6.41$, Cohen's $d=1.01$) were found for adolescents in early-stage intense romantic love (ESIRL M duration=5.3 months, $SD=6.78$) and adolescents not in love or in long-term relationships (M long-term relationship duration=13.08 months, $SD=16.50$). ESIRL adolescents also reported more positive mood states in the mornings and in the evenings, a decreased need for sleep and better daytime concentration than controls. Sleep patterns stabilized as the relationship shifted to companionate love. ESIRL also reported a greater sense of self-control than their long-term relationship counterparts, along with feeling more energetic and physically active during the day. Functional impairment was associated with romantic love intensity in the Yale Brown Obsessive-Compulsive Scale (Y-BOCS). The authors concluded that the cognitive and sleep-related shifts experienced by adolescents during ESIRL were comparable to BD-II hypomania in adults (Brand et al., 2007), although the effect size was small (Cohen's $d=-0.27$).

In a follow-up study, Brand, Angst, & Holsboer-Trachsler (2010) assessed gender differences in ESIRL adolescent groups. Participants with psychiatric disorders were excluded. Female adolescents in ESIRL reported more hypomanic symptoms than males, but all adolescents in ESIRL ($n=60$; M relationship duration=5.3 months, $SD=6.78$) endorsed HCL-32 scores comparable to a comparison sample of adult outpatients with BD-II (Angst et al., 2005; Brand et al., 2010). Both ESIRL and controls ($n=47$) had higher scores in the RT/I dimension compared to adults. According to the authors, high RT/I score may reflect developmentally adaptive, autonomy-promoting attitudes among adolescents.

In a later study by Bajoghli et al. (2011), female adolescents ($n=86$, M age=17.97, $SD=1.09$) within the in-love group ($n=38$ in love; M relationship duration=10.10 months, $SD=5.84$; relationship duration range: 4-14 months) reported more hypomanic symptoms (HCL-32 M score=15.97, $SD=4.16$) than controls ($n=48$ not in love; HCL-32 M score=10.48, $SD=4.37$). The effect size of the inter-group mean difference was strong (Cohen's $d=1.28$). Participants in love also reported increased physical activity, more positive moods, and no changes in sleep quality (Bajoghli et al., 2011). There was a moderate, positive correlation between hypomanic symptoms and relationship duration ($r=.44$, $p<.01$).

In a second study by Bajoghli et al. (2013), adolescents in love ($n=81$, M relationship duration=10.66 months, $SD=7.40$) reported more hypomanic and less depression symptoms than controls. Furthermore, there was a significant gender difference in total scores: female adolescents in love reported significantly more hypomanic symptoms than males ($F(1, 197) = .006$, $p=.006$). Increased state anxiety was also reported by adolescents in love in the State-Trait Anxiety Inventory (STAI). However, no significant changes in sleep quality were found by the authors, who suggested that changes in sleep quality can potentially differentiate between clinical hypomanic symptoms from romantic love states in adolescents (Bajoghli et al., 2013).

In a follow-up study by Bajoghli et al. (2017), romantic love states ($n=45$ still in love, 69 still not in love, 17 recently in love and 19 no longer in love) were significantly associated with more hypomanic symptoms at 8 months, though symptoms decreased with relationship duration. A large 6-point difference in mean HCL-32 scores was found in adolescents who reported being newly in love at the 8-month follow-up (Cohen's $d=2.97$). Contrary to sleep quality findings, mood and anxiety symptoms increased while recently in love. Sociocultural factors such as

parental approval, romantic or sexual conflicts, or arousal interpreted as anxiety can potentially mediate this association (Bajoghli et al., 2017).

HCL-32 and Emotion Dysregulation in Eating Disorders (n = 1)

As published in a peer-reviewed poster, Vargas-Castro, Grau, Faus, & Sanchez-Povedano (2015) assessed emotion dysregulation and eating habits in a cross-sectional study with a sample of adolescents with eating disorders (ED $n=40$; Age range=12-19 years old). Adolescents with anorexia nervosa (AN $n=17$) endorsed more hypomanic symptoms on the HCL-32 than adolescents with bulimia nervosa (BN $n=23$), but only BN scores correlated positively with lack of inhibition, self-control and attentional capacity on the Barcelona-Bipolar Eating Disorder Scale (BEDS), suggesting that BN may be more strongly related to BD (Vargas Castro et al., 2015).

Discussion

The present review was completed to assess the current state of the literature regarding the use of the HCL-32 for screening BD in adolescents. A systematic database search and literature review yielded 8 relevant studies: 2/8 assessed HCL-32 psychometric properties with adolescent samples, 5/8 assessed the hypomanic-like qualities of romantic love in adolescents, and 1/8 assessed emotion dysregulation in adolescent inpatients with ED. In all studies, the HCL-32 identified significant differences between control and target group samples. Holtmann et al. (2009) found that the HCL-32 maintained its psychometric properties with adolescents. Additionally, they found a three-factor solution, where RT/I divided into Disinhibition/Stimulation-Seeking and Irritable-Eratic dimensions, that can potentially improve diagnostic specificity for adolescents. Furthermore, adolescents with increased active/elated

symptoms are at risk for poor treatment seeking and adherence since they tend to view their symptoms as less pathological (Hosang et al., 2017).

Adolescents in Love Endorsed More Symptoms on the HCL-32

Female adolescents in love reported significantly more symptoms than their male counterparts (Bajoghli et al., 2013; Brand et al., 2010). However, a subset reported more hypomanic-like symptoms as relationship duration *increased* (Bajoghli et al., 2013). These gender differences possibly reflect distinct biopsychosocial attachment processes between female and male adolescents, as higher HCL-32 scores were found in adolescent female groups, regardless of ethnicity. Relationship duration, while informative of sentimental status and relationship goals, does not necessarily reflect attachment style or relationship dynamics. An insecure and preoccupied attachment style often underlies mood disorders: “For preoccupied persons, the primary goal is to maintain closeness with the partner at all costs and divert attention away from the problem, the solving of which can paradoxically cause the partner to withdraw attention” (Wendołowska et al., 2020). Although relationship quality and attachment style were not assessed in these studies, increased anxiety symptoms along with increased mood symptoms could have also emerged from preoccupation with social and interpersonal goals. In BD, elevated mood and hyperpositive affect have been associated with an increased need to win within a social context (Gilbert et al., 2007), while the association between major life events and bipolar mood episodes is well-documented across the literature. In support of this theory, Brand et al. (2007) found that adolescents with functional impairment were more likely to have experienced stronger ESIRL and higher HCL-32 scores (Brand et al., 2007). Mismatched expectations and diverging communication styles can contribute to a dysphoric mood by reinforcing insecure

attachment schemas. Concurrent assessment of personality traits and attachment styles can inform future studies and mood-management interventions for adolescents.

Adolescents in Love Experienced Increased State Anxiety. Four out of seven (4/7) studies included an instrument to assess concurrent anxiety symptoms. Bajoghli et al. (2013, 2017) found that adolescents in love experienced significant state anxiety, regardless of gender. Furthermore, anxiety severity was independent of depression symptoms. Thus, sociocultural factors, such as parental disapproval, potentially mediate this association since adolescents learn to conceal symptoms as a function of social acceptance (MacLean et al., 2010). In adults, anxiety disorders are highly comorbid with BD and associated with a more severe course of illness that includes marked functional impairment, substance abuse, and increased suicidality (Simon et al., 2004). Allostatic load theory suggests that frequent exposure to stressful or traumatic events increases neurophysiological sensitivity to stress, increasing the likelihood of a bipolar mood episode and progressive declines in systemic health (Grande et al., 2012; Kapczinski et al., 2008; POST et al., 2001). As such, future studies of romantic love and anxiety in at-risk and initial-stage adolescents are especially relevant for early interventions.

Adolescents in Love Conserved Sleep Quality with Reduced Hours. A reduced need for sleep is a prodromal manic symptom. Therefore, marked changes in sleep pattern can differentiate *de facto* BD onset from subclinical active or elated moods. Brand et al. (2007) found an association between ESIRL and significant reductions in sleep hours with no decline in sleep quality, which is often considered a prodromal symptom of mania. Relatedly, Hosang, Cardno, Freeman, & Ronald (2017) found a positive association between sleep problems, HCL-16 total scores and increased markers of psychopathology. These findings support the well-evidenced association between hypomania and sleep problems within adolescent samples.

Increased HCL-32 Scores in Adolescents with Bulimia

Vargas-Castro, Grau, Faus, & Sánchez-Povedano (Vargas Castro et al., 2015) used the HCL-32 to assess emotion dysregulation in adolescent inpatients with severe ED. Though both groups with ED had significant HCL-32 scores, bulimia was more strongly associated to BD than anorexia. The association between bulimia and BD is well evidenced (Amianto et al., 2011). However, less is known about anorexia and possible BD. Given that many components of the RT/I subscale are meant to assess dysphoric mood, this subscale possibly provides a preliminary index of emotion dysregulation problems in anorexia.

Clinical Implications

Findings support the validity and reliability of the HCL-32 to identify hypomanic symptoms in adolescents, though additional studies with larger sample sizes are warranted. A series of studies which assessed the impact of relationship status on hypomanic mood support the need to routinely assess social and interpersonal events as risk factors for mood disorders. Concurrent assessment with the Y-BOCS can be used to discriminate between subclinical hypomania and ESIRL intensity by also considering the degree of functional impairment. Finally, significant disruptions in sleep pattern and binge eating habits in adolescents can point to an early-stage BD as opposed to a psychosocial event such as ESIRL. Because adolescents tend to report a high number of symptoms on the RT/I subscale, cut-off scores should be reassessed for this population. Questions about relationship status can be assessed with a semi-structured interview during the second phase of the screening process, where a more thorough approach is warranted (Zimmerman & Holst, 2018). A brief screening intervention for adolescents is outlined in Figure 2.

Limitations

This review was completed to assess the state of the literature regarding use of the HCL-32 with adolescents. As such, a review of studies with more inclusive parameters can determine if these findings are reproducible with other screening instruments, such as the MDQ. While most studies were completed with nonclinical adolescents, results from this review can inform future studies of romantic love and anxiety in adolescents with psychiatric disorders and screening interventions for nonclinical adolescent samples.

Conclusion

The HCL-32 can be used to screen hypomanic symptoms in adolescents. However, the neurophysiological and developmental processes of adolescence can impact the number of symptoms reported in the HCL-32. Nonclinical adolescents tend to report an increased number of risk-taking/irritability symptoms and those in early-stage romantic love (ESIRL) experience significant anxiety and mood elevation. These findings can inform future studies as well as clinical and public health policy interventions that target adolescent mental health and well-being.

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Appendix A: Tables and Figures

Table A1

Sample Characteristics for Each of the Studies (n=8)

Authors	Country	Sample Size (Female <i>N</i>)	<i>M</i> age (SD)	Population	Relationship Status
Holtmann et al. (2009)	Germany	294 (139)	17.3 (SD=1.1)	Nonclinical – Students (<i>n</i> =5 schools in Cologne)	Not Reported
Hosang, Cardno, Freeman, & Ronald (2017)	England	1400 (830)	17.05 (SD=.88)	Nonclinical – Siblings of twins from TEDS/LEAP study	Not Reported
Brand et al. (2007)	Switzerland	107 (72)	17.95 (SD=1.34)	Nonclinical - Early-Stage Romantic Love (ESIRL)/Not in Love	ESIRL <i>M</i> duration=5.3 months (SD=6.78 months); Long- Term Partnership <i>M</i> duration=13.08 months (SD=16.50)

Authors	Country	Sample Size (Female <i>N</i>)	<i>M</i> age (SD)	Population	Relationship Status
					months).
Brand, Angst, & Holsboer-Trachsler (2010)	Switzerland	107 (66)	17.85 (SD=1.30)	Nonclinical – ESIRL/Not in Love	ESIRL <i>M</i> duration=5.3 months (SD=6.78 months); Long- Term Partnership <i>M</i> duration=13.08 months (SD=16.50 months).
Bajoghli et al. (2011)	Iran	86 (100%)	17.97 (SD=1.09)	Nonclinical – In Love/Not in Love	In Love <i>M</i> duration=10.10 months.
Bajoghli et al. (2013)	Iran	201 (113)	17.73 (SD=1.06)	Nonclinical – In Love/Not in Love	In Love <i>M</i> duration=10.66 months (Range: 3 – 16 months).
Bajoghli et al. (2017)	Iran	157 (90)	18.97 ^a (SD=1.34)	Nonclinical – In Love/Not in Love	In love with another person (<i>n</i> =62). Baseline+8mo.

Authors	Country	Sample Size (Female <i>N</i>)	<i>M</i> age (SD)	Population	Relationship Status
					<p><i>M</i> relationship duration=20.34 months, SD=4.04 months.</p> <p>Relationship Duration Range: 12-28 months. At 8-months only <i>M</i> relationship duration=4 months, SD= 2.34 months. Range: 1-8 months.</p>
Vargas-Castro, Grau, Faus, & Sánchez-Povedano (2015)	Spain	40 ^b	Age Range: 12 – 19 years old ^c	Inpatients with ED (17 Anorexia Nervosa; 23 Bulimia Nervosa).	Not Reported

-
- a) Participants had been recruited 8 months prior; *M* age reflects age at follow-up.
 - b) Gender proportion was not reported.
 - c) Mean age was not reported; participants had been diagnosed < 18 years old.

Table A2

Literature Review Summary Findings: HCL-32 Use with Adolescents (n=8)

Category	Authors	Method	HCL-32 Properties and Results			Relevant Findings
			Total	Active/Elated (A/E)	Risk- Taking/Irritability (RT/I)	
Psychometric	Holtmann et al. (2009)	Cross-Sectional. Exclusion: Missing biological sex data (n=2) and more than 3 missing items (n=5). Principal components analysis performed with Kaiser's Varimax rotation. Hypomania assessed with DSM-5	German version, no modifications (Cronbach's $\alpha=0.71$). Duration and functional impact items (n=8) were rated. Most frequently unreported items: 7 ("I tend to drive	A/E Cronbach's $\alpha=.68$. Hypomaniac. $M=9.0$ ($SD=1.55$). Non- Hypomaniac. $M=8.5$ ($SD=2.15$;	Subdivided in two: Disinhibited/Stimul ation Seeking (D/SS; Cronbach's $\alpha=.58$) and Irritable-Erratic (I-E $\alpha=.58$). Hypomaniac D/SS. $M=3.8$ ($SD=1.57$); Non- Hypomaniac D/SS.	<i>Severity and impact items were not well understood by adolescents. The A/E subscale identified adolescents who did not view their symptoms as pathological. D/SS was associated to less inhibited behavior, increased substance use and sexual activity. I-E was associated to distractibility and poor self-regulation. Generalizability limited by non-clinical adolescents.</i>

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HCL-32 Properties and Results						
Category	Authors	Method	Total	Active/Elated (A/E)	Risk- Taking/Irritability (RT/I)	Relevant Findings
		duration criteria (>4 days) and negative reactions from others. Co-assessments: SDQ	faster”), 16 (“I am more interested in sex”), and 17 (“I am more flirtatious”). Hypomaniac (n=23). Total score $M=18.3$ (SD=3.78). Non-Hypomaniac (n=182). $M=15.8$ (SD=4.32; $p=.01$).	NS).	$M=2.8$ (SD=1.64; $p<.01$). Hypomaniac I-E. $M=5.6$ (SD=2.29); Non-Hypomaniac I-E. $M=4.6$ (SD=2.44; NS).	
Psychometric	Hosang, Cardno, Freeman & Ronald (2017)	Cross-Sectional (Phase 2 of the LEAP longitudinal study). Exclusion criteria: Severe medical disorder, history of	HCL-32, reduced items (HCL-16, Forty et al., 2010; Cronbach’s $a=.66$.) Cut-off score=8. Most frequently	Cronbach’s $a=.67$. BD Family History. $t(1395)=1.99$, $p=.047$. SPEQ	Cronbach’s $a=.42$. Correlated with: SDQ - Emotional Problems $z=3.79$, $p<.002$. Hyperactive $z=5.30$, $p<.002$.	Total scores correlated positively with extraversion, openness to experience, substance use in the last 12 months, sleep problems and sensitivity to anxiety. Risk-taking items loaded in the A/E dimension.

HCL-32 Properties and Results

Category	Authors	Method	Total	Active/Elated (A/E)	Risk- Taking/Irritability (RT/I)	Relevant Findings
		severe perinatal complications, unknown zygosity. Co-assessments: SMFQ, CASI, SPEQ, PLIKS-Q, PSQI, FFM, Family history of BD [by parent report], Yes/No 15-substance abuse questionnaire.	endorsed items: More optimistic, less shy or inhibited. Less endorsed: “Smoking more cigarettes” and “Taking more drugs”. Total M score =7.12 (SD=2.60). <i>N</i> =673 hypomanic (47%). 124 (9%) participants had a total score over 8, with negatively impacting symptoms lasting more than 2 days.	Anhedonia <i>z</i> =2.14, <i>p</i> =.032.	Conduct Problems <i>z</i> =4.85, <i>p</i> <.002; Peer Problems <i>z</i> =5.52, <i>p</i> <.002; Lower Life Satisfaction <i>z</i> =-4.99, <i>p</i> <.002.	A/E was less associated with psychopathology. Family history of BD correlated with higher total and A/E scores.

HCL-32 Properties and Results						
Category	Authors	Method	Total	Active/Elated (A/E)	Risk- Taking/Irritability (RT/I)	Relevant Findings
Romantic Love Hypomania	Brand et al. (2007)	Cross-Sectional. Exclusion criteria: Psychiatric disorder. Co-assessments: DSLQ, LIPCQ – German version. ESIRL screened with yes/no survey: 1) Recently in love; 2) In love for a longer period, or 3) Single and not in love. ESIRL intensity assessed with three questions from the Y- BOCS (Marazziti & Canale, 2004; Cutoff	HCL-32, without modifications. Control Group (n=13 Long-Term Relationships; 34 Not in Love). Total score <i>M</i> =9.76, <i>SD</i> =6.82. Hypomaniac adults (Angst et al., 2005). <i>M</i> =17.67, <i>SD</i> =5.19 (CG vs. BD-II <i>t</i> [46] =-7.94, <i>p</i> <.00). ESIRL (n=60) M = 16.17, <i>SD</i> =5.84 (ESIRL vs. BD-II <i>t</i> [59] =-1.99, ns).	Not assessed	Not assessed	<i>Adolescents in ESIRL endorsed total scores comparable to clinical hypomania. ESIRL did not last more than 7 months and was associated to increased sense of internal control and reduced sleep hours. Intensity of ESIRL was associated with increased functional impairment.</i>

HCL-32 Properties and Results						
Category	Authors	Method	Total	Active/Elated (A/E)	Risk- Taking/Irritability (RT/I)	Relevant Findings
		score = 6).				
Romantic Love Hypomania	Brand, Angst, & Holsboer- Trachsler (2010)	Cross-Sectional. Exclusion criteria: Psychiatric disorder (Screened with MINI, VZDS, and STAI). ESIRL was screened via yes/no survey and co- assessed with the Y- BOCS (Cut-off score = 6 discriminates “in love” vs “highly in love”).	HCL-32, without modifications. Gender differences. Total score $F(1, 103)$ $=5.64, p=.019$; Group Type x Gender. Total score $F(1, 103) = 24.47,$ $p=.000$	BD-II (Angst et al., 2005) $M=12.49$ ($SD=4.36$); ESIRL $M=9.83$ ($SD=4.19$); CG $M=6.02$ ($SD=4.65$). Group Type x Gender. $F(1,$ $103) = 30.50,$ $p=.000.$	Group Differences. BD-II $M=2.82, SD=1.82$; ESIRL $M=3.82, SD$ $=1.72$; CG=3.43, $SD=1.98$. Gender differences. $F(1,$ $103) = 9.40, p=.003.$	ESIRL HCL-32 total scores were comparable to adult outpatients with BD-II. Female adolescents had significantly higher total and RT/I symptoms. <i>Adolescents overall had higher RT/I symptoms than adult BD- II outpatients.</i> Adults with BD-II had significantly more A/E symptoms.
Romantic Love	Bajoghli et al.	Cross-Sectional. Romantic love was	HCL-32, Farsi version, without	Not assessed	Not assessed	Adolescents in love reported more hypomanic symptoms and increased

HCL-32 Properties and Results

Category	Authors	Method	Total	Active/Elated (A/E)	Risk- Taking/Irritability (RT/I)	Relevant Findings
Hypomania	(2011)	assessed with a self-administered, three-question, yes/no survey: 1) "Are you currently in love with another person?"; 2) "How many times have you been in love with another person?"; 3) "If you are currently in love with another person, for how many weeks has the relationship lasted so far?". Questionnaires were translated into	modifications (Cronbach's $\alpha=.91$). In Love (n=38) Total Score $M=15.97$ (SD = 4.16). Control (n=48) Total Score $M=10.48$ (SD=4.37). U -test: $Z=4.96$, $p<.001$.			physical activity, had improved concentration during the day and more positive evening moods. No significant inter-group differences were found for sleep or depression symptoms. Hypomania scores <i>increased</i> with relationship duration.

HCL-32 Properties and Results						
Category	Authors	Method	Total	Active/Elated (A/E)	Risk- Taking/Irritability (RT/I)	Relevant Findings
		Farsi with Brislin's method (1986). Co-assessments: VZDS, DSLQ, 7-Day Exercise Log.				
Romantic Love Hypomania	Bajoghli et al. (2013)	Cross-Sectional. ESIRL assessed via self-administered, three-question, yes/no survey. Other assessments: VZDS, STAI, DSLQ, 7-Day Exercise Log	HCL-32, Farsi version, without modifications. Female in Love (n=48) <i>M</i> =19.25 (SD=4.10). Female Not in Love (n=65). <i>M</i> =18.36 (SD =3.78). Male in Love (n=33). <i>M</i> =10.98 (SD =4.38). Male Not in Love	Female in Love <i>M</i> =12.01 (SD=2.05). Female Not in Love <i>M</i> =9.21 (SD=3.25). Male in Love <i>M</i> =10.98 (SD =4.38). Male Not in Love	Female in Love <i>M</i> =7.24, SD=3.78. Female Not in Love <i>M</i> =9.15, SD =2.90. Male in Love <i>M</i> =8.20 (SD =3.01). Male Not in Love <i>M</i> =10.42 (SD=3.77). ANOVA Gender <i>F</i> (1, 197) =.006,	In love adolescent group reported elevated mood, improved concentration, less depression symptoms and increased state anxiety. Romantic love state correlated positively with hypomania only.

HCL-32 Properties and Results						
Category	Authors	Method	Total	Active/Elated (A/E)	Risk- Taking/Irritability (RT/I)	Relevant Findings
			(n=55). $M=19.14$ (SD=5.75). ANOVA Gender $F(1, 197)$ $=.28, p=.001$.	$M=8.72$ (SD=4.92). ANOVA Gender $F(1,$ 197) =1.95, p =.003.	$p=.006$.	
Romantic Love Hypomania	Bajoghli et al. (2017)	Cross-sectional; follow- up at 8 months (Bajoghli et al., 2013). ESIRL assessed via self-administered, three- question, yes/no survey. Co-assessments: STAI, VZDS, DSLQ.	HCL-32, Farsi version, without modifications. INLOVESTABLE (n=45) (In love at baseline and follow- up): Baseline $M=20.91$ (SD=4.20); Follow-up $M=16.21$ (SD=2.81).	Not assessed	Not assessed	Four patterns of hypomanic symptoms correlated with romantic love status, mood, and anxiety at 8- month follow-up. “Newly in love” had increased hypomania and state anxiety. Hypomanic scores decreased for those still in love at 8 months. Sleep pattern did not differ between groups.

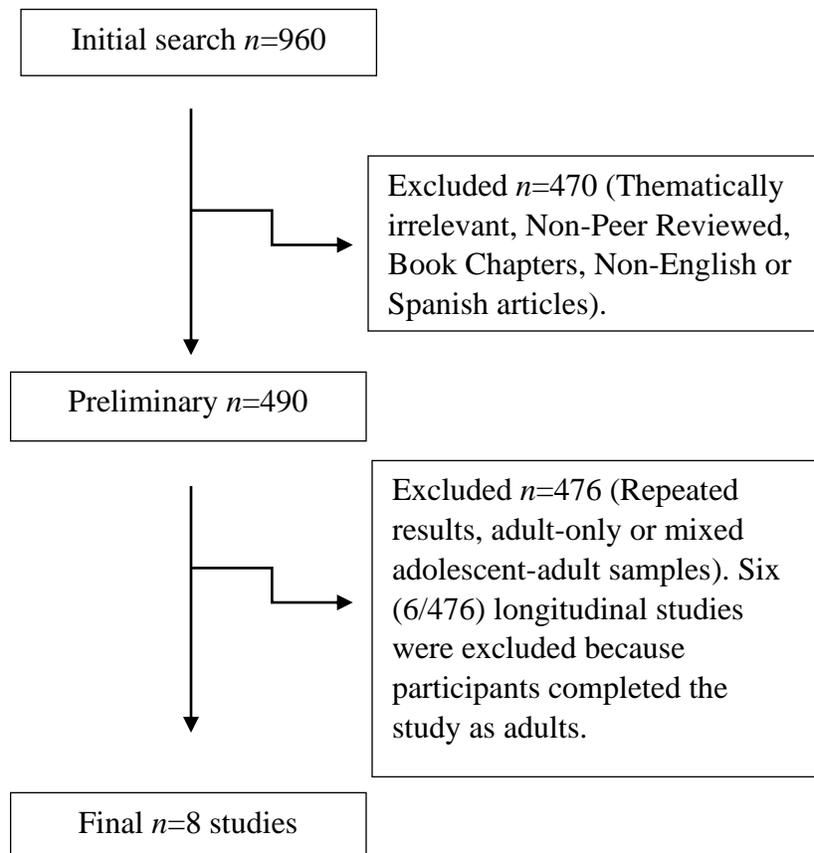
HCL-32 Properties and Results						
Category	Authors	Method	Total	Active/Elated (A/E)	Risk- Taking/Irritability (RT/I)	Relevant Findings
NOTINLOVESTAB						
<p>LE (n=69) (Not in love at baseline or follow-up): Baseline $M=18.32$ (SD=4.52); Follow-Up $M=19.01$ (4.88).</p>						
NEWLYINLOVE						
<p>(n=17) Baseline $M=17.47$ (SD=2.99); Follow-Up $M=24.20$ (SD=1.15)</p>						
NOTANYMOREIN						
<p>LOVE (n=19) Baseline $M=20.36$ (SD=2.30), Follow-</p>						

HCL-32 Properties and Results						
Category	Authors	Method	Total	Active/Elated (A/E)	Risk- Taking/Irritability (RT/I)	Relevant Findings
			Up $M=16.47$ ($SD=4.26$).			
Eating Disorders	Vargas-Castro, Grau, Faus, & Sánchez-Povedano (2015)	Cross-Sectional. Other assessment: BEDS	HCL-32, without modifications.	Unavailable	Unavailable	Adolescents with bulimia endorsed less symptoms in the HCL-32, and significantly correlated with lack of inhibition, self-control, and attention in the BEDS. Co-occurring emotion dysregulation and bulimia may suggest an underlying BD.

d) *Abbreviations:* Barcelona-Bipolar Eating Scale (BEDS), Child Anxiety Sensitivity Index (CASI), Daily Sleep Log Questionnaire (DSLQ), Five-Factor Model (FFM), Hypomania Check List – 32 (HCL-32), Levenson’s IPC Questionnaire (LIPCQ), Mini International Neuropsychiatric Interview (MINI), Pittsburgh Sleep Quality Index (PSQI), Psychotic-Like Symptoms Questionnaire (PLSQ), Specific Psychotic Experiences Questionnaire (SPEQ), State-Trait Anxiety Inventory (STAI), Short version of the Moods and Feelings Questionnaire (SMFQ), Strengths and Difficulties Questionnaire (SDQ), Von Zerssen’s Depression Scale (VZDS), Yale Brown Obsessive-Compulsive Scale (Y-BOCS)

Figure 1A

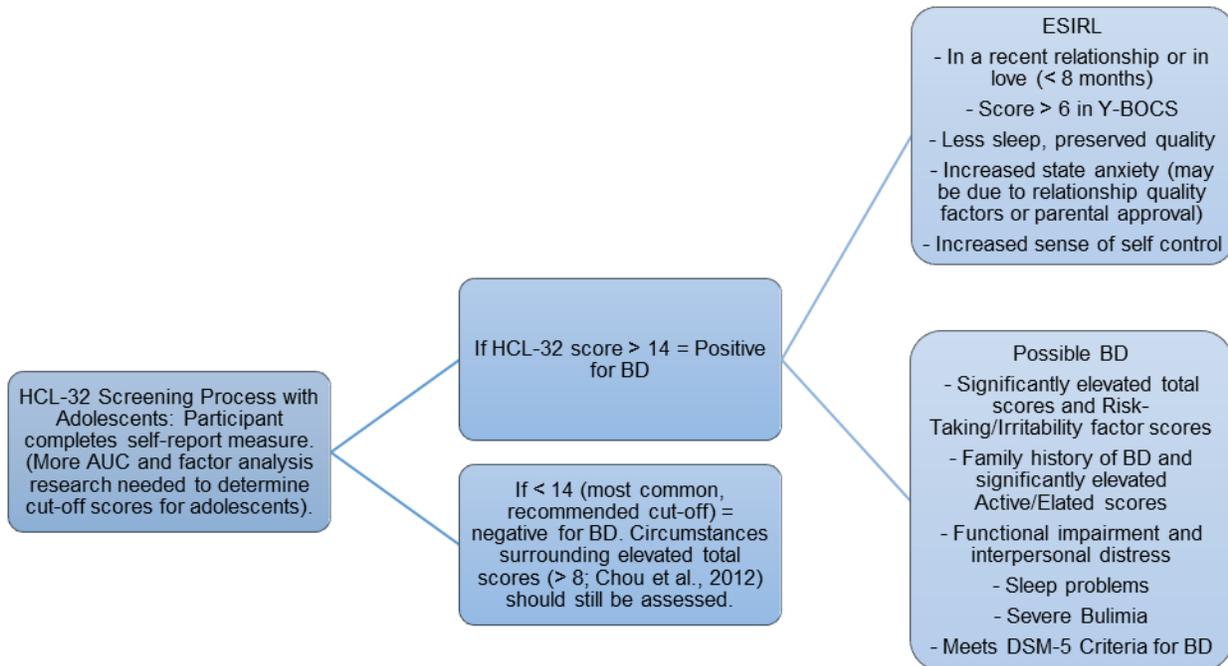
Schematic of the Systematic Literature Review Inclusion/Exclusion Process



Note. Included publications were classified according to thematic focus and their references parsed for additional, potentially eligible studies.

Figure 2A

Recommended HCL-32 Screening Process with Adolescents



Note. A cut-off score of 14 confers the most balance between specificity and sensitivity (Angst et al., 2005). Because adolescents tend to endorse more irritable/risk-taking symptoms, an assessment of the optimal cut-off score for this population is suggested.

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