Psychological attachment in obesity: the significance for bariatric surgery

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The significance of attachment representations for obesity: a systematic review

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Abstract

Theoretical considerations and empirical results suggest that interpersonal patterns known as attachment representations are of relevance to obesity. This paper systematically examines the peer-reviewed evidence regarding the relationship between attachment representations and obesity. Peer-reviewed literature published between 1990 and 2013 was derived from PubMed, PsycINFO and reference lists of included papers. Ten studies met the selection criteria. Overall the studies suggest a relationship between attachment insecurity and obesity. Particularly attachment anxiety, (i.e. the anxiety about rejection and abandonment by others) was associated with current and future obesity. Possible explanations for an impact of attachment insecurity on obesity can be found in heightened physiological responses to stressful situations and the underdevelopment of emotion-regulation, which is an issue for future inquiry. Despite the early stage of theory and research in the field of obesity, there is potential in considering attachment representations in obesity care.

Keywords: obesity; attachment; body mass index; child; adult; systematic review
Introduction

Obesity is a complex global health problem, which has proven difficult to prevent and to treat and is also affecting children. It is now clear that the aetiology of many chronic diseases including obesity concerns not only genetic and current environmental factors, but also the way in which early repeated interactions with significant others results in enduring ways of reacting to stress and dealing with negative affectivity. Problems with stress management and affect regulation have been repeatedly linked to obesity in both children and adults. One specific theoretical framework that describes individual differences in dealing with stress and affect regulation based on early childhood experiences is attachment theory.

According to attachment theory, individuals internalize early childhood interactions with primary caregivers in enduring beliefs and expectations about how others behave towards oneself and how oneself behaves towards others. These enduring expectations are referred to as attachment representations or internal working models and are thought to be the mechanisms by which the influence of childhood experiences are sustained into adulthood. In adulthood, internal working models of attachment are generally conceptualized as sets of global beliefs about the self (e.g., as worthy of care and lovable) and about others (e.g., as trustworthy and caring). In terms of their affective–motivational characteristics, these global beliefs are referred to as anxiety about rejection and abandonment and avoidance of intimacy and interdependence. These two dimensions can be combined into four attachment styles– one secure and three insecure subtypes: preoccupied, dismissing and fearful.

Individuals low on attachment anxiety and low on attachment avoidance (i.e., secure) have a sense of social resiliency. That is, they dispose over psychosocial skills (e.g. social and communicative competences) and are capable to use a broad range of coping strategies (e.g. social support, active problem solving) in times of stress. Individuals high on attachment anxiety (i.e., preoccupied) have a sense of vulnerability and hypervigilance for threats, resulting in high levels of perceived stress and distress. They have been found to make stronger attempts to seek proximity in order to try and elicit increased attention and support from others often to the point of being ‘clingy’ in order to regulate their emotions. Despite their strong desire for closeness and reassurance, research shows that social and emotional support is hardly effective in reducing distress in these people. In contrast, individuals high on attachment avoidance (i.e., dismissing) tend to dismiss symptoms of distress and vulnerability. They deal with stressors by distancing, avoiding and repressing negative emotions. Consequently, more avoidantly attached patients may
experience and report to be non-distressed while showing considerable biological distress (e.g., increased blood pressure, heart rate variability).\textsuperscript{24, 25} Individuals high on both attachment anxiety and attachment avoidance (i.e., fearful) show a mixture of both preoccupied and dismissing attachment patterns.\textsuperscript{14} Although they may experience intense negative affect, they rather suffer than seek help.\textsuperscript{26, 27}

Due to their prototypical ways of dealing with stress and affect regulation, eating has been suggested to be a regulatory mechanism for more insecurely attached individuals to deal with stressors.\textsuperscript{28} Therefore, several investigators expected higher levels of attachment anxiety and attachment avoidance to be associated with obesity.

Insight into the relationship between attachment representations and obesity is important as it may help to determine who is at risk of obesity as well as to develop person-customized prevention and intervention programs. Therefore, in the present study we systematically reviewed the literature on the association between attachment and obesity.

**Materials and Methods**

**Document eligibility**

We aimed to identify articles which covered any aspect of the relationship between attachment representations – in both adults as children – and obesity, published between 1990 and 2013. Dissertations were excluded.\textsuperscript{29} The study design and document type was unrestricted.

**Search strategy and document selection**

A systematic search was implemented in the following two bibliographic databases: PubMed and PsycINFO. The search strategy included the following combination of key words/MeSH terms: ‘attachment’ OR ‘relationship style’ AND ‘obesity’ OR ‘overweight’ OR ‘body weight’ OR ‘body mass index’ OR ‘waist-to-hip ratio’ OR ‘BMI’. In line with the document eligibility criteria, publication date and human studies limits were applied. The search strategy is shown in Table 1.

First, titles and abstracts and, second, full-text version of records identified by the search strategies were assessed by two authors (FA and CH) against document eligibility returned 350 articles in PubMed and 86 articles in PsycINFO of which 421 articles remained after the removal of duplicates.
Table 1. Search strategy

<table>
<thead>
<tr>
<th>Database</th>
<th>Keywords</th>
</tr>
</thead>
<tbody>
<tr>
<td>PsycINFO</td>
<td>(exp Attachment behavior/ or relationship style.ti,ab. or emotional attachment.ti,ab) AND (exp Overweight/ or exp Obesity/ or exp Body Weight/ or exp Body Mass Index/ or obesity.ti,ab. or overweight.ti,ab. or body weight.ti,ab. or exp body weight/ or body mass index.ti,ab. or exp body mass/ or waist-hip ratio.ti,ab. or waist-to-hip ratio.ti,ab.)</td>
</tr>
</tbody>
</table>

Quality assessment
The Newcastle-Ottawa Scale (NOS) for assessing the quality of non-randomised studies in metanalyses was used as a guide to assess the quality of the observational studies. This scale assesses three broad areas: (i) selection; (ii) comparability; (iii) outcome or exposure. Quality of the included studies was assessed independently by the same two reviewers (FA and CH). No attempts to mask for authorship, journal name or institution were made. Appendix 1 details the quality assessment and scoring system.

Results

Characteristics of studies
A total of 10 articles met the inclusion criteria and were identified in this review. Table 2 depicts the study characteristics and main results. Six studies were cross-sectional and four were longitudinal. Six studies investigated an adult population whereas four studies investigated children. The majority of the studies were performed in the general population with a prevalence of obesity between 15%-20%.

Obesity and attachment measures
As a definition of obesity, BMI was used in the majority of studies; however, also waist-to-hip ratio (WHR) was used in two studies. In children an adjusted BMI score for youngsters was used, or categories relative to the 2000 US growth reference were used. For the evaluation of attachment representations, nine methods were used comprising both categorical (e.g., RQ, AHQ, AAPR) and dimensional measures of attachment (e.g., AQS, ECR-R, MAQ, IPPA-R, SC).
<table>
<thead>
<tr>
<th>Study</th>
<th>Population</th>
<th>Design</th>
<th>Attachment measure</th>
<th>Obesity characterization</th>
<th>Outcome</th>
<th>Quality</th>
<th>Significant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cooper et al. 44</td>
<td>145 young women</td>
<td>Cross-sectional</td>
<td>AHQ-questionnaire</td>
<td>17.2 % BMI &gt;25</td>
<td>The subscale negative parental discipline was associated with BMI Beta=.017, but not the subscales secure base, threats of separation or peer affectional support.</td>
<td>Low</td>
<td>Yes for parental discipline, no for secure base/threats of separation/affectional support</td>
</tr>
<tr>
<td>Wilkinson et al. 45</td>
<td>200 students</td>
<td>Cross-sectional</td>
<td>ECR-R-questionnaire</td>
<td>Mean BMI 23.0, range from 17.4 - 41.1 (sd = 3.2)</td>
<td>Attachment anxiety and BMI r = .15 (p &lt; .05); attachment avoidance and BMI were not significantly correlated.</td>
<td>Low</td>
<td>Yes</td>
</tr>
<tr>
<td>D'Argenio et al. 46</td>
<td>50 non-obese, 150 obese</td>
<td>Cross-sectional</td>
<td>RQ-questionnaire</td>
<td>Mean BMI non-obese healthy participants 23.38 ±2.85 Mean BMI obese participants=41.33 (sd=6.80) Mean BMI obese participants with current psychiatric diagnosis=38.27 (sd=6.69)</td>
<td>The odds for obesity was 1.23 (95% CI, 1.08-1.41, p = .002) higher for anxious vs. secure attachment</td>
<td>Medium</td>
<td>Yes</td>
</tr>
<tr>
<td>Kiesewetter et al. 61</td>
<td>44 obese patients</td>
<td>Cross-sectional</td>
<td>AAPR-interview</td>
<td>Mean BMI=37.3 (sd=7.4) Mean BMI insecure patients=40.6 (sd=9.1) Mean BMI secure patients=37.2 (sd=6.4) Mean weight in kg insecure patients=116.0 (sd=22.3) Mean weight in kg secure patients=104 (sd= 23.7)</td>
<td>No relation between attachment and BMI at baseline. Secure and insecure patients did differ on weight in kg at baseline p=.03.</td>
<td>Low</td>
<td>Yes for weight in kg, no for BMI</td>
</tr>
<tr>
<td>Bahrami et al. 70</td>
<td>202 overweight students</td>
<td>Cross-sectional</td>
<td>IPPA-R-questionnaire</td>
<td>Mean BMI 27.48 (sd = 4.81)</td>
<td>Attachment quality and BMI r=-0.27, p=.003</td>
<td>Low</td>
<td>Yes</td>
</tr>
<tr>
<td>Study</td>
<td>Sample Size</td>
<td>Study Design</td>
<td>Measure</td>
<td>Methodology</td>
<td>Findings</td>
<td>Strength of Evidence</td>
<td>Summary</td>
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<tr>
<td>Hintsanen et al.</td>
<td>1570 men and women from the Cardiovascular Risk Finns study</td>
<td>Cross-sectional and RQ-questionnaire</td>
<td>Not reported</td>
<td>Fearful attachment and youth BMI Beta = .07, p = .01; Fearful attachment and adulthood BMI Beta = .07, p = .007; Fearful attachment and WHR Beta = .082, p = .016; Preoccupied attachment and WHR Beta = .132, p = .002; No associations between other attachment styles and BMI were found.</td>
<td>Medium</td>
<td>Yes for preoccupied attachment in men and for fearful attachment, and no for other attachment styles</td>
<td></td>
</tr>
<tr>
<td>Goossens et al.</td>
<td>601 preadolescents</td>
<td>Cross-sectional and longitudinal and SC-questionnaire</td>
<td>Based on adjusted BMI score youngsters [(actual BMI/percentile 50 of BMI for age and gender) x 100)], 4% underweight (adjusted BMI ≤ 85), 83% normal weight (85 &lt; adjusted BMI &lt; 120), 11% overweight (120 ≤ adjusted BMI &lt; 140), 2% obese (adjusted BMI ≥ 140)</td>
<td>No relation between attachment towards mother and baseline BMI. Attachment insecurity towards mother, but not towards father, significantly predicted increase of BMI one year later β = -.07, p &lt; .01, adjusted for baseline BMI.</td>
<td>High</td>
<td>Yes, for attachment insecurity towards mother in predicting BMI, no for attachment towards mother for baseline BMI or towards father</td>
<td></td>
</tr>
<tr>
<td>Anderson et al.</td>
<td>8750 children</td>
<td>Longitudinal Observation of the mother-child interaction with the TASS-45 (modified version of AQS)</td>
<td>Prevalence obesity insecure 23.1%; Prevalence obesity secure 16.6%; Obesity status at 4.5 years was defined relative to the 2000 US growth reference</td>
<td>The odds for obesity at 4.5 years was 1.30 (95% CI, 1.05-1.62) times higher for insecure vs. secure attachment (with the observation of attachment at 24 months of age), adjusted for sociodemographic characteristics such as birth weight</td>
<td>High</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Study</td>
<td>Population</td>
<td>Design</td>
<td>Attachment measure</td>
<td>Obesity characterization</td>
<td>Outcome</td>
<td>Quality</td>
<td>Significant</td>
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</tbody>
</table>
| Anderson et al. 42 | 977 children | Longitudinal | Observation of the mother-child interaction with the AQS | 32.9 % "secure" of which 13.4 % obese  
42.7 % "in between group" (not secure not insecure) of which 17.5 % obese  
24.5 % "insecure" of which 18.8 % obese  
Adolescent obesity was defined as gender-specific BMI ≥95th percentile of the Centers for Disease Control and Prevention growth reference 72 | The odds for adolescent obesity (with the observation of attachment at 15 and 36 months of age) was 1.29 (95% CI, 0.85-1.94) times higher for the "in between group" vs. "secure" and 1.23 (95% CI, 0.75-1.93) times higher for "insecure" vs. "secure", after adjustment for gender and birth weight | High    | Yes         |
| Midei et al. 31 | 213 adolescents | Longitudinal | MAQ-questionnaire | Mean WHR=.79 (sd=.05)  
Mean BMI=22.7 (sd=4.0)  
Attachment anxiety vs. WHR (3 years after the observation of attachment), adjusted for BMI at baseline β=.115, p=.06 |                                                                                                   | High    | No          |

BMI=body mass index (kg/m²), WHR=Waist-to-hip ratio, ECR-R=experiences in close relationships-revised, AHQ=attachment history questionnaire, RQ=relationship questionnaire, IPPA-R=inventory of parent and peer attachment-revised version for children, MAQ=Measurement of attachment quality, SC=Security Scale, AAPR=Adult Attachment Prototype Rating, AQS=Attachment Q-sort, TASS-45=Toddler Attachment Sort-45
The relationship questionnaire (RQ)\textsuperscript{14} is a single item measure made up for four short paragraphs, each describing a prototypical attachment pattern as it applies in close adult peer relationships. The RQ is relatively brief, has been implemented in multiple studies and demonstrated independence from self-deceptive biases.\textsuperscript{34} A weakness, however, is that each attachment style is measured with only one item, and therefore no internal consistency reliability can be determined. The attachment history questionnaire (AHQ)\textsuperscript{35} provides self-report information about early attachment-related events and peer relationships. It has 51 items, with responses rated on seven point scales, which assess the frequency and intensity of behaviors by attachment figures. The AHQ shows respectable reliability and validity, but the nature of the AHQ is relatively untested. The adult attachment prototype rating (AAPR) is a measurement used during a semi-standardized one- to two hour attachment interview and determines a patients’ attachment style. The AAPR has demonstrated its reliability and validity in a variety of studies. The attachment Q-sort (AQS) is used by a data collector during approximately 2 hours of observation of the mother-child interaction. The data collector sorted 45 “cards” based on how well the behavior described on the card applied to the mother-child interaction. From the AQS, a continuous measure of attachment security was derived, which could range from -1 to 1, with higher values indicating a secure child. IJzendoorn et al. showed that the AQS is a reliable an valid measure.\textsuperscript{36} The Experiences in Close Relationships- Revised Scale (ECR-R) is a 36-item self-report measure of adult attachment, which requires participants to reflect on their typical ways of relating in close/romantic relationships. Reviews of self-report measures of adult attachment suggest that the ECR-R has the best psychometric properties of the available measures.\textsuperscript{37} The measurement of attachment quality (MAQ)\textsuperscript{38} is a 14-item, measure of attachment orientation. It has separate scales to assess secure attachment tendencies and avoidant tendencies, and two scales reflecting aspects of the anxious-ambivalent pattern. The inventory of parent and peer attachment-revised version for children (IPPA-R),\textsuperscript{39} is a 28-item child report questionnaire measuring the quality of attachment to parents (and peers) and how well they serve as a source of psychological security. The IPPA-R had good internal consistency and good convergent validity. However, it is possible that children answer these questions in a more socially desirable manner as the questions are more personalised. The security scale (SC)\textsuperscript{40} is a self-report questionnaire to measure attachment toward mother and father. The SC has been found to be internally consistent and stable. Support was found for the convergent and discriminant validity.\textsuperscript{41}

**Findings**

The prevalence of obesity in insecurely attached children (23.1%, 95% CI, 19.9%-26.3%) and securely attached children (16.6%, 95% CI, 15.3%-17.8%) was reported once.\textsuperscript{12}
Overall, the reviewed studies suggested a concurrent relationship between insecure attachment, particularly attachment anxiety, and a higher BMI.\textsuperscript{12, 32, 33, 42-46} All longitudinal studies controlled for baseline BMI or birth weight. The two longitudinal studies of Anderson et al.\textsuperscript{12, 42} that included the largest study populations found an association between attachment insecurity at 2 years of age and obesity two-and-a-half years later\textsuperscript{12} and in their adolescence.\textsuperscript{42} This was also confirmed in a longitudinal study with 601 preadolescent children, in which attachment insecurity was found to predict an increase of BMI one year later.\textsuperscript{33} No longitudinal studies were performed in adults.

Three studies reported mediational pathways between attachment and BMI.\textsuperscript{43, 44, 46} One study suggested that the relationship between attachment and BMI was partially mediated by mood (i.e., symptoms of anxiety and depression).\textsuperscript{44} Other studies indicated that eating self-efficacy\textsuperscript{43} and disinhibited eating\textsuperscript{46} were mediators of the relationship between attachment representations and BMI.

However, not all studies observed a relation between attachment and BMI. One study did not find a relation between attachment and waist-hip ratio (WHR).\textsuperscript{31}

\textbf{Quality of included studies}

A detailed description of individual study quality is provided in Appendix 1. Four studies of high quality and two studies of medium quality were identified. The other remaining studies were considered of low quality.

\textbf{Discussion}

This paper reviewed empirical studies highlighting the association between attachment representations and obesity. Both cross-sectional and longitudinal studies rather uniformly suggest that individuals with more insecure attachment representations, in particular individuals high on attachment anxiety, are at greater risk for obesity.

Although the three of the four reviewed longitudinal studies observed a temporal relationship between early observations of attachment and later observations of obesity,\textsuperscript{12, 33, 42} solid conclusions about causality cannot be inferred from observational longitudinal data. Moreover, in two studies birth weight –but not body weight at the time of assessment of attachment– was used as a control variable.\textsuperscript{12, 42} However, another study that controlled for earlier body weight
did also observe an association between attachment insecurity and an increase of body weight one year later. Thus, although it cannot be excluded that the presence of obesity impacts on attachment relationships or that both insecure attachment and obesity are influenced by a third variable, the longitudinal studies do suggest that early attachment insecurity shows who is at risk for later obesity.

Several complementary explanations for the association between attachment and obesity may hold. One explanation is based on physiological responses to stress. Studies suggest that attachment insecurity, and in particular attachment anxiety, lead to hyperactivity of the hypothalamic pituitary adrenal (HPA) axis and the release of glucocorticoids of which cortisol is the most well-known. Hyperactivity of the HPA-axis can cause accumulation of depot fat in visceral adipose tissues. This can alter glucose metabolism and promote insulin resistance which changes the number of appetite-related hormones (e.g. leptin, ghrelin) and feeding neuropeptides. As a result the secretion of Neuropeptide Y and ghrelin (hunger-stimulating hormone) may increase, while the release of leptin (satiety-stimulating hormone) may decrease. By modifying glucose metabolism and insulin sensitivity, eating and especially eating of high caloric food may reduce the symptoms of stress. Thus, in people with high attachment anxiety, the heightened physical responses to stressors may have stimulated eating leading to obesity.

As stress responses not only depend on stressors but also on the appraisal of stressors and one's capability of dealing with stressors, a supplementary explanation for the association between attachment representations and obesity can be found in the underdevelopment of emotion-regulation processes. Confronted with a stressor, securely attached individuals seek proximity to significant others. Previous studies suggest that satisfying interpersonal relationships may reduce the impact of stressors on individuals' health in interaction with other mediators by decreasing cortisol levels. Similarity high caloric foods may act to calm the stress-perceiving areas of the brain as was shown in animal studies. That is, food intake, just as during satisfying social interactions with significant others, leads to a release of oxytocin from the hypothalamus which has an anxiolytic effect. Therefore, to compensate for poor emotion regulation skills, food consumption may serve as a way of "self-medication" for more anxiously attached individuals by releasing oxytocin and down-regulating negative affect.

A number of limitations to this review should be recognised. First, we reviewed 10 individual studies, each of which with its own strengths, but also limitations such as small sample size or representatives of the study population. Using the Newcastle-Ottawa Scale as a guide, only six
of the ten studies were observed medium to high quality. Second a variety of measures were used for attachment and obesity. Obesity was measured by BMI and waist-hip-ratio and attachment was measured with nine different measures, which may have affected the results. However, the relationship between attachment and obesity was rather uniformly observed, independent of the attachment measure, which supports the strength of the association between attachment representations and obesity. The assessment of attachment representations involved observation of the child, the Adult Attachment Prototype Rating (AAPR) interview, and questionnaires measuring attachment in a categorical or dimensional way. While categorical measures provide clear textbook cases of the four prototypical attachment styles, dimensional measures describe a two dimensional space which may be depicted linearly on a spectrum with attachment anxiety at the one end and attachment avoidance at the other. Both types of measures have their advantages and disadvantages. Categorical measures often use responses to single items to make classifications (e.g.), which can lead to serious problems in conceptual analyses, statistical power, and measurement precision, whereas dimensional measures do not guarantee that measurement precision will be equally distributed across the domain of interest.

One important step in future research will be to perform high quality longitudinal studies and research on the predictive role of attachment on obesity. The prediction of adult attachment behavior and obesity from attachment patterns in early childhood is needed to verify the hypothesized etiological role of early attachment behavior. In these studies baseline assessments of body weight should be included. Also the prediction of adult obesity from attachment in adolescence is particularly useful, because adolescence is a significant period for the onset and increase of obesity, especially among girls. Future studies employing a prospective design could investigate the usefulness of interventions aimed at the guidance of more insecurely attached patients both during weight loss treatment programs and during treatment of comorbidities.

The early stage of theory and research in the field of obesity indicates the potential importance of considering attachment representations in obesity care. Implications can be twofold. On an individual level attachment theory may guide us in indicating individuals at risk of obesity in order to better customize prevention efforts to individual characteristics. At a wider level, attachment theory can usefully contribute to finding an overall framework for future research and the development of obesity care and services.
Significance of attachment for obesity

Reference List


### Appendix 1

Main items of quality assessment and their scoring using the Newcastle-Ottawa Scale (NOS).\(^3^0\)

**Selection** (Maximum 5 stars)

1. Representatives of sample (1 star for quality is given if the cohort consisted of patients truly or somewhat comparable to the general population).
2. Ascertainment of exposure (2 stars are given if data was derived from medical records, through observation or by structured interview, 1 star is given by the use of validated self-reported measurement tool and presenting cronbach’s alpha).
3. Sample size (1 star is given if justified and satisfactory).
4. Non-respondents (1 star is given if comparability between respondents and non-respondents characteristics is established, and the response rate is satisfactory).

**Comparability** (Maximum 2 stars)

5. Confounding (2 stars are given as body weight at the start of the study was presented and controlled for and if the study controls for the most important factors and 1 star is given if the study controls for the most important factor or when a study controls for any additional factor).

**Outcome** (Maximum 3 stars)

6. Statistical test (1 star is given if the statistical test used to analyze the data is clearly described and appropriate, and the measurement of the association is presented, including confidence intervals and the probability level).
7. Follow-up (1 star is given if study design is longitudinal).
8. Adequacy of follow up (1 star is given if study design is longitudinal) & Adequacy of follow up (1 star is given in case of complete follow-up, or subjects lost to follow up unlikely to introduce bias - small number lost - > 30 % or description provided of those lost).

A total of 8-10 stars was considered a high quality study; 5-7 stars a medium quality study; 4 stars or less, a low quality study.
Table 1. Individual quality assessment of observational studies

<table>
<thead>
<tr>
<th>First author</th>
<th>Representativeness</th>
<th>Ascertainment of exposure</th>
<th>Sample size</th>
<th>Non-respondents</th>
<th>Confounding</th>
<th>Statistical test</th>
<th>Follow-up</th>
<th>Adequacy of follow-up</th>
<th>Score</th>
<th>Study quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cooper et al. 44</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>3</td>
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</tr>
<tr>
<td>Wilkinson et al. 46</td>
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<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>Low</td>
</tr>
<tr>
<td>D’Argenio et al. 45</td>
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<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>5</td>
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<td>Kiesewetter et al. 63, 69</td>
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<td>0</td>
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<td>1</td>
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<tr>
<td>Bahrami et al. 70</td>
<td>0</td>
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<td>1</td>
<td>1</td>
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<td>Goossens et al. 33</td>
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<tr>
<td>Anderson et al. 12</td>
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<td>1</td>
<td>1</td>
<td>1</td>
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<tr>
<td>Anderson et al. 42</td>
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<td>2</td>
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<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>10</td>
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</tr>
<tr>
<td>Midei et al. 31</td>
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<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>8</td>
<td>High</td>
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