

■ Table 39.1 ■

## Measures Assessing Behavioral Physical Activity

Variable	Measure	Pros	Cons	Sources	Websites
Intensity	Indirect calorimetry	<ul style="list-style-type: none"> <li>Validates other measures</li> <li>Provides accurate measure of short-term energy expenditure</li> <li>Avoids biases and inaccuracy</li> <li>Provides quantitative data</li> </ul>	<ul style="list-style-type: none"> <li>Confined to unnatural laboratory setting</li> <li>Highly invasive</li> <li>Requires a lot of equipment</li> </ul>	Carron, Hausenblas, & Estabrooks (2003); Smith & Biddle (2008)	None
Intensity	Doubly labeled water	<ul style="list-style-type: none"> <li>Little interference with everyday life—noninvasive</li> <li>No time constraints</li> <li>Avoids biases and inaccuracy</li> <li>Provides quantitative data</li> <li>High validity for all ages</li> <li>Valuable for small, controlled studies</li> </ul>	<ul style="list-style-type: none"> <li>High cost of equipment and required analysis</li> <li>Not a specific measure of physical activity because it measures all forms of energy expenditure</li> <li>Does not provide data on type, frequency, intensity, or duration of activity</li> </ul>	Carron, Hausenblas, & Estabrooks (2003); Kang (2008)	None
Frequency, intensity, and mode	Direct observation	<ul style="list-style-type: none"> <li>Valid and reliable for controlled studies</li> <li>Captures whole-body movement</li> <li>Convenient for large groups</li> <li>Provides quantitative and qualitative information</li> <li>Provides valuable and detailed information</li> <li>Little interference with activity</li> </ul>	<ul style="list-style-type: none"> <li>Observation done by a trained individual</li> <li>May produce biased results (on trainer's or participant's behalf)</li> <li>Time intensive</li> <li>Provides measurement for time frame observed</li> <li>Accuracy decreases over time</li> </ul>	Carron, Hausenblas, & Estabrooks (2003); Sharpe & Koperwas (2003); Smith & Biddle (2008); Welk (2002)	<a href="http://www.noldus.com/human-behavior-research">www.noldus.com/human-behavior-research</a> <a href="http://www.skware.com/softwaredata/BestCD.pdf">www.skware.com/softwaredata/BestCD.pdf</a> <a href="http://www.drjamesallis.sdsu.edu/Documents/sofitprotocol.pdf">www.drjamesallis.sdsu.edu/Documents/sofitprotocol.pdf</a> <a href="http://www.drjamesallis.sdsu.edu/Documents/SOPLAYprotocol.pdf">www.drjamesallis.sdsu.edu/Documents/SOPLAYprotocol.pdf</a>
Frequency and intensity	Pedometer	<ul style="list-style-type: none"> <li>Inexpensive and easy to use</li> <li>Used in a variety of settings</li> <li>Captures low intensity</li> <li>Provides incentive and motivation</li> <li>No additional equipment required to record or interpret results</li> <li>Reliable and valid instrument</li> <li>Provides quantitative data</li> </ul>	<ul style="list-style-type: none"> <li>May not account for time</li> <li>Accuracy can be affected by alteration in gait or placement of device</li> <li>Cannot measure upper-body activity</li> <li>Intensity cannot be measured</li> </ul>	Carron, Hausenblas, & Estabrooks (2003); Jago et al. (2006); Reiser & Schlenk (2009); Schmidt et al. (2007); Smith & Biddle (2008); Tudor-Locke (2002); Welk (2002)	<a href="http://www.thepedometercompany.com">www.thepedometercompany.com</a> <a href="http://www.accusplit.com">www.accusplit.com</a> <a href="http://www.sportline.com">www.sportline.com</a>

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Variable	Measure	Pros	Cons	Sources	Websites
Duration, frequency, and intensity	Accelerometer	<ul style="list-style-type: none"> <li>Records movement in several planes simultaneously</li> <li>Objective measure</li> <li>Measures complex activities</li> <li>Avoids biases and inaccuracy</li> <li>Provides quantitative data</li> </ul>	<ul style="list-style-type: none"> <li>Expensive</li> <li>High sensitivity may record background vibrations</li> <li>Unit of measurement is not standardized</li> <li>No direct translation to energy expenditure</li> </ul>	Carron, Hausenblas, & Estabrooks (2003); Reiser & Schlenk (2009); Smith & Biddle (2008); Welk (2002)	<a href="http://www.theactigraph.com">www.theactigraph.com</a> <a href="http://www.biotrainerusa.com">www.biotrainerusa.com</a> <a href="http://www.bio-lynx.com/actical.html">www.bio-lynx.com/actical.html</a>
Adherence, duration, frequency, and intensity	Heart rate monitor	<ul style="list-style-type: none"> <li>Accurately measures physical exertion</li> <li>Valid in laboratory and field settings</li> <li>Indicator of true physiological stress on the body</li> <li>Monitors target HR during exercise</li> <li>Avoids biases and inaccuracy</li> <li>Provide quantitative data</li> <li>Easy and quick data collection and analysis</li> </ul>	<ul style="list-style-type: none"> <li>Limited accuracy during low levels of activity</li> <li>Results can be affected by medications, pathology, or stress levels</li> <li>Provides only indirect information about energy expenditure</li> <li>Highly individualized</li> <li>Strap can be inconvenient and uncomfortable</li> <li>Other electronic devices can interfere with data</li> </ul>	Carron, Hausenblas, & Estabrooks (2003); Reiser & Schlenk (2009); Smith & Biddle (2008); Welk (2002)	<a href="http://www.polarusa.com">www.polarusa.com</a> <a href="http://www.consumersearch.com/heart-rate-monitors">www.consumersearch.com/heart-rate-monitors</a> <a href="http://www.sportline.com">www.sportline.com</a>
Adherence, duration, frequency, intensity, and mode	Diary or log	<ul style="list-style-type: none"> <li>Increases accountability and awareness</li> <li>Inexpensive</li> <li>Able to reference long term</li> <li>Does not require an observer</li> <li>Can be completed by large group simultaneously</li> <li>Captures quantitative and qualitative information</li> </ul>	<ul style="list-style-type: none"> <li>Subjective</li> <li>Memory limitations</li> <li>Reliability and validity can be affected with recall</li> <li>Time consuming</li> <li>May not be consistently updated</li> </ul>	Carron, Hausenblas, & Estabrooks (2003); Reiser & Schlenk (2009); Smith & Biddle (2008); Welk (2002)	<a href="http://www.cdc.gov/healthysurvey/pdf/Physical_Activity_Diary_CDC.pdf">www.cdc.gov/healthysurvey/pdf/Physical_Activity_Diary_CDC.pdf</a> <a href="http://www.shapeup.org/support/maintain/logform1.php">www.shapeup.org/support/maintain/logform1.php</a>
Adherence, duration, frequency, intensity, and mode	Interview or questionnaire	<ul style="list-style-type: none"> <li>Easy administration</li> <li>Inexpensive and immediate</li> <li>Ability to assess large sample</li> <li>Captures quantitative and qualitative information</li> <li>Facilitates understanding of concepts and questions</li> </ul>	<ul style="list-style-type: none"> <li>Subjective</li> <li>Memory limitations</li> <li>Terms used can be misunderstood</li> <li>Reliability and validity can be affected with recall</li> </ul>	Carron, Hausenblas, & Estabrooks (2003); Di Pietro et al. (1993); Smith & Biddle (2008); Stewart, Sepsis, King, McLellan, & Ritter (1997); Welk (2002)	<a href="http://www.ipaq.ki.se/ipaq.htm">www.ipaq.ki.se/ipaq.htm</a>