

**Psychosocial
Impact of
Assistive Devices
Scale (PIADS®)**

PIADS



PIADS

The Psychosocial Impact of Assistive Devices Scale

*A Tool for Evaluating the Psychological Benefits of
Rehabilitation Technologies*

MANUAL

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General Description of the PIADS

The PIADS is a 26-item, self-report questionnaire designed to assess the effects of an assistive device on functional independence, well-being, and quality of life. **(See the Appendix for a sample of the PIADS Questionnaire.)** The three subscales of the PIADS are based on a factor analysis of the responses combined from several studies¹. The first one, Competence, measures feelings of competence and efficacy. It is sensitive to the perceived impacts of assistive technology on performance and productivity. The Competence subscale (12 items) includes questions on topics such as competence, productivity, usefulness, performance, and independence. The second subscale, Adaptability (6 items), indicates a willingness to try out new things and to take risks. It is sensitive to the enabling and liberating aspects of assistive technology that might be expected if ATs enhanced “participation” as described in the WHO (ICF) framework². The Adaptability subscale includes questions on topics such as ability to participate, willingness to take chances, eagerness to try new things, and the ability to take advantage of opportunities. The third subscale, Self-esteem (8 items), indicates feelings of emotional health and happiness. It is sensitive to the perceived impact of assistive technology on self-confidence and emotional well-being. The Self-esteem subscale includes questions on topics such as self-esteem, security, sense of power and control, and self-confidence. Scores can range from –3 (maximum negative impact) through zero (no perceived impact) to +3 (maximum positive impact).

Under normal circumstances, the PIADS can be completed in 5-10 minutes. The PIADS comes with a manual that presents the conceptual basis and intended applications for the instrument, summarizes its measurement properties and validation research to date, and describes administration and scoring procedures in detail with examples. A glossary is also included to aid users in the interpretation of PIADS items where needed. The PIADS may also be used to assess a respondent’s expectations of device impact (i.e., anticipated impact, prior to using the device). In this instance, there is a modified set of instructions that can be given. The PIADS can be completed reliably by telephone, although it is highly recommended that the initial assessment be done in person.

Applicability

The PIADS can be used to assess the impact of any assistive device (AD), prosthesis or medical procedure. It can be used to evaluate the impact of ADs over time and to match the devices with consumers. With its excellent psychometric properties, the PIADS fills a missing link in the assessment of Ads as well as in the examination of their acceptance and abandonment.

Need and Rationale for the PIADS

Assistive technology (AT) is designed to provide important functional benefits and improve the quality of life for people who use it. However, research has shown that people will sometimes reject or abandon what seem to be well-designed and functional devices³⁻⁶. The possible consequences of non-use of prescribed technologies can be very serious. They include the loss of functional abilities of the user, increases in attendant and other care costs, and ineffective use of funds from provider organizations. Assistive technology might be threatening to some people and produce feelings of helplessness, frustration, and loss of control⁷. For these reasons, designers and providers need to better understand the psychosocial factors that might determine device adoption, retention and abandonment (or discontinuance). Moreover, the field of AT needs measures that can be comfortably included in a comprehensive outcome assessment of AT⁸.

By 'psychosocial' we refer to both factors within the person and factors attributable to the environment that affect the psychological adjustment of individuals who have a disability. We are concerned with the challenges faced by these individuals in relation to the social environment⁹. This includes measuring how they perceive their assistive devices to act as environmental facilitators, whose goal is to enhance unrestricted or facilitated participation in major areas of human life¹⁰. Intrapersonal factors are the core dimensions of psychological well-being, which include independence, personal control, self-efficacy, and self-acceptance¹¹. In our experience, they are essential components of how AT users define the impact of their devices on their quality of life¹².

Investigating the psychosocial impact of an AT on its user may shed some light into the reasons for its use and abandonment. It may also make it possible to address the problematic areas of an AT, leading to the design of improved devices and related services. However, the psychosocial constructs that may be crucial to the satisfaction of the user have not yet been operationalized or assessed. Assistive device designers and service providers need to better understand the psychosocial factors that might determine device adoption and retention and discontinuance outcomes.

Why not use a so-called health-related quality of life (QOL) measure? A number of published generic and disease-specific "quality of life" measurement scales might be considered for use in assessing AT impact. They have two primary limitations. First, they are too medically oriented. Most assistive devices are not intended to promote health and healing, but rather to improve or restore functional capabilities. Second, they are designed to assess health status or change in health status, and not the

impact attributable to any particular form of intervention . They are¹³ either not sensitive enough to detect functional and psychosocial changes specific to an AT intervention, or cannot be used with some clients because their functional limitations, although accommodated through AT, are too severe to permit reliable assessment using the instrument. In any event, AT is meant to achieve different QOL outcomes than surgery, physical therapy, and pharmaceutical treatments.

The Psychosocial Impact of Assistive Devices Scale (PIADS) was researched and developed to fill¹ the need for a reliable, valid, and economical measure that is generically applicable across all major categories of assistive technology.

Development of the PIADS

PIADS items were created from 3 principal sources: (1) empirical explorations with the Pleasure-Arousal-Dominance scale; (2) qualitative research (focus groups) wherein AT users were asked to describe how they expected devices to impact their quality of life; (3) the literature on personality research which suggested that the PIADS include items that are associated with constructs such as perceived self-efficacy and personal control . The¹ priority was to create a scale that would reliably measure perceived device impact and discriminate among device categories and user conditions in a clinically sensible way . The authors were less concerned originally about developing a measure that¹⁴ was consistent with any single theoretical perspective.

Nonetheless, the PIADS embodies assumptions about QOL that are consistent with emerging, influential frameworks in disability and rehabilitation research . Principally, QOL is a complex and multidimensional¹² construct. It is dynamic, changing over time and over a person's life . It arises from a person's interaction with¹⁵ their environment. It is experienced differently from person to person, but has the same components for everyone. The most important perspective on how an AT affects quality of life is the perspective of the device user. We defined quality of life impact following Renwick, Brown & Raphael¹⁶ as the effect of the device on, "the degree to which a person enjoys the important possibilities of his/her life" (p.35). An assistive device should promote good quality of life for the user to the extent to which it makes the user feel competent, confident, and inclined (or motivated) to exploit life's possibilities. These three key dimensions have been determined empirically to underlie how users perceive the psychosocial impact of an AT.

Psychometric Properties of the PIADS

The psychometric qualities of the PIADS have been described in a number of publications as being good to excellent. The results are summarized in Table 1.

Table 1. Psychometric properties of the PIADS

Reference	Internal consistency	Test-retest reliability	Stability	Reliability of caregiver proxy	Sensitivity to user condition and device features	Responsiveness to device intervention	Validity
6, 14	✓	✓	✓				✓
12, 23			✓		✓	✓	✓
17	✓	✓	✓				
24			✓	✓			
20, 25				✓			
18					✓		✓
19			✓				✓
21	✓	✓	✓				✓
			✓			✓	✓

Day and Jutai¹ described the basic psychometric properties of the PIADS, based on a sample of eyewear device users (n=307). Internal consistency was assessed using Cronbach's alpha. Values were .95 for the PIADS total score and .92, .88, and .87 for the Competence, Adaptability, and Self-esteem subscales, respectively. Sixty respondents completed the PIADS twice, about a month apart. None of the *t* tests comparing the two assessments reached significant differences (p values ranging from .77 to .85), indicating the stability of the scale. Construct validity was examined using a Principal Component Analysis of the data from 307 subjects. The results yielded three distinct subscales, accounting for 61.1% of the total variance. This 3-dimensional structure was confirmed in replication studies involving 150 eyewear device users and 92 wheelchair users¹². Construct validity was further demonstrated in an examination of the association of the PIADS with a measure believed to tap environmental impact on emotional responses: the Pleasure, Dominance and Arousal (PAD) scale^{1,14}. The Pearson correlation coefficients (*r_p*) were significant at the 0.05 level between the PIADS subscales and the Pleasure (*r_p* .46 to .59) and Dominance subscales (*r_p* .21 to .34) but not with the Arousal subscale (*r_p* .06 to .17). The results were interpreted as supporting the discriminate validity of the PIADS.

Validity was further supported by a study of the scale's ability to distinguish the responses from eyeglass wearers and contact lens wearers, in which group patterns of response were consistent with predictions from the literature¹. Demers and colleagues¹⁹ found that both the three subscales and total

scale of the French translation of the PIADS had good test-retest reliability (ICC of .77 to .90) and internal consistency (.75 to .94). Concurrent validity with the source (original, English) PIADS also produced acceptable coefficients (.77 to .83). Comparisons between PIADS scores and qualitative data obtained through interviews with device users indicate a high degree of reflection of user concerns and issues in the PIADS . User²⁰ expectations of psychosocial impact from device use accurately predict their experiences following device adoption .²¹

The studies summarized in Table 1 have demonstrated that the PIADS is a reliable, valid, and responsive measure, with good clinical utility. The PIADS is a sensitive measure of the impact of a wide range of ATs, in populations of adults who have various forms of disability and medical condition. Highlights from the research findings to date include:

- The psychosocial impact of assistive devices can be reliably assessed in a standardized way across diverse populations of device users .¹²
- The PIADS is capable of predicting device retention and abandonment .²²
- Patterns of psychosocial impact vary across populations of device users .¹²
- Devices associated with stigma produce predictable patterns of psychosocial response .^{12,23,24,25}
- The psychosocial impact of assistive devices is dissociable from the effects of illness and disabling condition .^{12,23,14}
- The overall agreement between user self-report and caregiver report of device impact on the user is surprisingly good .²⁴
- The PIADS is sensitive to clinically and functionally important variables associated with the user's condition and device capabilities .^{12,20,14,21}

Other projects are currently underway to: (1) develop versions of the PIADS suitable for young children and for adults who have cognitive difficulties; (2) examine the validity of translations of the PIADS into languages other than English; (3) investigate psychosocial factors in the long-term device use and discontinuance for various populations of device users. At present, the only translated version of the PIADS is Canadian French .¹⁹

The ability of the PIADS to predict abandonment and retention has prompted examination of how the PIADS can best be used to advance the knowledge base in this area . Theories thus far considered include personal control and self-efficacy .¹⁴ They are possibly the most promising psychological conceptualizations for developing a user-focused, environmentally sensitive understanding of AT adoption and retention .²⁶ When AT is successful in helping people maintain or regain control, important²⁷

results are increased self-efficacy and decreased negative emotional reactions to disability. These effects in turn are hypothesized to enhance subjective well-being. They are forms of psychosocial impact that are measured in the PIADS.

The PIADS is a reliable and valid tool that appears to have significant power to predict important AT outcomes. It can and should be used both deductively and inductively to build and test theory about the psychosocial impact of assistive technology. Further investigation is needed into the relationships among the PIADS and other validated outcome measures. Researchers are encouraged to keep the PIADS, authors informed about their findings.

Administration of the PIADS

The PIADS is a self-report measure that can be easily administered individually, in a group, or via telephone. The procedure is the same whether the PIADS is administered individually or in a group, although it is important to preserve the confidentiality of the individuals during group administration. Each respondent must be provided with a pen or pencil and a flat surface to write on. Every effort must be made to ensure that the respondent is comfortable during the administration of the scale. The PIADS has been used with both children aged 10 and up and adults. Instructions for administering the PIADS by phone are included in the Appendix.

Respondents are told why they are completing the scale and asked to select the box that best represents how they are affected by wearing or using their device. They must be asked to respond as honestly as they can and to respond in light of how they are affected by the device as opposed to how they would like to be affected by the device. It is important that the respondents thoroughly understand the instructions. It is preferable that the test administrator be present during the administration to answer questions. ***(See the Appendix for instructions on how to administer the PIADS from respondent and caregiver perspectives.) The PIADS may also be used to assess a respondent's expectations of device impact (i.e., anticipated impact, prior to using the device). In this instance, there is a modified set of instructions that can be given.***

Scoring the Results

The PIADS Scale can be scored manually or with the aid of a computer, using an EXCEL spreadsheet. Scoring sheets are available to aid in the manual scoring process. To see an example of a completed scoring sheet, refer to Table 2 in the Appendix. A blank scoring sheet is also included in the Appendix

(Table 1) and distributed with the PIADS questionnaire. An electronic version of the scoring sheet can be obtained by contacting the authors.

Three PIADS subscale scores are calculated as follows:

The *Competence* subscale is derived by adding the values corresponding to items 1, 3, 4, 6, 8, 11, 13, 14, 16, 17, and 18, subtracting the value corresponding to item 5 and dividing the total by 12.

The *Adaptability* subscale is derived by adding the values corresponding to items 15, 22, 23, 24, 25, and 26 and dividing the total by 6.

The *Self-esteem* subscale is derived by adding the values corresponding to items 2, 7, 9, 12, 19, and 20, subtracting the values corresponding to items 10 and 21 and dividing the total by 8.

Frequently Asked Questions

1. How can I obtain information about the PIADS?

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Please include your full postal address with your correspondence. We will send you our **PIADS Information Package**, which contains the scale, manual, reprints and other information.

2. How do I obtain permission to use the PIADS and how much does it cost?

The PIADS is available free of charge for use in clinical, research or educational projects. The PIADS package includes a form for you to complete, sign and return to us, along with a brief questionnaire asking about your proposed research and how you might be using the PIADS. This process will allow you to make photocopies of the PIADS form found in the PIADS manual (see Table 3 of the Appendix).

3. What qualifications are required to administer the PIADS?

No specific training is required to administer the PIADS. The form comes with a manual that presents the conceptual basis and intended applications for the instrument. The manual summarizes measurement properties and validation research to date, and describes administration and scoring procedures in detail. A glossary is also included to aid users in the interpretation of PIADS items where needed.

4. How much time does it take to administer the PIADS?

Under normal circumstances, the PIADS can be completed in 5-10 minutes.

5. How difficult is it to administer the PIADS?

The PIADS is a self-report measure that can be easily administered individually, in a group, or via telephone.

6. How difficult is it to score the PIADS?

Scoring the PIADS is not difficult. It can be scored manually or with the aid of a spreadsheet. Scoring sheets are available to aid in the manual scoring process. To see an example of a completed scoring sheet, refer to Table 2 in the Appendix. A blank scoring sheet is also included in the Appendix (Table 1) and distributed with the PIADS questionnaire. An electronic version of the scoring sheet can be obtained by contacting the authors. Directions for calculating the three PIADS sub-scales are found on page 2.

7. In what situations is the PIADS applicable?

The PIADS is designed to be generically applicable to any form of assistive device. It has been shown to be very sensitive to differences among device options (e.g., tilt, recline) within a device category (e.g., powered wheelchairs). Data on various combinations of user population and device category are described in the research literature. Normative data is not required to examine whether or not an assistive device has produced a positive psychosocial impact.

For More Information or Help

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PIADS Scale

Client Name: _____ male female
 (last name, then first name)

Diagnosis: _____ Date of Birth: _____
 month/day/year

3. other (describe): _____ The form is being filled out at (choose one) 1. home 2. a clinic

The form is being filled out by (choose one) 1. the client, without any help 2. the client, with help from the caregiver (e.g., client showed or told caregiver what answers to give) 3. the caregiver on behalf of the client, without any direction from the client 4. other (describe): _____

Each word or phrase below describes how using an assistive device may affect a user. Some might seem unusual but it is important that you answer every one of the 26 items. So, for each word or phrase, put an "X" in the appropriate box to show how you are affected by using the _____ (device name).

Decreases-3-2-10123Increases

- 1) competence
- 2) happiness
- 3) independence
- 4) adequacy
- 5) confusion
- 6) efficiency
- 7) self-esteem
- 8) productivity
- 9) security
- 10) frustration
- 11) usefulness
- 12) self-confidence
- 13) expertise
- 14) skillfulness
- 15) well-being
- 16) capability
- 17) quality of life
- 18) performance
- 19) sense of power
- 20) sense of control
- 21) embarrassment
- 22) willingness to take chances
- 23) ability to participate
- 24) eagerness to try new things
- 25) ability to adapt to the activities of daily living
- 26) ability to take advantage of opportunities

Glossary of PIADS Items

Ability to Adapt to the Activities of Daily Living (item 25) Ability to cope with change; ability to make basic tasks more manageable

Ability to Participate (item 23) Ability to join in activities with other people

Ability to take advantage of opportunities (item 26) Ability to act quickly and confidently when there is a chance to improve something in your life

Adequacy (item 4) Capable of handling life situations, and handling little

crises **Capability** (item 16) Feeling more capable; able to cope

Competence (item 1) Ability to do well the important things you need to do in life

Confusion (item 5) Unable to think clearly, act decisively

Eagerness to Try New Things (item 24) Feeling adventuresome and open to new experiences

Efficiency (item 6) Effective management of day to day tasks

Embarrassment (item 21) Feeling awkward or ashamed

Expertise (item 13) Knowledge in a particular area or occupation

Frustration (item 10) Being upset about lack of progress in achieving your desires; feeling

disappointed **Happiness** (item 2) Gladness, pleasure; satisfaction with life

Independence (item 3) Not dependent on, or not always needing help from, someone or something

Performance (item 18) Able to demonstrate your skills

Productivity (item 8) Able to get more things done in a day

Quality of Life (item 17) How good your life is

Security (item 9) Feeling safe rather than feeling vulnerable or insecure **Self-**

Confidence (item 12) Self-reliance; trust in yourself and your abilities **Self-**

Esteem (item 7) How you feel about yourself, and like yourself as a person

Sense of Control (item 20) Sense of being able to do what you want in your environment

Sense of Power (item 19) Sense of inner strength; feeling that you have significant influence over your life

Skillfulness (item 14) Able to show your expertise; perform tasks well

Usefulness (item 11) Helpful to yourself and others; can get things done

Well-being (item 15) Feeling well; optimistic about your life and future

Willingness to Take Chances (item 22) Willing to take some risks; willing to take on new challenges

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Appendix

PIADS SCORING SHEET			
Client ID#:		Device:	
Item	Competence	Adaptability	Self-Esteem
Competence 1	+		
Happiness 2	2		+
Independence 3	+		
Adequacy 4	+		
Confusion 5	-		
Efficiency 6	+		
Self-esteem 7			+
Productivity 8	+		
Security 9			+
Frustration 10			-
Usefulness 11	+		
Self-confidence 12			+
Expertise 13	+		
Skillfulness 14	+		
Well-being 15		+	
Capability 16	+		
Quality of life 17	+		
Performance 18	+		
Sense of power 19			+
Sense of control 20			+
Embarrassment 21			-
Willingness to take chances 22		+	
Ability to participate 23		+	
Eagerness to try new things 24		+	
Ability to adapt to the activities of daily living 25		+	
Ability to take advantage of opportunities 26		+	
Sum of subscale column (A)			
Number of items in (B)	12	6	8
SUBSCALE SCORE (A) ÷ (B)			

Example of Completed Sample of PIADS Scoring Sheet

PIADS SCORING SHEET			
Client ID#:	95876	Device:	Walker
Item	Competence	Adaptability	Self-Esteem
1. Competence	1. 2		
2. Happiness			2. 2
3. Independence	3. 3		
4. Adequacy	4. 2		
5. Confusion*	5.* (-1) = 1		
6. Efficiency	6. 2		
7. Self-esteem			7. 3
8. Productivity	8. 3		
9. Security			9. 2
10. Frustration*			10.* (-2) = 2
11. Usefulness	11. 2		
12. Self-confidence			12. 3
13. Expertise	13. 2		
14. Skillfulness	14. 2		
15. Well-being		15. 3	
16. Capability	16. 3		
17. Quality of life	17. 3		
18. Performance	18. 3		
19. Sense of power			19. 1
20. Sense of control			20. 2
21. Embarrassment*			21.* (-3) = 3
22. Willingness to take chances		22. -2	
23. Ability to participate		23. 2	
24. Eagerness to try new things		24. 2	
25. Ability to adapt to the activities of daily living		25. 2	
26. Ability to take advantage of opportunities		26. 3	
(A) Sum of subscale column	28	10	18
(B) Number of items in subscale	12	6	8
SUBSCALE SCORE (A) + (B)	2.33	1.67	2.25

* Note: A high **positive** score on any of these three items (5, 10 and 21) would indicate a **negative** impact on quality of life. (For all other items, a high positive score indicates a positive impact on the quality of life.) To capture the meaning of the scores for items 5, 10 and 21, the sign of the respondent's score must be reversed. For example, a respondent who chose a value of (-2) for item 5 would be indicating that the device had diminished their level of frustration. This diminished level of frustration would have a positive impact on quality of life. To reflect that positive impact the (-2) would be changed to a (+2) on this scoring sheet.

Instructions on Completing the PIADS: Client Version

When instructing a client on how to complete the PIADS, stick as closely as possible to the script given below. Do not define the words and phrases that make up the PIADS items unless the client asks for help.

If the client is not sure how the item applies, tell him/her that if he/she cannot decide whether the assistive device has had a positive or negative effect with regard to that word or phrase, then he/she should put a mark in the "0" box, to indicate no effect.

Be sure the client understands that every item on the PIADS must be answered. There is no "Not Applicable" option. Also, check to see that the client is not responding randomly or giving the same response to each item without sufficient consideration.

If the client asks for a definition for a PIADS item, give the explanation for the item that is in the PIADS glossary. Remind the client that there are no right or wrong answers on the PIADS, and that every item must be answered. The PIADS is all about how he/she feels about each item, and how he/she interprets it in terms of his/her own life and experiences. If after you have gone through this explanation the client is still puzzled by an item, encourage him/her to take a guess, and move on to the next item. (Note that the PIADS need not be completed in order of the number beside each item. If the client wants to, he/she can skip an item and come back to it later, so long as all items are answered.)

1. The PIADS Impact Scale is a questionnaire that asks you to describe how an assistive device (*give an example appropriate to the client, e.g., wheelchair*) affects your life and makes you feel.
2. For each word or phrase, put a mark in the box that best describes your feelings. Mark only one box for each word or phrase, and do not put a mark between boxes.
3. Let's look at a couple of examples of how the questionnaire works when you are describing your feelings about one of the words or phrases. Let's look at how you might rate your reactions to the word, "competence".
4. If the device has helped you to feel *very much more competent* than you feel without it (or before you started using it), put a mark in the "3" box.
5. If the device has helped you to feel *somewhat more competent*, but not as competent as you thought you might feel, you might put a mark in either the "1" box or the "2" box.
6. If the device has *not made you feel any more or less competent*, put a mark in the "0" box.
7. If the device has made you feel *quite incompetent (or a lot less competent than you used to feel)*, then put a mark in the "-3" box.
8. If the device has made you feel *somewhat incompetent (or less competent than you used to feel)*, then you might put a mark in either the "-2" box or the "-1" box.

Additional Notes for Using the PIADS with Clients who have Degenerative Disorders or Traumatic Injuries

If the client appears to be stuck or non-committal, you should try to give encouragement as a means of moving the interview along. This might entail suggesting examples suited to the client's device and personal experiences. For example, for the item, Efficiency, you might ask the client to consider whether writing letters is important to him/her, and if so, has a writing aid helped him/her to write letters more efficiently than when he/she did not have the device.

Be prepared for resistance from a client or caregiver. Resistance and agitation may arise from their emotional response to the client's diagnosis or prognosis.