

RESEARCH PAPER

“If I can do it I will do it, if I can’t, I can’t”: a study of adaptive self-regulatory strategies following lower limb amputation

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Abstract

Purpose: To explore the goal-related strategies employed by people following lower limb amputation using a framework based on the dual-process model of adaptive self-regulation. **Methods:** Semi-structured interviews were conducted with 30 individuals with a lower limb amputation. **Results:** Theoretical thematic analysis identified four broad assimilative/goal pursuit strategies; internal resource use, planning, technology use and help use. The most common strategies were maintaining a specific leisure activity ($n=20$), seeking instrumental help ($n=15$) and determination ($n=15$). Three broad categories of accommodative/goal adjustment strategies were also identified; interpersonal accommodation, managing limitations and meaning-making. The most common were accepting limitations ($n=18$), emotional support from friends and family ($n=17$) and adjusting goals to constraints ($n=16$). There was also evidence of strategies that combined the use of accommodative and assimilative strategies, and the use of avoidant strategies. **Conclusions:** The findings point towards key assimilative/goal pursuit and accommodative/goal adjustment strategies that may be adaptive following lower limb amputation. The study highlights the potential usefulness of the dual-process model in understanding how individuals adapt to functional disability, while bringing to light issues warranting further explication within this framework.

Keywords

Adaptation, amputation, goals, lower limb, self-regulation

History

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► Implications for Rehabilitation

- People adopt specific adaptive goal pursuit and goal adjustment strategies in response to goal disruptions following limb loss.
- Being aware of the processes involved in regulating goals in response to challenges is useful for understanding adjustment to limb loss.
- Greater understanding of adaptive and maladaptive goal strategies may help the rehabilitation team to foster positive outcomes in people with lower limb amputation.

Introduction

The loss of a limb confronts individuals with challenges to their physical, psychological and social functioning [1]. These can include impairments in mobility [2], changes in personal relationships [3] and occupational status [4], limitations in carrying out daily living and leisure activities [5,6] and restrictions in participating in the community and wider society [7]. A rehabilitation approach that is responsive to the varied and complex needs of people with amputations is required to effectively promote adjustment [8].

Great diversity has been observed in how successfully people adjust to the loss of a limb [9,10]. Research efforts have implicated a number of factors to account for these differences in psychosocial responses to limb loss. Associations with

demographic and clinical characteristics have tended to be weak or inconsistent [1] and psychological traits such as hope [10] and optimism [9], although correlated with indices of adjustment in this population, are not typically amenable to change and are thus unlikely to represent effective rehabilitation targets.

Current conceptualizations of adjustment to acquired disability emphasize the importance of phenomenological and appraisal processes, which are thought to mediate the relationship between enduring characteristics and psychosocial outcomes [11]. These include active social-cognitive behaviors to deal with disruptions to the pursuit of personal goals, as well as cognitive activities that either promote (i.e. constructions of personal meaning and purpose, positive side-benefits and growth, value shifts) or impede (i.e. rumination, catastrophizing, blame of self or others) adjustment [11,12]. A greater understanding of these cognitive-behavioral mechanisms could help rehabilitation professionals to tailor services more effectively to the diverse needs of patients, thus promoting optimal restoration of health and well-being [13].

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A self-regulation perspective provides a useful framework for examining the mechanisms underlying adjustment to disability [8,12]. According to this approach, most human behavior is goal-directed, with progress or failure in goal attainment having affective consequences [14–16]. Disruptions in goal attainment may leave individuals vulnerable to negative psychosocial outcomes if they do not regulate their goals in response to these challenges. A number of theories and models have been developed to describe such adaptive self-regulatory processes [17–20], all of which demonstrate a common theme that people have the capacity to shape their development within the context of their own strengths and limitations through a balance of continued striving towards attainable goals and the adjustment of goals that are no longer feasible. The dual-process model of adaptive self-regulation [20–22] delineates two modes of adaptive self-regulation that individuals adopt to manage discrepancies between perceived and desired goal attainment. The assimilative (or goal pursuit) mode comprises efforts to modify one's life situation or behavior to fit one's goals and preferences (e.g. acquisition of relevant knowledge and skills, use of compensatory means, implementation of lifestyle changes), and is adaptive as long as goal attainment remains feasible. When goals exceed available resources or irreversible losses are encountered, a shift from assimilative to accommodative processes is thought to occur. The accommodative (or goal adjustment) mode involves processes by which a person adjusts his or her goals and preferences to situational constraints (e.g. disengagement from blocked goals, reappraisal of emerging losses or limitations, downward social comparison), and helps to alleviate feelings of helplessness and preserve a sense of efficacy.

These assimilative (goal pursuit) and accommodative (goal adjustment) modes have been found to play an important role in adjustment to disability [8,23–25]. For instance, in recent studies focusing on individuals with lower limb amputations, stronger tendencies towards goal pursuit and goal adjustment were predictive of better psychosocial outcomes both cross-sectionally and longitudinally [26,27]. However, only one study appears to have examined the specific strategies employed by individuals who engage in these adaptive self-regulatory processes in response to disruptions in goal attainment. Boerner and Wang [13] adopted an open-ended narrative format to investigate the various goal engagement, pursuit and adjustment strategies utilized by middle-aged adults with acquired visual impairment, and found that they broadly reflected the assimilative (internal resource use, new approach use, technology use, help use) and accommodative (psychological self-regulation) processes outlined in the dual-process model. Building on recent research on individuals' goal-related characteristics following lower limb amputation [26–28], the aim of the present study was to use the dual process model as a theoretical framework [20–22] from which to explore the types of assimilative (goal pursuit) and accommodative (goal adjustment) strategies employed by people with lower limb amputations in response to their acquired disability, where they may deal with disruptions to their existing goals and the setting of new goals.

Methods

Study design and data collection method

Semi-structured interviews were conducted and were composed of a series of open-ended questions which asked participants to discuss their current goals and priorities, how their limb loss affected these goals and priorities, how their goals and priorities have changed, new priorities that emerged since their amputation and approaches they used to achieve their goals and priorities (interested readers should contact the corresponding author by

e-mail to receive a copy of the interview schedule used in this research). Interviews lasted up to 40 min. Prompts were provided by the researcher to maximize the quality and depth of data gathered. Participants were encouraged to interpret the meaning of goals and priorities according to their own criteria and were given scope to discuss areas of interest to them. The interviews were partially led by these discussions. Each interview was audio-recorded and transcribed.

Participants and recruitment strategy

Ethical approval for the study was obtained from a national rehabilitation institution. Thirty people with a major lower limb amputation who were 15-month post-discharge from a specialist in-patient multidisciplinary rehabilitation program, aged at least 18 years and had sufficient spoken English were recruited to the study. Participants in the current study represent a subset of those recruited to a longitudinal study of psychosocial outcomes following lower limb amputation [26–28]. All participants who completed the 15-month follow-up in the longitudinal study ($n=53$) were invited to participate in the current research. Fifty-seven per cent of those eligible consented to be interviewed. Following receipt of a signed consent form, the researcher (LC) contacted each participant to arrange a suitable time and location to carry out the interview. Participants were interviewed by telephone ($N=21$) or face-to-face ($N=9$). It is important to note that the interviewer was known to and familiar with the participant due to their prior contact during the longitudinal study.

Data analysis

Interview data was initially coded in an inductive fashion by one of the researchers (SD) using the thematic analysis framework outlined by Braun and Clarke [29]. Following this initial bottom-up coding, a process of theoretical thematic analysis [29] based on the dual-process model of adaptive self-regulation [20–22] was employed as the data relating to participants' goals and priorities appeared to fit the framework of this model well. Using this model as a guiding framework, data were coded independently by two of the researchers (SD and LC) for content relating to assimilative and accommodative strategies. Codes were specifically related to the theoretical content of the self-regulation dual-process model [21,22]. The key headings *Internal resource use*, *New approach use*, *Technology use* and *Help use* (assimilative) and *Psychological self-regulation* (accommodative) were adopted from Boerner and Wang [13] as a preliminary guide to this coding process.

After an initial set of codes was developed by the researchers independently, they met to discuss, clarify and refine the codes. Following this process, the category heading *New approach use* was changed to *Planning*, and *Psychological self-regulation* to *Accommodative strategies*. *Internal resource use* was further divided into lower and higher order resource strategies. Additionally, a set of codes was developed for data that did not fit into either assimilative or accommodative strategies.

The two researchers then returned to the interview data to compile a complete set of examples relating to these codes. Following this, the researchers met again to further discuss, refine and clarify the codes. The resultant set of codes was used as a checklist for a subsequent content analysis of the interview data. For the content analysis of items, the two researchers independently coded each of the transcripts. Cohen's kappa was used to assess inter-rater agreements with coefficients ranging from 0.63 to 1.00 ($M=0.85$, $SD=0.13$), indicating substantial to perfect agreement. The researchers then met once more and differences in ratings were resolved through discussion.

Results

Demographic and clinical information is provided in Table 1. The *Assimilative/goal pursuit* strategies adopted following lower limb amputation reflected the four broad categories of *Internal resource use* (three lower-order and three higher-order strategies), *Planning* (five strategies), *Technology use* (three strategies) and *Help use* (two strategies). *Internal resource use* was subdivided into lower-order and higher-order strategies following the hierarchical structuring of goals identified in theories of self-regulation [14,30]. Lower-order strategies indicated that a participant had adopted an internal resource towards a discrete goal; *perseverance with goal pursuit*, *problem-solving in-the-moment* and *maintaining a specific leisure activity*. Higher-order strategies indicated that a participant tended to generally adopt a particular internal resource in the pursuit of their goals, *determination*, *maintaining independence* and *upward social comparison*. *Planning* related to strategies that incorporated the use of planning in the pursuit of goals or activities; *use alternative transportation*, *setting a future goal*, *setting up facilitating conditions*, *preventing further damage* and *seeking information*. *Technology use* indicated that participants employed a particular technology in pursuit of their goals; adaptations to personal surroundings, using own vehicle and adaptive aids. *Help use* reflected methods of seeking help in pursuit of goals; *seeking instrumental help* and *seeking formal services*. While the above strategies may be considered adaptive through the dual process model, dysfunctional assimilative/goal pursuit was also identified, under the strategy *Exhausting resources with unrealistic projects*. In both instances, this strategy referred to participants' continued focus on obtaining a prosthesis, despite their ineligibility for

fitting (as determined by their rehabilitation team). Detailed frequency information for these assimilative strategies is provided in Table 2.

The *Accommodative/goal adjustment strategies* adopted by participants were represented by three broad categories; *Interpersonal accommodation* (three strategies), *Managing limitations* (six strategies) and *Meaning-making* (two strategies). *Interpersonal accommodation* reflected goal adjustment strategies that involved accepting emotional or instrumental support from others; *accepting help from others*, *seeking support/assurance from fellow patients* and *emotional support from friends and family*. *Managing limitations* incorporated cognitive strategies to accommodate the loss of specific goals; *adjusting goals to constraints*, *positive outlook*, *sense of humor*, *de-emphasizing the impact of amputation*, *downward comparison* and *accepting limitations*. *Meaning-making strategies* of goal adjustment involved higher-order cognitive strategies used to accommodate goal disruption into the broader context of life as a whole; *benefit-finding* and *re-orientation*. With reference to the dual process model, *premature disengagement* was also identified as a dysfunctional side-effect of accommodation. Frequency information pertaining to these strategies is provided in Table 3.

Table 4 displays frequency data relating to whether or not participants indicated they used only assimilative or accommodative strategies. The majority of participants ($N=26$) used at least one assimilative/goal pursuit and one accommodative/goal adjustment strategy in response to goal disruptions following lower limb amputation.

Three strategies used in response to disruptions in goal attainment also contained a strategic combination of both assimilation and accommodation (Table 5). The first of these strategies comprised *adoption of new activities* (assimilative component) *for a renewed sense of purpose* (accommodative component). The second strategy comprised *strategic flexibility in the use of both assimilative and accommodative modes* (i.e. flexibility in strategically employing one or the other modes as appropriate in a specific episode). Following the logic of the dual process model, a third strategy was also identified as a dysfunctional side-effect of combining both modes; *remaining attached to blocked goals*, where participants acknowledged they could no longer achieve a particular goal due to their loss of function (accommodation) but were still emotionally attached to this goal (assimilation).

Participants also identified avoidant strategies that did not relate to either assimilation or accommodation. These strategies were *cognitive avoidance* and *behavioral avoidance*. Frequency information for these strategies is provided in Table 6.

Discussion

The findings support prior research [26,27] that has examined the application of the dual process model of adaptive self-regulation [20–22] to individuals with lower limb amputation and suggest that this model is a valid way of categorizing the strategies adopted by such individuals following discharge from a rehabilitation institution. Specifically, four categories of adaptive assimilative strategies and three categories of adaptive accommodative strategies were evident. Within these categories, the most common assimilative strategies were *maintaining a specific leisure activity*, *seeking instrumental help*, and *determination* and the most common accommodative strategies were *accepting limitations*, *emotional support from friends and family* and *adjusting goals to constraints*.

Findings regarding assimilation point towards key strategies of actively pursuing goals that could be adaptive following lower limb amputation. Firstly, maintaining a specific leisure activity

Table 1. Demographic and clinical information for participants.

Variable	N	%
Gender		
Male	26	86.7
Female	4	13.3
Marital status		
Single	5	16.7
Married	16	53.3
Separated/divorced	5	16.7
Widowed	4	13.3
Education level		
Primary level	11	36.7
Secondary level	9	30
Third level	10	33.3
Type of lower-limb amputation		
Above knee	16	53.3
Below knee	12	40
Bilateral	2	6.7
Cause of amputation		
Peripheral vascular disease	17	56.7
Diabetes	5	16.7
Trauma	5	16.7
Other	3	10
Currently using prosthesis		
Yes	18	60
No	12	40
Discharge destination		
Home	27	90
Nursing home	2	6.7
District hospital	1	3.3
	Range	M (SD)
Age	38–86	63.80 (11.63)
Weeks from amputation to admission for rehabilitation	6–200	26.57 (36.64)

Table 2. Frequency of participants reporting assimilative strategies with corresponding sample quotes.

Content codes for strategies	N	%	Sample quote
Internal resource use (lower order resources)			
Perseverance with goal pursuit	11	36.7	I live out here on my own so I have to do the things out here which I have someone to do for me at home but it is no real problem for me to do them. [...] It takes me a little bit longer but I am not in any rush anywhere.
Problem-solving in-the-moment	8	26.7	When you go out you have to look to see where there is a stool that you can prop up against or to sit down. And if the place is busy and you don't get a stool you don't stay long, you only have one drink, you go onto the next place.
Maintaining a specific leisure activity	20	66.7	There [are some activities that I have been able to keep up since having my leg amputated], yes. I can still go fishing with the lads up on Lough X. It is known as trawling, your line is out and you are rowing the boat. We go in then on the island and have the best of fun and make up a fire.
Internal resource use (higher order resources)			
Determination	15	50	I don't know, I hate people saying to me, "you can't do that, you have lost a leg". And you kind of go home then and go, yes I can do it. They might be minimal but you can still do them, you still manage it.
Maintaining independence	12	40	I like to depend on myself rather than other people so I tend not to ask for help unless I really, really need it and to try and do things for myself. [...] That was my main goal after my illness because I was so weak for months after it and the one thing that got me through was I wanted to get my life back; I wanted to get back to my own house and my own routine and do what I wanted to do and not be depending on other people.
Upward social comparison/inspiration from others	3	10	You see somebody 1 day and they are in a wheelchair and a couple of days later they are up on walker, another couple of weeks and they have progressed to a walking stick. So it is really uplifting for you personally to see other people progressing with their rehab because it means I didn't think I could do something and now I can see somebody who I thought was in a bad way, look at them now 3 weeks later, they are up and walking.
Planning			
Using alternative transportation	5	16.7	I get an ordinary taxi over to the pub. I just slide into the front passenger seat, he folds up the chair and puts it in the boot. But going over to [hospital] for a check-up or anything like that, I get my wheelchair taxi.
Setting a future goal	9	30	And I knew when I went out to the rehabilitation the good part there, they gave me a date so I knew, right in 3-month time you are out of here and you have to work. [...] You get on with it and do it and get out of here.
Setting up facilitating conditions	4	13.3	I make sure that I always get a place if we are parking as close to the entrance as possible, things like that, simple things.
Preventing further damage	7	23.3	But one of the important things is to ensure that my second leg doesn't go the same way as my first one.
Seeking information	3	10	The other thing about it, if you are going anywhere you have to find out is it wheelchair accessible.
Technology use			
Adaptations to personal surroundings	5	16.7	The whole house was done out for me, I have a new bathroom and everything is automatic, a new bed, new chairs and all this electric stuff and I have no problem in the house, moving around the house.
Using own vehicle	8	26.7	Driving is fine because I had my car adapted so there is nothing really else.
Adaptive aids	14	46.7	I can manage the wheelchair great, I have a good chair, it is easy to get in and out of it.
Help use			
Seeking instrumental help	15	50	Well my sister was a help, she gave me financial help to put in the disabled bathroom and I know the builder who done it and he was a great help to me as well, he is a friend of mine.
Seeking formal help	9	30	I've an appointment with the [rehabilitation centre] on the 11th January for an assessment and I'm going to ask them to bring me in to do the physio to get the knee straightened which will be no problem once the professional physiotherapist do it, y'know?
Dysfunctional assimilation – exhausting resources with unrealistic projects	2	6.7	Now all my efforts are concentrating on living my life and doing as much exercise as I can so that I will hopefully get a prosthesis.

Table 3. Frequency of participants reporting accommodative strategies with corresponding sample quotes.

Content codes for strategies	N	%	Sample quote
Interpersonal accommodation			
Accepting instrumental help from others	11	36.7	Most people know me so most people know I can't stay standing very long so they will give me the stool to sit down and then there is no problem staying.
Seeking empathy from similar others	4	13.3	I suppose being able to talk to people and not talking to the professionals, you know, like you take Dr. X or any of those, yes they know a lot about it but still when it goes to it they really don't know, they haven't lived through the experience.
Emotional support from friends and family	17	56.7	A very supportive partner who I must say is brilliant and good friends as well who help you get along.
Managing limitations			
Sense of humour	7	23.3	You have to be able to look at yourself and be able to laugh about yourself as well.
De-emphasizing the impact of amputation	14	46.7	Even in a situation if it didn't have worked and the second leg had to be amputated like the first one, what is the problem? Tell me? Another artificial leg and you walk away after a bit of rehearsal as I call it and you walk away again.
Downward comparison	14	46.7	And when you see some of the other injuries and illnesses that have happened to people you realize that there are a lot of people out there who are a lot worse than you. And that really helped me to put my situation into perspective and it helped me to accept it and to deal with it.
Accepting limitations	18	60	It's not a matter of giving up, it's just a matter of acceptance since I can foresee that there's nothing that I can do that would make things any better.
Adjusting goals to constraints	16	53.3	Well I used to go out a couple of nights a week for a drink, I'd stop out for about an hour, but I go out about once every 4 weeks, maybe more, maybe less, maybe once every 5 or 6 weeks and I'd have two pints.
Positive outlook	11	36.7	On the whole I am a pretty optimistic person and I do try to see the good in every situation so that certainly helped me through this experience desperately.
Meaning-making			
Benefit-finding	4	13.3	I did feel that before the operation I was just kind of tipping along, as a friend of mine would say, and I wasn't really doing much and I think I have a new lease of life now because I appreciate it more.
Re-orientation	4	13.3	I suppose it also makes you take stock of things as well so you tend to see what is really important at the end of the day. Health is certainly so important in comparison to a lot of other things.
Dysfunctional side effects – premature disengagement	2	6.7	No matter what way you look at it, everything you face up to in life brings you hassle. So if you don't want to be hassled, just don't bother. What's the point? You're not going to better things any way at all so –

Table 4. Frequency of assimilative and accommodative strategies employed by participants.

Strategies adopted	N	%
Assimilative only	2	6.7
Accommodative only	2	6.7
Using both assimilative and accommodative strategies	26	86.7

(e.g. attending football matches regularly) is valuable and could be considered a relatively easily achievable yet emotionally rewarding goal. This is consistent with Murray's finding [31] that individuals with an amputation often actively seek to perform leisure activities, such as dancing or walking, as a means of regaining a sense of normality following their limb loss. Furthermore, due to the inherent functional limitations which a lower limb amputation entails, a long-term strategy of determination could be particularly useful in order to enable an individual to successfully follow through with planned goals following lower limb amputation. Such findings also accord with inductive qualitative research on adjustment to limb loss. For instance,

Murray [32] has emphasized the necessity for long-term effort and perseverance in order to successfully adapt to using a new artificial limb following amputation. The importance of seeking instrumental help (e.g. financial or physical assistance) in successful goal pursuit is also evident here.

The findings in relation to assimilation point to the importance of investigating condition-specific adaptive strategies following functional disability. For instance, while the assimilative strategies adopted closely reflected the four categories outlined by Boerner and Wang [13], the novel category *Planning* was a more prominent and specific adaptive approach in the present sample. This may be because individuals faced with functional disabilities arising from limb loss are particularly concerned with planning in relation to their goals (e.g. finding out in advance whether or not there are wheelchair facilities or disabled access to a particular location). Additionally, the category *Internal resource use* was divided into lower- and higher-order strategies in the current study. This distinction is useful in this context as a slightly different set of internal resources is adopted by individuals who are adjusting to functional disability when they set concrete goals in comparison to more abstract goals. This distinction between concrete and abstract

Table 5. Frequency of participants reporting strategies combining both assimilation and accommodation with corresponding sample quotes.

Content codes for strategies	N	%	Sample quote
Adoption of new activities for renewed sense of purpose	7	23.3	And my sister suggested volunteering, so I started training old people how to use computers one morning a week. And they got so much out of it that I started to get something out of their joy and then I started doing it 2 days a week.
Strategic flexibility in the use of accommodative and assimilative modes	4	13.3	If I was given a challenge I would try anything, I would never say no I can't do that or I won't do that. I would try it to the best of my ability, if I can do it I will do it, if I can't, I can't. I will try it and maybe I can't go this far, it might be only to go that far but at least I will try it.
Dysfunctional side effects – remaining attached to blocked goals	5	16.7	But I just can't cross those and I just can't do it and I would actually love to do it. And I do send other people to the mart for me look at prices of animals and it is such a simple thing to do. And I do much more difficult things than that but I just can't do that now and I don't know why.

Table 6. Frequency of participants reporting defensive/avoidant strategies with corresponding sample quotes.

Content codes for strategies	N	%	Sample quote
Cognitive avoidance	10	33.3	I just wipe it out of my head, wash it out – just forget about it, y'know? That's all. I don't let things get into me head, y'know? It's just an attitude I have, y'know?
Behavioural avoidance	6	20	Yes I just found for myself, after the first surgery I had nothing to do and I kind of slipped into a depression and as soon as I started doing things I snapped out of it. So for me it is really important to keep myself busy.

goals has been identified in several theories of self-regulation [14,28].

With regard to accommodation and goal adjustment, strategies such as accepting limitations, receiving emotional support from friends and family, and adjusting goals to constraints were particularly salient. The adoption of such strategies points towards the potential need to come to terms with disruption to valued goals and the value of seeking social support as a way of assisting this process following amputation. This supports findings from inductive qualitative studies which have identified that individuals with lower limb amputations need to overcome negative changes to their professional life and achievements following limb loss [31,33] and that these individuals regard social support as a valuable resource which can assist their adjustment [33,34]. The delineation of specific types of adaptive accommodative strategies provides further refinement to the accommodative mode, which had been previously categorized broadly as ‘‘psychological self-regulation’’ [13]. Firstly, *Interpersonal accommodation* such as accepting help from others and seeking empathy from similar others appears to be particularly important for individuals who are faced with significant functional impairments following limb loss. This may be due to such individuals' reliance on others for a variety of physical supports and their seeking of extra support from fellow patients, friends and family in order to accommodate goals that have been blocked by their functional disability. Additionally, there are a variety of ways in which an individual faced with disability might need to cognitively manage their newfound functional limitations, including adopting a positive outlook, adjusting their goals to constraints and using humor as a diffusing technique. Finally, frustration of goals arising from functional disabilities can lead individuals to adopt *Meaning-making* strategies such as re-orienting their priorities (e.g. towards their health) and making sense of the functional disability by attempting to find benefits from their limb loss.

In addition to adopting specific assimilative and accommodative strategies following lower limb amputation, participants also reported use of both types of strategy in a seemingly harmonious fashion. Indeed, there was evidence that the majority of

participants had employed both assimilative and accommodative strategies since they had lost a limb. Furthermore, three strategies were identified in the current study that incorporated combined use of assimilation and accommodation. Using the dual-process model [20–22] as a guiding framework, two of these could be considered adaptive and one maladaptive because it involved fixation on a blocked goal. An example of an adaptive strategy was the adoption of new activities for a renewed sense of purpose; individuals typically noted that new activities, such as volunteer work, reinvigorated their lives with meaning. Such new activities did not appear to compensate for the loss of, or diminish the importance of, a valued goal for the individual but rather served to establish a new set of priorities. Strategies incorporating a combined use of accommodation and assimilation appear consistent with the functional loss attributable to lower limb amputation, as people inevitably have to accommodate a certain amount of loss of functionality after losing a limb, while simultaneously having to take up new goals during the rehabilitation process.

Together, the findings suggest that the assimilative and accommodative modes incorporate complementary adaptive strategies for dealing with the loss of a limb. Moreover, unattainable and attainable goals could actually be bound up together in the same processes, such that assimilation and accommodation strategies are used in combination with each other. In support of this proposition, a 10-year cohort study of an ageing population conducted by Kelly et al. [35] found that individuals who had strong tendencies towards the use of both modes experienced greatest decreases in symptoms of depression, hostility and physical ill-health over this period. Furthermore, a significant positive correlation between the use of assimilative and accommodative strategies among individuals receiving rehabilitative treatment for vision loss and lower-limb amputation has also been documented [8,26]. When taken together, such findings suggest that individuals who successfully adjust to the loss of a limb exhibit a degree of psychological flexibility and can simultaneously use both types of strategies together in order to adaptively respond to functional loss. For instance, when faced

with a potential inability to pursue activities like hill walking, an individual might accept the loss of this previously valued goal (accommodation) and instead create a new goal such as investing energy in volunteering (assimilation).

Another key finding was the commonly reported use of avoidant strategies. In particular, participants employed cognitive and behavioral avoidance to distract themselves from thinking about limb loss and its consequences (i.e. by focusing on other thoughts or behaviors, respectively). Significantly, participants also indicated that these strategies were adaptive (e.g. as a means of defending against depression). Boerner and Wang [13] similarly identified strategies such as “keeping busy”, “try not to think about it” and “seeking distraction”, but they considered these strategies within the general category of “psychological self-regulation”. However, these sorts of defensively avoidant responses involve avoiding or ignoring disrupted goals entirely rather than modifying one’s situation or oneself in response to goal disruption. Prior research indicates that denial and defensive avoidance can be adaptive in certain circumstances [36,37]. For instance, Kortte and Wegener [36] note consistent evidence to suggest that denial and avoidant strategies can help individuals faced with diagnoses of heart disease, cancer, acquired brain injury and spinal cord injury to preserve hope and optimism and reconceptualize their illness in a more positive fashion. In the current context, cognitive and behavioral avoidance could help individuals to initially deal with the burden of losing a limb before they fully integrate such losses into their lives.

While such defensively avoidant strategies have been previously referred to in the dual-process model as “immunization” (e.g. Brandstädter and Greve, 1994; as cited in Leipold and Greve [38]), such strategies have not been fully integrated into some of the key theoretical accounts of the model [21]. Furthermore, defensive strategies have thus far been subsumed by negatively valenced items in the Tenacious Goal Pursuit scale [20] (e.g. items 11 and 13). The prevalence of such strategies might be obscured through the sublimation of these strategies within the concept of assimilation. As a result, defensive avoidant strategies need further clarification within the context of the dual-process model and could point towards a third adaptive strategy for dealing with goal disruption following a functional disability.

Despite this need for conceptual clarification, the pattern of results indicates that the dual-process model is a valuable framework for understanding how people adjust to lower limb amputation. In particular, the potential for the dual-process model to be applied uniquely to condition-specific adaptive strategies following functional disability highlights the utility of the assimilative-accommodative distinction proposed by the model. Indeed, many authors have underlined the value of this distinction stressing that it recognizes the influence of contextual factors in determining the value of appraisal processes, while also capturing their dynamic, interactive quality [39,40]. This is of particular salience following acquired disability, as the individual has to contend with multiple stressors simultaneously [12]. A self-regulation perspective such as the dual-process model accounts for such contextual factors by positing that specific frustrations to goal attainment can lead individuals to respond by modifying their situation appropriately to fit their goals or by modifying their goals. In this context, the current pattern of findings suggest that interventions to promote adjustment to limb loss should emphasize specific assimilative strategies such as maintaining valued leisure activities and the importance of adopting a determined attitude and seeking instrumental help in the pursuit of other valued goals. Intervention programs could also stress the utility of employing resources such as emotional support from friends and family which may assist in adaptive accommodation to blocked goals arising from functional loss. Flexibility in using assimilative

or accommodative strategies, the adoption of new activities and avoidant approaches to functional disability may also be adaptive responses toward the challenges of limb loss.

This study was conducted at one specific targeted period of time; i.e. 15 months after being discharged from specialist multidisciplinary in-patient prosthetic rehabilitation program. The cross-sectional nature of the design could mean that strategies used by participants reflect a trend in the adoption of assimilative, accommodative or avoidant strategies during this particular stage in the adaptation process. Future longitudinal qualitative research is necessary to investigate whether there are particular stages in the rehabilitation process when specific assimilative, accommodative and avoidant strategies tend to become more salient to individuals adjusting to functional disability. Such research may also help to clarify if certain strategies change over time as an individual adjusts to their functional disability and new priorities emerge. A second limitation relates to the fact that people with a lower limb amputation targeted for in-patient rehabilitation represent a sector of this population who are at the upper end of the spectrum in terms of their health and well-being. Findings from the current study might thus overemphasize healthy and adaptive strategies used by people in adjusting to lower limb loss, although maladaptive strategies were also apparent. It is possible that individuals in this patient group who do not qualify for in-patient rehabilitation services might employ a different pattern of adaptive and maladaptive strategies. Further research with different groups of patients with lower limb amputation is recommended. Finally, the findings might not be generalizable to other functional disabilities, which can involve a range of unique challenges.

In spite of these limitations, the research findings could be particularly useful for rehabilitation practitioners working within the area of functional disability. Firstly, the research has articulated key types of assimilative and accommodative strategies adopted by individuals following significant functional disability and illustrates some of the specific types of strategies that may be adaptive for these individuals following in-patient rehabilitation. The study also highlights the potential usefulness of the dual-process model in understanding how individuals adjust to functional disability resulting from limb loss, while also illuminating issues warranting further explication in the model. Furthermore, the current pattern of findings suggests that assimilative and accommodative strategies may be adopted together in parallel by individuals faced with functional disability and that encouraging psychological flexibility in the adoption of such strategies could be particularly important for successful adaptation to functional loss. Finally, the study underlines the adaptive potential of avoidant strategies for individuals who are adjusting to a lower limb amputation.

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Declaration of interest

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