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### *Directed motivational currents: A systematic review*

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#### Abstract

Directed motivational currents, unique and intense goal-directed motivational surges lasting over a period of time, have received increasing attention recently. This article reports the first systematic review of this phenomenon. A total of 21 reports appearing between 2013 and 2020 were included in the analysis. The results show that the majority of empirical reports were small-scale qualitative studies (median = 18 participants). The evidence on the three characteristics proposed as necessary and/or distinguishing conditions of directed motivational currents (vision, salient facilitative structure, and positive affect) is inconclusive due to the presence of directed motivational currents cases not exhibiting these features, and the absence of direct comparative analyses with non-directed motivational currents cases. A few intervention studies ( $N = 4$ ) were conducted, but their results are also inconclusive due to a number of methodological limitations. Contrary to the claim that directed motivational current experiences are the “optimal form” of motivation, the results additionally showed that these experiences could lead to intense stress, anxiety, depression, sleeplessness, and panic attacks, thereby raising ethical concerns about deliberately inducing directed motivational currents in learners. We conclude that, although the concept of directed motivational currents is

promising, more research is needed to reach a better understanding of its potential. We end this article by suggesting directions for future research into directed motivational currents, including renaming them as *sustained flow*.

*Keywords:* directed motivational currents; DMC; sustained flow; systematic review; language learning; language motivation

## 1. Introduction

Second language (L2) motivation has attracted the interest of researchers for several decades (Al-Hoorie, 2017; Al-Hoorie & MacIntyre, 2020). The critical role motivation plays in L2 learning success and achievement has become a truism (e.g., Dörnyei & Ryan, 2015; Dörnyei & Ushioda, 2011). More recently, some interest has been devoted to the “time” dimension of motivation. This interest has recently crystalized in what came to be known as *directed motivational currents* (DMCs; Dörnyei et al., 2014). DMCs were first conceived of in 2013 by Dörnyei et al. (2014), though this chapter appeared in print a year later (cf. Dörnyei et al., 2016, p. 18, footnote 1).

Since they were introduced, DMCs have attracted the attention of L2 researchers and have grown in popularity year after year. For example, at the time of writing, the first book on DMCs (Dörnyei et al., 2016) has been cited almost 300 times according to Google Scholar. Similarly, the first theoretical papers introducing DMCs (Dörnyei et al., 2015; Dörnyei et al., 2014; Muir & Dörnyei, 2013) and the first empirical study (Henry et al., 2015) have been cited over 100 times each. The past years have also witnessed further elaboration of the theoretical tenets underlying DMCs, as well as interest in their potential for classroom practice. All these developments make it timely to systematically review the empirical basis supporting the theoretical tenets and the practical significance of DMCs.

## 2. Theoretical tenets of DMCs

The DMC phenomenon has two defining characteristics: being a brief *surge* directed toward a certain *goal*. Beyond these two defining features, Dörnyei et al. (2014) proposed three other “necessary conditions” of DMCs in that it is “crucial that all of these conditions are present” (p. 12) for this experience to occur: vision, facilitative structure, and positive affect. The first feature refers to the notion that individuals experiencing a DMC are hypothesized not to merely have a target goal but to also imagine themselves, with a strong sensory element, achieving that goal. Dörnyei et al. (2014) illustrated this notion with the goal of

becoming a doctor; the individual would be expected to go beyond the abstract goal of earning a medical degree to “actually seeing him/herself receiving the degree certificate and practicing as a qualified doctor” (p. 13). Dörnyei et al. (2014) further explained: “We believe that the intensity of a DMC cannot be achieved without adding this visionary quality to guiding goals” (p. 13).

The second hypothesized feature of a DMC is its salient, facilitative structure. This includes the adoption of certain behavioral routines (e.g., spending three hours a day on learning a new language) that help the learner achieve the desired outcomes. These routines are thought not to require constant volitional control since they become automatized in the process (nonconscious self-regulation; Dörnyei et al., 2016). Progress checks have been proposed as a means of assessing the pace at which goals are achieved through affirmative feedback, resulting in a sense of satisfaction. It has been argued that adoption of a facilitative structure represents “the primary distinguishing feature” of this phenomenon (Dörnyei et al., 2016, p. 80).

The third characteristic of DMC is positive affect. However, this positive emotional load is believed to be unlike simple pleasure and happiness. Instead, it results in self-fulfillment achieved through pursuit of self-concordant goals (Dörnyei et al., 2016). According to this view, individuals may even consider as enjoyable and satisfying activities that were once boring to them. This notion draws on eudaimonic well-being, which refers to the actualization of one’s potential and thus going beyond mere hedonistic pleasure (Ryan & Deci, 2001; Waterman, 1993, 2008). As Dörnyei et al. (2015) explained, a DMC exhibits the characteristics of eudaimonic well-being as described by Waterman (1993):

(a) an unusually intense involvement in an undertaking, (b) a feeling of a special fit or meshing with an activity that is not characteristic of most daily tasks, (c) a feeling of intensely being alive, (d) a feeling of being complete or fulfilled while engaged in an activity, (e) an impression that this is what the person was meant to do, and (f) a feeling that this is who one really is. (p. 679)

In short, DMCs have been presented to the language learning community as a “magic-like” experience where the learner is effortlessly carried in a “current” to their proficiency destination. Beyond the two defining characteristics of DMCs (surge toward a goal), DMC proponents have argued that three characteristics are necessary for the DMC experience to take place: vivid imagery, facilitative structure, and positive emotional load. Without all these elements, a DMC is hypothesized not to occur because, as Dörnyei et al. (2015) emphasized, these characteristics “are exactly the primary domains where DMCs operate” (p. 101).

### 3. Practical significance of DMCs

The discussion of DMCs has transcended theoretical speculations and penetrated classroom walls. As mentioned above, despite their short history, DMCs have been cited hundreds of times so far. A major driver behind this interest are the pedagogical implications of DMCs. According to Dörnyei et al. (2015), the significance of DMCs lies in the potential that they can be deliberately induced. This could occur, for example, as part of an educational intervention so that the learner experiences this uniquely intense motivational surge and consequently improves their language uptake. Involvement in projects, studying abroad, and performing personalized tasks are examples of situations in which learners may experience exceptional levels of motivation and which may function as a trigger to foster learner autonomy (Dörnyei et al., 2015; Muir, 2020).

DMCs have therefore received overwhelming acclaim. A DMC is posited to represent “a perfect match” (Dörnyei et al., 2016, p. 23) between vision and action plans, allowing learners to “perform beyond expectations and across several levels and timescales” (Dörnyei et al., 2014, p. 9) because a DMC can “act as a precious organizing force which is able to regulate events in a complicated world” (Dörnyei et al., 2014, p. 17). Thus a DMC can “project positive emotionality to all the stages of the progress” (Dörnyei et al., 2015, p. 101). All of this is attributed to the claim that the motivation generated from a DMC is significantly stronger than – and “qualitatively different” (Dörnyei et al., 2016, p. 2) from conventional high motivation.

The DMC literature has also attempted to equip teachers with specific strategies. Through what came to be known as “frameworks of focused interventions,” it has been proposed that practitioners can deliberately induce DMCs in their learners (Dörnyei et al., 2016). One of the most common approaches is collaborative projects (e.g., Ibrahim & Al-Hoorie, 2019). This approach draws on group DMCs, where learners engage in groupwork and cooperate to achieve a shared goal. This collaboration may be short-term (e.g., over a weekend) or last longer (e.g., several weeks or a whole semester). Learners may find this activity enjoyable and exert extra effort to achieve their collective goal, especially when the ultimate outcome is perceived as authentic such as presenting before a real audience or working for a charity.

Thus, DMCs, particularly group DMCs, have been argued to hold practical significance that classroom teachers can utilize. Although a DMC may be experienced individually or as part of a group, the latter has been argued to be within the reach of average teachers without the need for fancy equipment or expensive facilities. This DMC experience eventually culminates in improved proficiency and language learning success (Muir, 2020). All of this potential makes it essential to systematically examine the evidence backing DMCs and the extent to which the results support the effectiveness of inducing DMCs in language learning.

#### 4. The present study

The above review shows that DMCs are posited to represent a novel and qualitatively different construct that might have useful implications as a motivational tool for classroom practitioners (e.g., Dörnyei et al., 2015; Dörnyei et al., 2014; Ibrahim & Al-Hoorie, 2019; Muir, 2020). At the same time, some concern has also been expressed about the broader paradigm that constitutes the theoretical basis of the DMC construct and that emphasizes self- and vision-based motivation (e.g., Lamb, 2012; Moskovsky et al., 2016; Papi & Abdollahzadeh, 2012). In fact, it has even been compared to a Kuhnian normal science, where “there is a risk that central concepts are adopted uncritically and anomalies ignored” (Henry & Cliffordson, 2017, p. 732) and where the impact of methodological limitations may be underestimated (Hiver & Al-Hoorie, 2020a). All this would suggest the need to examine more closely the concept of DMC, the empirical results with respect to it, and the methodologies used to obtain these results.

To this end, we attempted to locate all studies on DMCs published since the introduction of the concept in 2013 in order to address the following research questions:

RQ1. To what extent have the three characteristics of DMCs (vision-orient- edness, salient facilitative structure, and positive affect) been shown to be necessary and distinguishing features of this experience?

RQ1 therefore has a theoretical focus. It is concerned with the conceptualization of DMCs beyond their two defining characteristics (a surge toward a goal). We investigated whether the three hypothesized characteristics are borne out empirically.

RQ2. To what extent does the DMC experience improve actual L2 learning?

RQ2 is a more practical question. It is concerned with gains in L2 proficiency and achievement in learners experiencing DMCs. Ideally, establishing this kind of language improvement requires some form of an experimental design (or intervention), where researchers deliberately induce a DMC in learners and then compare them either with other learners not experiencing it or with themselves in non-DMC states.

#### 5. Method

##### 5.1. Search procedure and criteria for inclusion

A search was conducted in several databases including EBSCOhost, ERIC, Google Scholar, and ProQuest for “directed motivation currents,” “DMC,” “sustained flow,”

and their variations. We also issued an informal call for papers sent to researchers active in this area. A total of 120 reports were subsequently identified. The following inclusion criteria were applied on this initial pool of reports: (1) DCMs were a main focus of the report, and (2) the language of the report was English. For completeness, both conceptual analyses and empirical reports were initially included whether published as journal articles or book chapters, though poster presentations and book reviews were excluded. Eventually, a total of 34 reports, 13 conceptual and 21 empirical, appearing between 2013 and December 2020 satisfied the inclusion criteria (see Figure 1). Some of these reports were in press at the time and were subsequently conferred a 2021 copyright. The focus in this article is on empirical reports, while conceptual analyses of DMCs are listed in the appendix for interested readers.

## 5.2. Coding and analysis

The reports satisfying the inclusion criteria were systematically coded by two coders based on the coding scheme included in Table 1. Each report was coded in relation to its publication outlet, research type (conceptual vs. empirical), publication information, context, purpose and methodology, and a brief overview of the main findings (empirical) and conclusions (conceptual).

Table 1 Coding scheme used in this study

Basic information	a. author(s)	b. title	c. year
Outlet	a. article	b. book/chapter	c. thesis
Research type	a. empirical	b. conceptual	
Context (if empirical)	a. country	b. no. of participants	c. age of participants
Design (if empirical)	a. method	b. statistical analysis	
Outcome	a. purpose	b. results (if empirical)	c. arguments (if conceptual)

We read the reports carefully and identified the ones that have direct relevance to the two research questions. We then synthesized the findings of these studies in order to address our research questions. For RQ1, we attempted to find out whether learners experiencing DMCs exhibited the three characteristics hypothesized to be necessary for a DMC to occur (vision-orientedness, salient structure, and positive affect). For RQ2, we focused on interventions attempting to induce DMCs and examined their findings and methodological rigor. We also extracted descriptive data about the reports, including sample size, gender distribution, age, and context. Additionally, we summarized the main findings of each report.

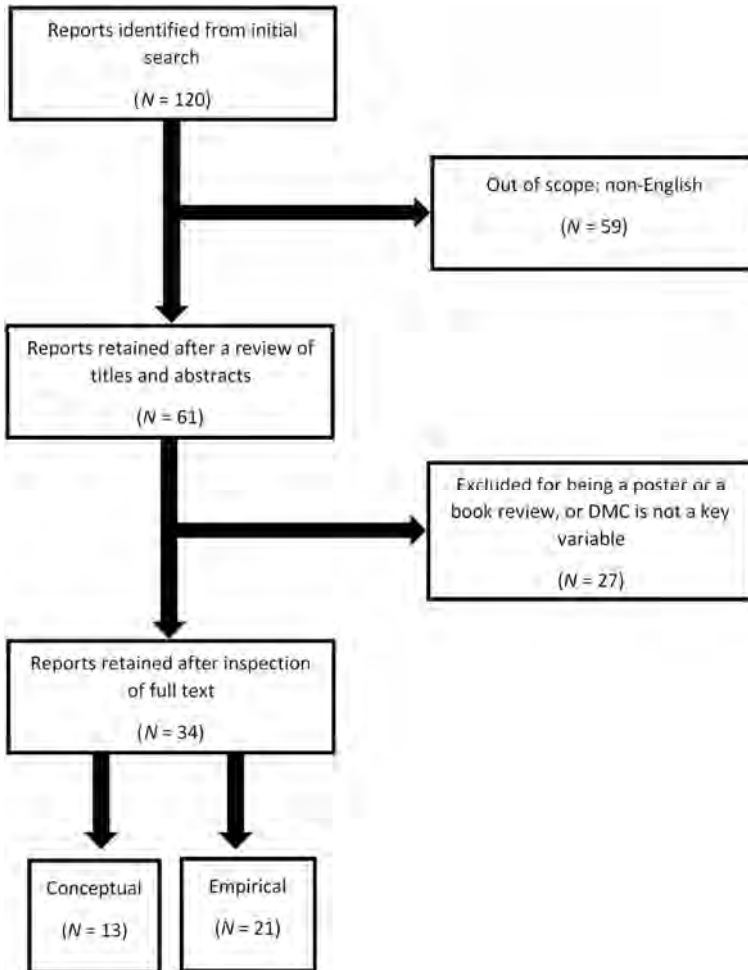


Figure 1 Flowchart of the report selection process

## 6. Results and discussion

### 6.1. Description of the report pool

Table 2 provides a summary of empirical reports on DMCs. A total of 21 reports attempted to investigate the theoretical underpinnings and the practical applicability of DMCs. Most of this literature has relied on a qualitative approach employing semi-structured interviews; thus, it was not possible at this point to obtain effect sizes for a meta-analytic synthesis. In most investigations it was also attempted to determine the characteristics that learners exhibit during a DMC. A few studies additionally used self-plotted graphs and questionnaires. Only four reports were published

in journals that might be described as “major journals” in the L2 field (see Al-Hoorie & Vitta, 2019; Vitta & Al-Hoorie, 2017), namely *ELT Journal*, *Modern Language Journal*, and *TESOL Quarterly* – and one appeared in *Frontiers in Psychology*. Three reports were unpublished PhD dissertations, in addition to one dissertation and one journal article that were later published as books.

Examination of the samples used also revealed some patterns. As can be seen in Table 3, many studies had modest sample sizes (median = 18). Age of the participants ranged from 16 to over 60, with most learning English as the L2 at university level. These participants came from different backgrounds, though as is generally the case with L2 motivation research Africa and South America were underrepresented.

Finally, as explained earlier, conceptual analyses of DMCs were also synthesized for completeness (see the appendix). Generally, these analyses aimed to introduce the concept of a DMC, motivational theories feeding into it, characteristics of effective DMCs, and the possibility of inducing DMCs in language classrooms. The overarching arguments in this literature include the claims that a DMC is a favorable state that is conducive to language learning; that it is characterized by vision-orient edness, salient facilitative structure, and positive affect; and that it is a useful motivational tool when intentionally induced by the language teacher.

As explained above, the aim of this investigation was not to provide a comprehensive review of all aspects related to DMCs. Instead, we had two specific foci: the extent to which the three hypothesized characteristics are supported empirically (theoretical side) and the extent to which DMCs contribute to actual learning gains (practical side). These two foci are discussed in the sections that follow.

Table 2 Summary of empirical studies

Author(s)	Purpose	Method	Main findings
Colombo (2017)	To explore student motivation in a technology-enhanced classroom and the factors affecting their motivation	Qualitative case study	The group project helped promote a DMC, leading students to go beyond their teacher’s requirements.
Dastgahian and Ghonsooly (2018)	To examine the effect of teaching religious texts on students’ DMCs	Pre-post religious vocabulary test, interviews	Vocabulary scores improved significantly in the post-test, though no direct quantitative evidence on the role of DMCs in this increase was presented.
Direckze and Ratwatte (2017)	To test the effectiveness a DMC intervention with a group of schoolteachers in Sri Lanka	Intervention, observation, semi-structured interviews	Teachers reported an increase in the level of their own motivation as well as an improvement in their students’ proficiency level. No quantitative analysis or a control group was included.
Ghanizadeh and Jahedizadeh (2017)	To validate the Persian version of DMC Disposition Scale, and investigate the association between DMCs and learners’ proficiency and educational levels	Confirmatory factor analysis, ANOVA, content analysis of open-ended questions	The scale showed acceptable reliability and validity. Most DMC experiences were related to competitively self-referenced, rather than other-referenced, objectives. Upper intermediate students experienced more DMCs



			than their elementary counterparts. BA and MA students had higher levels of DMCs than diploma learners.
Jahedizadeh and Ghanizadeh (2021)	To explore the dynamic interplay between personal best goals and DMCs	Mixed-methods research	Students' personal best goals predicted their DMCs, and competitively self-referenced goals created more DMC experiences than competitively other-referenced goals.
Jahedizadeh et al. (2021)	To examine interactions among DMCs, personal best, buoyancy, evaluation apprehension, and academic achievement	Questionnaire	Significant correlations among the variables were obtained.
Henry et al. (2015)	To investigate whether core characteristics of DMCs can be manifested in participants' descriptions of motivated behavior to examine the validity of the DMC construct	Semi-structured interviews, self-plotted graphs	Reported DMC features included positive emotionality, a salient facilitative structure, and the direction toward long-term investment goals. Vision did not seem to play a central role.
Henry and Davydenko (2020)	To compare approach and avoidance regulation foci during DMCs	Semi-structured interviews	Learners with approach orientations reported enjoyment and well-being, while those with avoidance orientations reported worry and stress.
Ibrahim (2016b, 2017)	To explore the stages of a DMC and its characteristics	Phenomenological analysis of interviews	A DMC was reported to follow a predictable structure from launch to closure. Participants reported a central role for positive affect, but volitional self-control may be dispensable. A DMC can be experienced by learners at different levels and time-scales and by groups.
Ibrahim (2016a)	To analyze the emotional element of the DMC experience	Phenomenological analysis of interviews	Participants reported excitement due to a sense of progress, development, and identity transformation. Vision did not seem to play a central role for all participants.
Ibrahim and Al-Hoorie (2019)	To find out the conditions in which a group DMC can be experienced	Phenomenological analysis of interviews	A group DMC was reported to be facilitated through forming a group identity, attaching personal value, and providing partial autonomy.
Ibrahim (2020)	To explore what fuels the intense and sustained motivated behavior which distinguishes the phenomenon from other types of high motivated engagement	Questionnaire and interviews	Positive emotionality was the dominant type of affect experienced in a DMC (i.e., motivation was perhaps fueled by positive affect). This connection was attributed to making tangible progress toward a personally valuable learning goal and a perception of productivity, skill acquisition, personal development and transformation.
Koné (2020)	To examine the effect of a group DMC on perception of assessment	Intervention with reflective journals	The DMC experience led to students enjoying the assessment. There was no control group or pre-post quantitative assessment.
Muir (2016)	Study 1: To examine the recognizability of DMCs	Study 1: Online survey	Study 1: DMCs seem to be well-recognizable and widely experienced.

	Study 2: To examine inducibility of a DMC in language classes	Study 2: Intervention, Skype semi-structured interviews, diary analysis	Study 2: Participants reported that project-based teaching was successful in enhancing a group DMC and language development, though no quantitative measures or a control group was included.
Murphy et al. (2017)	To explore the characteristics of a DMC and whether insights from neuroELT can help to explain it	Telephone interviews	A DMC was reported to involve goal-orientedness, salient facilitative structure, and positive affect, though vision did not play a major role. DMC description seems to align with neuroELT maxims.
Pietluch (2018)	To explore the relationship between self-efficacy and DMCs	Questionnaire with open-ended questions	There is a strong association between self-efficacy and DMCs. Participants' responses suggest that self-efficacy increases during a DMC.
Selçuk and Erten (2017)	To explore the patterns and perceived causes of language learners' motivational changes while studying a foreign language	Retrodictive qualitative modelling, self-plotted graphs	One learner reporting to have experienced a DMC recalled more stable motivational and affective patterns than another learner not reporting to have experienced a DMC.
Sugino et al. (2017)	To explore sources of teachers' demotivation, their strategies to cope with it in order to extract factors that might lead to a DMC	Questionnaire with open-ended questions	Students' attitudes were the most important factor for teacher demotivation.
Watkins (2016)	To examine the feasibility of a curriculum structured around a DMC and its effect on learner confidence	Intervention, retrospective questionnaire	Descriptive results suggested improvement in self-confidence but with unexplained fluctuations in weekly motivation. It was difficult to determine whether learners actually experienced DMCs. No inferential statistics were presented, and no control group was used.
Zarrinabadi et al. (2019)	To examine the characteristics of a DMC and explore its association with some psychological variables	Semi-structured interview, self-plotted graphs, stimulated recall	A DMC was reported to involve goal-orientedness and vision, salient facilitative structure, and positive affect. The participants linked their DMC experiences with willingness to communicate, self-confidence, self-concept, and autonomy.
Zarrinabadi and Tavakoli (2017)	To examine the characteristics of DMCs	Semi-structured interviews	A DMC was reported to involve goal-orientedness and vision, salient facilitative structure, and positive affect.

Table 3 Characteristics of participants

	Sample size (female)	Age <i>M</i> or range	Level	Context	Target language
Colombo (2017)	4 (50%)	-	University	USA	Spanish
Dastgahian and Ghonsooly (2018)	63 (100%)	18	High school	Iran	English
Direckze and Ratwatte (2017)	4 (100%)	-	School teachers	Sri Lanka	English
Ghanizadeh and Jahedizadeh (2017); Jahedizadeh and Ghanizadeh (2021)	320 (79%)	24	Universities and language institutes	Iran	English

Jahedizadeh et al. (2021)	376 (87%)	24	Universities and language institutes	Iran	English
Henry et al. (2015)	3 (100%)	31	University	Sweden	Swedish
Henry and Davydenko (2020)	18 (72%)	20-50	Adult	Sweden	Swedish
Ibrahim (2016a, 2016b, 2017); Ibrahim and Al-Hoorie (2019); Ibrahim (2020)	18 (39%), 4 teachers, 1 principal	28*	University	UK	English
Koné (2020)	60 (42%)	17-21	University	Mali	English
Muir (2016)	1452 (72%, Study 1)	16-60+	Mixed	Mixed	Mixed
	16 (56%, Study 2)	18-40	University	Australia	English
Murphy et al. (2017)	7 (72%)	-	University	Japan	English
Pietluch (2018)	88 (54%)**	20-42**	University	Poland	English
Selçuk and Erten (2017)	2 (100%)	18	University	Turkey	English
Sugino et al. (2017)	34 (74%)	20-50+	University teachers	Japan	English
Watkins (2016)	25 (72%)	-	University	Japan	English
Zarrinabadi et al. (2019)	10 (30%)	16	High school	Iran	English
Zarrinabadi and Tavakoli (2017)	2 (100%)	26	Language institute	Iran	English

Note. \* Average of the learners (i.e., not teachers); \*\* female percentage and age range of the entire sample, including participants excluded for not exhibiting DMC characteristics.

## 6.2. RQ1: Characteristics of DMCs

When it comes to RQ1, the three characteristics argued to be necessary for distinguishing DMCs from other constructs, a major concern has to do with a situation analogous to a chicken-and-egg problem. Recruiting participants was usually deliberately based on the posited DMC characteristics – while excluding those not exhibiting them – before concluding that the results supported these characteristics. As an illustration of this circularity, one report in our pool used “purposeful sampling” in that “the key components of DMCs functioned as the guide” and that “only those students whose motivational experience had all of the key elements of DMCs were recruited.” The researchers then concluded that “the DMC construct proposed by Dörnyei and his associates accounted well for such a motivational experience.” Such circularity leads to a conceptual confusion that makes it hard to determine whether those characteristics are actually necessary since some excluded learners might still experience DMCs without exhibiting all these characteristics. Other reports excluded participants for not stating a *specific* goal beyond the desire to improve one’s L2 proficiency or not providing elaborate affective details. Again, these exclusion criteria presuppose that these features are essential for the DMC experience. Ideally, participants should be presented only with the two *defining* characteristics of DMCs (a surge toward a goal) without pre-conceived notions about this phenomenon (e.g., whether the goal should be specific, the emotion intense, or any other non-defining characteristic) to avoid confirmation bias. A major factor contributing to this problem is the fact that there is

currently no psychometrically valid instrument showing adequate predictive validity which could be used to determine whether a DMC occurs, when, for how long, or how intensely (see also Peng & Phakiti, 2020). Obviously, sound measurement is a prerequisite for any subsequent inference.

Our review also points to concerns about the evidence for each of the three characteristics posited for DMCs. When it comes to vision, though it has been argued that a DMC cannot be achieved without it (e.g., Dörnyei et al., 2014, p. 13), several empirical reports have demonstrated that learners were in fact able to achieve a DMC without engaging in vision or visualization of their desired states (Henry et al., 2015; Ibrahim, 2016b; Ibrahim & Al-Hoorie, 2019; Murphy et al., 2017; see also Muir, 2020). Some participants explicitly denied that vision was essential to their DMC experience when directly questioned about it (Murphy et al., 2017), while others even reported deliberately avoiding vision (Ibrahim, 2016b). When it comes to group DMCs, vision has similarly been absent from the scene (Ibrahim & Al-Hoorie, 2019; Muir, 2016). These results are hard to reconcile with the argument that vision plays a central role in initiating or sustaining this experience.

The second characteristic is a salient facilitative structure. This indeed turned out to be a recurring finding in the empirical literature. Four issues remain unresolved, however. First, “structure” is used rather loosely and without a clear definition. For example, performing “progress checks” is something that probably most learners around the world already do – whether during the DMC experience or not – and something that they do in countless shapes and forms. This impreciseness makes the notion of structure essentially unfalsifiable since, on the one hand, different manifestations could be reinterpreted as structure, and, on the other hand, different researchers may define this aspect in different and possibly contradictory ways. Second, structure has been reported in individual DMC experiences but not so much in group DMCs (e.g., Ibrahim & Al-Hoorie, 2019). In some instances of group DMCs participants reported feeling pressured to perform tasks that they might not have performed otherwise (Muir, 2016), suggesting that a non-volitional motivational structure may not be an essential characteristic of group DMCs (see Dörnyei et al., 2016, for differences between individual and group DMC). If individual and group DMCs follow different dynamics, then this suggests that many findings concerning individual DMCs may be irrelevant to classroom practitioners who are primarily concerned with groups of students. Third, this literature has not addressed the potential conceptual confusion of treating such strategic behaviors (e.g., progress checking and subgoal setting) as part of motivation. In fact, this very point was one of Dörnyei’s critiques of integrative motivation (Gardner, 1985, 2010), arguing that motivation should be conceptualized as “the unobservable mental phenomenon”

(Dörnyei, 2005, p. 71), not the behaviors resulting from it. Nor, finally, is it conceptually clear why a salient structure should be an integral part of a DMC in the first place. Imagine a learner traveling to an L2 community to improve her speaking skills. She decides to engage in conversations with the locals about random topics and as a result experiences a motivational surge. Should this learner be disqualified if she does not set “subgoals” or conduct “progress checks” of her speaking skill (see Dörnyei et al., 2015, p. 100)? A lot of conceptual confusion can result if a motivational phenomenon is not distinguished from “descriptions of specific strategic behaviors” (Dörnyei & Ryan, 2015, p. 159).

In terms of the third characteristic, positive affect and eudaimonic well-being, two main concerns emerge. First, the DMC literature has not engaged seriously with doubts about the very construct validity of eudaimonic well-being. Kashdan et al. (2008), for example, argued that the philosophical distinction between eudaimonic and hedonic well-being does not translate well into science because eudaimonia is ill-defined and lacks consistent measurement. Indeed, in our pool of DMC reports, not a single study presented a psychometrically valid measure of eudaimonic well-being to examine how individuals experiencing DMCs compare either with others not experiencing it or with themselves in non-DMC states. In fact, some research (Fredrickson et al., 2013) even suggests that the eudaimonic-hedonic distinction might be genetically-determined and beyond conscious experience (for more on these controversial findings, see Brown et al., 2014; Fredrickson, 2016). Along the same lines, a large-scale study by Disabato et al. (2016), involving over 7,500 participants from over 100 countries, also could not establish discriminant validity between self-reported eudaimonic and hedonic well-being ( $r = .96$ ), leading them to argue in favor of a single overarching construct only.

Second, the picture is further complicated by findings pointing to *negative* DMC experiences with some participants wishing *not* to repeat it (Muir, 2016, 2020). Some of these participants reported feelings of stress, anxiety, and even depression, and the overall experience being a “bad memory” (Muir, 2016, p. 183). Again, these results are hard to reconcile with the argument that positive affect and eudaimonic well-being are necessary conditions for a DMC, or with the claim that a DMC can project positive emotionality at all stages (Dörnyei et al., 2015, p. 101). Being a bad memory that the learner does not wish to repeat is additionally hard to reconcile with the claim that DMCs represent self-concordant goals (see later for more on this negative side).

### 6.3. RQ2: Effect on language learning

Regarding RQ2, whether DMCs lead to an improvement in language learning, the above conceptual issues add a further layer of difficulty to this question.

Nevertheless, one of the striking observations in the literature to date is that there is not a single randomized controlled experiment (or other forms of experimentation, see Hiver & Al-Hoorie, 2020b) testing the claims made about DMCs. Conducting educational research, particularly interventions, is undoubtedly fraught with difficulties. After all, however, the ultimate promise of DMCs is that they lead to better learning and that classroom practitioners should therefore draw on them (e.g., Dörnyei et al., 2015; Ibrahim & Al-Hoorie, 2019; Peng & Phakiti, 2020). The predominant methodology is either qualitative (e.g., interviews) or observational (e.g., questionnaires and self-plotted graphs), both cases often involving a small number of participants. While the results of such studies are valuable and their emphasis is understandable in the early stages of research into a new construct, these methodologies offer limited insight into cause-and-effect claims of the sort that DMCs lead to better language learning or academic achievement, let alone making pedagogical implications for classroom teachers (see Al-Hoorie, 2018; Al-Hoorie et al., 2021).

Four studies did implement interventions (Direckze & Ratwatte, 2017; Koné, 2020; Muir, 2016; Watkins, 2016), though a number of methodological limitations preclude unequivocal interpretation of their findings. Most notably, there was no control group in any of these studies. Without a control group, it is hard to rule out the role of maturation effects. Furthermore, use of objective measures to assess the extent to which the DMC experience has advanced actual language proficiency or achievement was absent from these studies. Instead, qualitative self-report (particularly of enjoyment and excitement) has been the primary criterion variable, sometimes obtained retrospectively at the end of the study. In one case (Watkins, 2016), the researcher utilized a quantitative, self-assessed measure of self-confidence without inferential statistics, thus making it hard to determine whether any significant improvement had actually occurred (see Al-Hoorie & Vitta, 2019). All in all, these results are in line with Peng and Phakiti's (2020) observation that the effectiveness of DMCs with respect to actual language learning has not been systematically investigated or empirically demonstrated.

#### 6.4. Directions for future research

DMC scholars acknowledge that research into DMCs is still in its infancy (e.g., Muir, 2020). A great deal of research is therefore required to better understand this construct and its applicability to classroom practice. A major concern, however, is the falsifiability of DMCs. As Peng and Phakiti (2020) pointed out, "it is unclear whether Dörnyei et al.'s (2016) DMC is a proposed theory, as it does not contain a set of hypotheses that establish or predict the relationships among aspects of DMCs as well as learners' motivational behaviors" (pp. 2-3). If genuine

progress is to be achieved, this lack of falsifiability needs to be addressed in future research. Clear hypotheses need to be formulated and tested, and the results independently replicated (see Hiver & Al-Hoorie, 2020a).

Perhaps the first step in this direction is renaming a DMC as *sustained flow* (e.g., Ibrahim, 2020; Ibrahim & Al-Hoorie, 2019; Murphey, 2019). Ibrahim and Al-Hoorie (2019) argued in favor of using the synonymous term *sustained flow* for two reasons. First, this term acknowledges the connection to the mother construct, flow. A DMC is essentially “the temporal expansion of the flow mechanism” (Dörnyei & Ryan, 2015, p. 99), and such renaming thus helps achieve a cumulative literature built on findings concerning flow in the field of psychology. A primary difference between the two constructs is that flow is typically a single-episode phenomenon whereas sustained flow “involves a prolonged process of engagement in a *series* of tasks” (Dörnyei et al., 2016, p. 5, original emphasis). Second, the term *sustained flow* may help alleviate the confusing terminological proliferation recently witnessed in the field (see Al-Hoorie, 2018). The remainder of this section discusses three research directions that seem to hold promise for better understanding of the DMC phenomena.

#### 6.4.1. Need for comparative evidence

Not only should the evidence on DMCs be drawn from experimental designs utilizing objective, quantitative measures of language learning, but it should also ideally compare the effectiveness of DMC interventions with other established interventions. Just as Bandura (1997) put it, “power is best gauged by comparing . . . with methods of proven strength, rather than with untreated controls or with weak treatments” (p. 339). From a cost-effectiveness analysis, practitioners are not only interested in some absolute effect of DMCs but also in how they compare to their current practice (see also Peng & Phakiti, 2020).

Investigations that attempted to induce DMCs have primarily focused on group DMCs (as opposed to individual DMCs), and the main strategy used to induce DMCs was involvement in projects. According to Dörnyei et al. (2016), DMCs are directly linked to project-based language teaching: “We believe that a fully-fledged DMC can be seen as the *optimal form* of engagement with an extended project in general” (p. 20, original emphasis). From this perspective, DMCs seem to also have direct conceptual links to task-based language teaching. In fact, the prototypical example of a DMC triggering task is a group project followed by a class presentation (e.g., Ibrahim & Al-Hoorie, 2019; Muir, 2016). The way such tasks are operationalized seems to satisfy the four criteria of task-based language learning that Ellis (2009) proposed: focus on meaning, genuine gap the activity fills, reliance on one’s own linguistic and non-linguistic resources, and presence of

a defined outcome other than the use of the language. Establishing whether a DMC indeed constitutes the “optimal form” of either project- or task-based language teaching, in the sense that the additional DMC element leads to better language learning, requires comparative analysis with learners engaging in a similar activity – with high motivation – though without the DMC element.

The need for comparative evidence is clear when the implicit assumptions in the DMC literature are considered. One implicit assumption seems to be that high intensity involvement in a project, typically outside the classroom (see Ibrahim & Al-Hoorie, 2019), would eventually lead to better learning (see, e.g., Dörnyei et al., 2016, p. 20). However, research into the effectiveness of project-based homework shows that it is not very effective (Hattie, 2009, p. 235; see also Muir, 2020). A second implicit assumption is that building a vision of oneself in the future and raising one’s aspirations is effective for learning. Again, existing research does not support this view. According to a synthesis of evidence by the Education Endowment Foundation (2018), aspiration interventions are rather costly and have little to no impact on educational outcomes. The Education Endowment Foundation (2018) rates the expected educational improvement in months, and aspiration interventions are one of the few interventions that are currently rated as improving learning by zero months.

Apart from project- and task-based language teaching, DMCs likewise bear curious resemblance to self-determined motivation. In the words of Ryan and Deci, integrated regulation

represents the fullest type of internalization and is the basis for the most autonomous form of extrinsic motivation. Achieving the integration of an identification or an introject is an active and transformational process and typically requires self-reflection and reciprocal assimilation. Integrated regulation entails that one bring a value or regulation into congruence with the other aspects of one’s self . . . (Ryan & Deci, 2017, p. 188)

Therefore, there seems to be substantial overlap between the two constructs, including autonomy facilitation, goal-directedness, self-transformation, self-fulfillment, self-satisfaction, and self-congruence (see Dörnyei et al., 2016). Although a DMC is argued to be qualitatively different from high motivation as traditionally defined, there are no comparative analyses demonstrating that better learning occurs with a DMC than with high intrinsic motivation or integrated regulation. In fact, it might be the case that, in the long-term, a DMC might lead to *less* learning due to the fatigue the learner might experience after an intense burst (slow and steady wins the race). To truly be an optimal form of motivation, not only should a DMC show a significant difference from untreated control groups, but also from other established treatments, with the effect maintained over time. Note also that Hattie (2009) argued that a magnitude of  $d = 0.40$  should be considered the minimum benchmark to judge educational effects.



#### 6.4.2. Need for longitudinal evidence

One of the glaring ironies in the DMC literature to date is that, despite the fact that “time” is the primary focus, most reports have used retrospective accounts of DMC experiences occurring several years in the past, in one case reaching 30 years (Ibrahim, 2016b). This is in line with the trend in the language motivation literature more generally, where convenience has made cross-sectional designs reign (Al-Hoorie, 2018; Sugita McEown et al., 2014; see Colombo, 2017, for an exception).

There is general agreement among memory researchers that the role of episodic memory is not to reproduce past experiences in an exact manner (the reproductive function), but to *reconstruct* these experiences along with various errors, biases, distortions, and illusions (the reconstructive function). Schacter and Addis (2007) comment: “Retrieval of a past experience involves a process of pattern completion . . . in which the rememberer pieces together some subset of distributed features that comprise a particular past experience, including perceptual and conceptual/interpretive elements” (p. 774). In fact, even at the neural level, there is substantial overlap between the neural activity of true and false memories (see Dennis et al., 2015, for a review). Cognitive psychologists have therefore long emphasized the importance of obtaining verbal reports immediately during the activity (e.g., through stimulated recall and think-aloud protocols) rather than relying on long-term memory (see, e.g., Ericsson & Simon, 1980, 1984).

Real-time analysis of DMCs may shed light not only on whether language learning indeed becomes more effective during this experience, but also how. It is equally important to uncover the process leading to the outcome as it is to investigate the outcome (Al-Hoorie & Al Shlowiy, 2020; Vitta & Al-Hoorie, 2020). Several studies have used self-plotted graphs, sometimes asking the participant to retrospectively rate their motivation over the course of a whole previous year. This blunt approach would most likely fail to capture subtle fluctuations, leaving researchers with broad stages that participants report going through such as launch, stability, and closure (Ibrahim, 2016b). These results might also simply represent post hoc rationalization by participants as to how it would make sense for motivation to develop over time. Of course, prospective analyses may pose additional challenges since it may be hard to detect a DMC while it is happening or predict when it would occur or in whom (e.g., Watkins, 2016).

#### 6.4.3. Need for emphasis on potential side effects

The canonical example of a DMC experience is an overweight person suddenly deciding to work out and go on a diet. While this is usually a constructive decision, exercising and dieting without proper guidance can also backfire. Extending this

analogy to DMCs, it is not impossible to imagine a negative side of a DMC. The way DMCs are portrayed in the literature is in fact more akin to this overweight person injecting anabolic steroids. A DMC involves an unusually intense and sudden motivational surge that lasts for some time. Some researchers (e.g., Ibrahim & Al-Hoorie, 2019) have therefore cautioned against applying this approach frequently since inducing such intense surges may lead to learner fatigue.

Indeed, as mentioned above, findings by Muir (2016) reveal that some participants consider their DMC experiences as unfavorable to the extent that they do not wish to experience them again. This is inconsistent with the initial claims that DMCs project positive emotionality at all stages and represent who the individual really is self-concordantly (e.g., Dörnyei et al., 2015, p. 101). Considering the acclaim DMCs had received before more careful empirical assessment, it is understandable that Muir (2016) describes these findings as “a true eye-opener” (p. 182). Some of these participants reported adverse health effects resulting from the intensity of their motivational surge. The experience was described as “time consuming and at times it causes depression, anxiety, sleeplessness and other disorders” and as leading to “intense stress and panic attacks” (Muir, 2016, Table 36). Other students in Muir’s study stated that the level of intensity required for the occurrence of a DMC was unnecessary. Indeed, for many learners, language learning is a means to an end rather than a life-changing activity. It would seem too ambitious, and even naïve, to expect all learners to embrace a language learning project with the eudaimonic spirit described by Waterman (1993, p. 679): “an impression that this is what the person was meant to do” or “a feeling that this is who one really is.”

As Muir (2020) pointed out, a DMC is typically (and incorrectly) thought to lead to universally positive experiences. However, considering the above potential negative effects, there might be ethical concerns with recommending that classroom practitioners induce DMCs. Some may argue that this situation seems akin to recommending an experimental drug to the public before a reasonable grasp of its side effects.<sup>1</sup> Without doubt, it is not justifiable to focus on the positive effects of an intervention without adequate consideration of its potential negative consequences.

## 7. Conclusion

“A theory that offers both predictive and operative power has greater utility than one that is limited mainly to prediction” (Bandura, 1997, p. 286). Indeed, it might

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<sup>1</sup> This example was included in the manuscript before the COVID-19 pandemic. Therefore, it must not be interpreted as implying that any COVID-19 vaccine is or is not effective.

well be the case that DMCs have useful operative power for classroom teachers. It is vital that understanding of the characteristics of DMCs and their effectiveness in language learning is refined to avoid *generative entrenchment*, which occurs when a concept has other concepts, theories and practices built on it, consequently making it resistant to change even after it is shown to be problematic (Eronen & Bringmann, 2021; see also Henry & Cliffordson, 2017). The results of the present review indicate that the current conception of DMCs may need to be refined.

At the individual level, when a DMC emerges spontaneously, there are numerous accounts from individuals experiencing this phenomenon and enjoying it, though its exact characteristics are still debatable. At the group level, things become murkier when it is intentionally induced, however. Demonstration of DMC effectiveness requires experimental designs and comparison with other interventions. It additionally requires building a cumulative science, where effect sizes are compared across contexts, student populations (e.g., age, gender, proficiency, etc.), and learning purposes (English majors, English for specific purposes, etc.). It further requires balanced scrutiny of the empirical results, considering both positive and negative aspects. In the case of DMCs, there is currently little direct evidence for their superiority over a slow-but-steady approach when it comes to tangible language learning outcomes, especially when considering long-term consistency and fatigue.

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## APPENDIX

## List of DMC conceptual analyses

- Dörnyei, Z., Henry, A., & Muir, C. (2016). *Motivational currents in language learning: Frameworks for focused interventions*. Routledge.
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