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Zoned-In and Zoned-Out: An Analysis of the Roles of Automaticity and Mindedness in Flow Experiences

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There are controversies within both philosophy and psychology regarding the roles of automaticity and mindedness in flow experiences. Within both fields, it has been proposed that there is a continuum between the automatized activities of experts functioning in their area of expertise and similar automatized experiences in day-to-day functioning. Also at issue is whether there is conscious awareness present during highly automatized activities. Such issues were central to the McDowell–Dreyfus debate in philosophy and to Csikszentmihalyi's flow theory within psychology. To evaluate the roles of automaticity and engaged mindedness in flow experiences, the psychological conditions of being zoned-in and zoned-out are compared with respect to the nine elements Csikszentmihalyi used to describe flow. It is concluded that despite the presence of automaticity both when zoned-in and zoned out, these represent categorically different types of subjective experiences and that, therefore, the proposed continuum between the functioning of experts and functioning in daily life should be rejected. The question as to whether automaticity and/or mindedness constitute necessary and/or sufficient conditions for flow is also considered. It appears that both automaticity and engaged mindedness are necessary for flow, but neither alone, nor in combination, are sufficient.

Keywords: flow experiences, automaticity, mindedness, absorption

Recently, in both philosophy and psychology, controversies regarding the roles of automaticity and mindedness in flow experiences have come to the fore, albeit with somewhat different points of focus. Within philosophy one of the central points of controversy pertains to continuity and differences between smooth coping by highly trained experts pursuing activities in their area of expertise and similar coping in everyday tasks like driving or catching a frisbee. A second point of concern is whether or not, during fully absorbed coping, there is any sense of the "I" in consciousness as the doer of the action. Within psychology the issue of

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the roles of automaticity and mindedness in flow arose initially with respect to the nature of the continuity between what Csikszentmihalyi (1975) referred to as "deep flow," when individuals are fully invested in demanding activities characterized by a balance of challenges and skills and "microflow," involving automaticity in activities in day-to-day functioning that would not be described as demanding. More recently, in sports psychology, mindfulness techniques have been used to promote flow and improve the performance of highly trained athletes, raising questions as to whether this approach is incompatible with the automaticity and absorption of athletes performing "in the zone."

In the analysis provided here, I will use these controversies as a vehicle for generating a clearer understanding of the essential defining elements of what constitutes flow experiences, both in terms of the necessary conditions for their occurrence and the nature of the experiences themselves. In doing so, I will draw upon developments in cognitive science with respect to dual process theories of cognitive functioning as these have relevance for the controversies in philosophy and psychology, while helping to clarify the roles that automaticity, absorption, mindedness, and mindfulness play in experiences of flow. The aim here is to distinguish between two modes of psychological functioning, zoning-in and zoning-out, that are currently conflated within both philosophy and psychology. Disentangling these modes of functioning will entail making substantive changes to flow theory, thereby providing answers to three questions pertaining to the roles of automaticity and mindedness in flow experiences: (a) Is there a continuum as regards flow between experts functioning in their area of expertise (deep flow) and coping in day-to-day activities (microflow) or are these categorically different phenomenological experiences? (b) If both automaticity and mindedness are regularly observed in flow experiences, what is the nature of their interconnections? (c) Are automaticity and/or a particular type of mindedness necessary and/or sufficient conditions for experiencing flow?

Dual Process Theories of Cognitive Functioning

Dual process theories of cognitive functioning are focused on the distinction between fast, seemingly spontaneous, intuitive thinking and slow, deliberative decision-making. These two forms of cognitive processing have been given a variety of labels with System 1 and System 2 thinking being among those most widely used (Kahneman, 2011; Stanovich, 1999).[1]

System 1 thinking takes place below the level of conscious awareness, is comparatively fast, involves parallel processing (which is what allows it to be fast);

[1] There are many variations of dual process theories of cognition and differences in associated terminology as well (Evans and Stanovich, 2013). However, a generic approach to such theories will be employed here as only the core differences between System 1 and System 2 processing are relevant to the present discussion.

but because it is fast, it is also impressionistic and intuitive (Evans and Stanovich, 2013). Such thinking is associative and highly contextualized, that is, specific to the particular circumstances in which one is currently functioning. It is described as automatic rather than volitional. It is also highly dependent on a person's past experiences regarding what types of information can be processed by the system. Inspiration for creative endeavors and scientific insights may derive from System 1 functioning, then subsequently developed further by conscious reflective thought (Sowden et al., 2015). However, because such non-conscious thought processes are rapid and unreflective, they may also be inaccurate in the intuitions advanced; inaccuracies that would need to be identified and corrected at the conscious thought level.

In contrast, cognitive functioning in System 2 is conscious, reflective, and controlled or volitional. Such cognition is comparatively slow, usually linear, and has a relatively narrow bandwidth, that is, only a few things can be held directly in consciousness or in short-term memory at a given point in time. George Miller (1956) estimated the number to be 7 plus or minus 2. That number has subsequently been revised downward (Dietrich, 2004). It is typically rule-based and may be either concrete or abstract with respect to the reasoning involved. The comparative slowness of System 2 thought is actually an asset since it allows time for reflection, weighing the accuracy of the information available, and assessing whether the conclusions drawn are logical and well-reasoned or wish-fulfilling and illogical.

Some theorists (Epstein, 1994; Evans and Over, 1996) place System 1 and System 2 thinking within an evolutionary context with System 1 having evolved earlier providing us with implicit knowledge and the expression of basic emotions. System 2 thinking evolved later and is distinctly human, providing us with both explicit knowledge and more complex forms of emotional expression.

Zoning-In and Zoning-Out: Contrasting Forms of Psychological Functioning

I will use as a paradigmatic example of zoning-in, a baseball outfielder laying out in an effort to catch a sinking line drive. After seeing the ball leave the bat, the outfielder does not have time to calculate the velocity of the ball, the ball's rate of descent, the fielder's own velocity approaching the ball and angle of approach, the appropriate timing for making the horizontal leap, and the best angle to hold the glove, among other variables in this problem. Further, although the outfielder may have caught thousands of line drives prior to this occasion, the conditions here are not likely to be identical to prior experience so established habits need to be adjusted, at least to some degree, when attempting this particular catch. The ballplayer does not think about how to make the catch but responds automatically to the ball, and it is a testament to the player's skill that such a catch is successfully made with considerable frequency. In recognition of the difficulty of the task and

the outfielder's skill, the player would be described as "zoned-in" and a successful catch is often called "the play of the game."

This example is also an illustration of System 1 cognitive decision-making. It is fast, non-conscious, and highly complex, indicating parallel, rather than serial, processing. But it would be wrong to conclude that being zoned-in is strictly a function of System 1 thinking. Prior to the pitch being thrown, the fielder determines where best to be positioned based on knowledge of this particular batter's tendencies, including adjusting the position based on the particular count of balls and strikes then facing the batter. Further, the fielder increases the level of concentration and focused attention just prior to the pitcher's delivery. Such volitional decision-making exemplifies System 2 thinking, without which the catch would not likely have been made.

I will use as my contrasting example of zoning-out the task of driving, particularly on a route with which one has considerable familiarity, as in a commute. Certainly, driving has its own share of complexities. One needs to monitor the speed of one's own vehicle, the position and speed of vehicles ahead and behind one's own, the movements of cars that may enter the lane in which one is driving, the appropriate speed with which to enter the approaching curve, and so on. Here again, driving conditions vary from day to day, such that the habit patterns established based on past experience have to be adapted to what is taking place on the road at that particular point in time. But while driving is a skill of considerable complexity, it becomes so well learned that it can be performed without reflective, conscious awareness. A zoned-out driver can be said to be proceeding on "automatic pilot" and may become aware of driving again only after missing the intended highway exit. The successful completion of such a journey would not be recognized as anyone's "play of the day."

As with the zoned-in ballplayer, the zoned-out driver is engaged in an activity characterized by a high level of automaticity and System 1 processing. The driver does not need to think about how to drive to respond appropriately to road and traffic condition. Multiple aspects of driving are being performed simultaneously without apparent conscious attention to them or volitional decision-making.

The difference between zoned-in and zoned-out functioning is the role played by System 2 processing. Whereas the ballplayer is engaging with focused attention on the task at hand and actively making decisions designed to increase the likelihood of success, the driver's attention is not on driving. It may be that the driver's consciousness is unfocused, allowing thoughts to drift in haphazard fashion or System 2 thinking may be directed to some matter other than driving, such as a conversation with a passenger in the car or planning what to have for dinner.

Whereas it is clear that the zoned-in ballplayer is performing in a manner consistent with the conditions of deep flow as described by Csikszentmihalyi (1975, 1990), the zoned-out driver is not. However, is the similarity between the two with respect to automaticity and System 1 processing a sufficient basis for linking

zoning-in and zoning-out as allied phenomena under the broader rubric of flow experiences? As will become evident when considering the specifics of the controversies in philosophy and psychology regarding automaticity and mindedness in flow, this is a matter of active debate. Before turning to those controversies, it will be helpful to outline key elements in flow theory as developed by Csikszentmihalyi (1975, 1990, 1997) pertinent to the substantive points at issue.

Flow Theory: Automaticity and Mindedness

Csikszentmihalyi (1975) introduced the concept of flow, also termed optimal experience, nearly 50 years ago to refer to a set of conditions present when individuals are fully engaged in demanding activities requiring their best efforts if they are to succeed in what they are endeavoring to do. In his initial interview studies, what struck him as remarkable is that the same phenomenological experiences were generated by activities that differed very widely in their descriptive characteristics, including athletics and other physically demanding activities, activities in the arts, including performances before live audiences, and activities that were primarily mental such as chess and scientific endeavors. This research pertains to flow experiences of experts functioning in their area of expertise. In later research, Csikszentmihalyi used the Experience Sampling Method (ESM) to study flow experiences in everyday activities. ESM involves signaling respondents multiple times throughout their day and having them complete a brief questionnaire about what they are doing at that time and how they are experiencing the activity.

On the basis of interview studies, Csikszentmihalyi (1975, 1990, 1997) identified nine defining aspects of flow that were reported with great consistency: (a) the presence of a challenging activity to which the person brings a well-matched level of skill, (b) the subjective experience of merging of action and awareness, (c) the presence of clear goals, (d) unambiguous feedback as to how the person is doing when carrying out the activity, (e) concentration on a limited stimulus field relating to the task at hand, (f) a paradox of control in which there are feelings of control in activities for which the outcomes are uncertain, (g) a loss of self-consciousness, that is, the absence of self-referential thought, (h) a transformation in the experience of time with long periods of time appearing to pass quickly or brief time periods felt to be happening in slow motion, and (i) an autotelic (intrinsic motivational) quality to engagement with the activity.

There are within these nine aspects of flow, elements that are indicative of System 1 cognitive processing and others referencing System 2 processing. Among the former are the merging of action and awareness, the loss of self-consciousness, and transformations in experiencing time. These have a common theme reflecting absorption in an activity so complete that conscious, rational decision-making may be markedly reduced and perhaps absent entirely. The ballplayer, in flow, does not think, "How do I catch this ball?" but reacts spontaneously without

(conscious) thinking and does so with a high level of automaticity. Among the defining elements of flow reflecting System 2 functioning are the presence of clear goals, focusing of attention on the task at hand, and a conscious awareness of the feedback being received. Further, an individual, in anticipation of experiencing flow, will often choose a specific activity because the challenges entailed are well-matched with the skills to be brought to it. Here the cognitive functioning is volitional, conscious, deliberative, and reasoned. Within the context of experiencing flow, such thinking can be termed "engaged mindedness."

The terms absorption and automaticity both figure prominently in the philosophical and psychological controversies concerning flow to be discussed here. Whereas the terms are closely related, they are not synonyms and the distinctions between them are important. Absorption was defined by Tellegen and Atkinson (1974) as "a disposition for having episodes of 'total' attention that fully engage one's representational (i.e., perceptual, enactive, imaginative, and ideational) resources" (p. 268) and, as a consequence, there is a heightened ability to ignore distractions. Similarly, Nakamura and Csikszentmihalyi (2002) described flow as simultaneously entailing effortless attention and intense concentration on the activity being enacted. These qualities reflect absorption in flow as a focused, conscious, and volitional process as well as one in which one can lose track of time and during which there is an absence of self-referential thoughts. This aligns absorption with both systems of cognitive functioning.

Automaticity refers to the performance of activities that are so well learned that they can be performed without thinking about them. Both the ballplayer making the catch and the driver functioning on autopilot are exhibiting automatized behavior. System 1 automaticity may also be observed in mental activities, for example, the ability of a chess player, upon seeing an opponent's move, to intuitively think several moves ahead for the implications of a possible response. This is not a conscious, deliberative process but an almost instant recognition of potential outcomes, indicating that it is a function of System 1 processing.

For the zoned-in baseball player, absorption and automaticity are both present, though perhaps not simultaneously at every point in time. The fielder is fully attentive to what is taking place in the game, is "in the moment" with respect to what needs to be done, and, in all likelihood, is excluding extraneous matters from consciousness. All these indicate a high level of absorption. Automaticity arises at the moment the fielder recognizes the direction in which the ball has been hit. At that point there may be a partial, or even total suppression of conscious thought, while responding entirely on the basis of System 1 functioning. If consciousness is suppressed, then use of the term absorption becomes problematic. Clearly during System 1 functioning the fielder is attending to, and concentrating on, what is occurring on the field or the catch could not be made. But such attention is neither conscious, nor volitional at that moment, such that it does not then meet the full array of criteria for absorption as described above.

But automaticity can occur without absorption in the activity being performed as evidenced by the zoned-out driver. The driver proceeding on autopilot is not consciously attending to driving; attention is focused elsewhere, if it is focused at all. Here too, there may be a partial, or even total suppression of conscious thought, the driving being conducted on the basis of System 1 functioning. But since the driver is not focused on driving, this would not meet the definition of absorption as advanced by Tellegen and Atkinson (1974) or Csikszentmihalyi (1990). The phenomenological experience of the driver on a conscious level would be more appropriately labeled as "inattention," or "mind-wandering." Nevertheless, with respect to System 1 processing, the driver must be attending to traffic and road conditions, or an accident would have immediately occurred.

The foregoing leads to the conclusion that attentional processes are ongoing with respect to System 1, non-conscious functioning and that these may or may not be accompanied, or supplemented, by System 2, conscious attentional processes. Tellegen and Atkinson (1974) identify absorption as requiring involvement of conscious attention, as do Csikszentmihalyi (1990) and other flow theorists (Jackson et al., 2001; Lavoie et al., 2022; Marty–Dugas and Smilek, 2019). When both are present, there is a presumption that the quality of performance of any activity will be higher than if only System1 attentional processes are engaged.

There is a related distinction to be made with respect to mindedness as well. Engaged mindedness refers to conscious cognitive functioning focused on the activity being performed as evidenced by the ballplayer preparing for whatever might happen next. In contrast, since the zoned-out driver is focused on matters other than driving, what is occurring with respect to System 2 functioning can be described as "disengaged mindedness."

Perhaps because the nine elements defining flow co-occurred with such regularity in Csikszentmihalyi's interview research, he never undertook an analysis of which elements, or combination of elements, constituted the necessary and/or sufficient conditions for flow to be present. As will become evident in the analysis provided below, this lack of clarity has contributed to a range of contrasting perspectives on the roles of automaticity and mindedness in flow experiences as these are reflected in the controversies to which I now turn.

Controversies in Philosophy Concerning Automaticity and Mindedness as They Pertain to Experiences of Flow

I will begin consideration of the controversies concerning the roles of automaticity and mindedness in flow experiences with reference to the McDowell–Dreyfus debate, an exchange that was carried out over more than a decade in various forums. Schear (2013) characterized the central issue in the debate as "the extent to which conceptual rationality is involved in our skillful embodied rapport with

the world" (p. 2).[2] It was McDowell's view that "rational mindedness pervades the lives of the rational animals we are, informing in particular our perceptual experience and our exercises of agency" (2013, p. 41). In contrast, Dreyfus (2013), in discussing "fully absorbed coping," took the phenomenological view that at such times the "I" disappears and, with it, conceptual rationality. Referencing Merleau–Ponty, he described what is occurring as embodied action without there having to be a self-aware subject having the experience. McDowell countered, that conceptuality is operative even in unreflective perceiving and acting, though it is not necessarily fully in consciousness at all times.

In terms of System 1 and System 2 thinking, Dreyfus appears focused on the former, as fully absorbed coping is automatized and occurs below the level of consciousness, hence without self-awareness. McDowell's contention that rational mindedness is also present in embodied action would imply conceptuality in System 1 thinking. This position appears defensible in that functioning at that level is associated with intuition, an integral aspect of many scientific discoveries, and with inspiration, a crucial element in creativity across the arts. To be useful, both intuition and inspiration require conceptuality relevant to the projects in which the person is engaged. However, for McDowell's view to be sustained, the broader question as to whether conceptuality is pervasive in System 1 processing would have to be answered in the affirmative.

Turning to the role played by the concept of flow in the McDowell–Dreyfus debate, it appears that Dreyfus initiated discussion of the concept as the subjective state present when a person is engaged in fully absorbed coping (Dreyfus, 2007). The examples he provides range from experts engaged in activities in their area of expertise, such as playing sports or blitz chess, to actions in everyday life such as catching a frisbee or opening doors. Thus, both the exemplars I introduced earlier, the zoned-in ballplayer and the zoned-out driver, would qualify as engaged in fully absorbed coping and as experiencing flow, based upon the criteria he is using. McDowell accepted Dreyfus's usage of the concept of flow in this context, but argues that conceptuality is still present in such embodied action, absent conscious functioning.

It is worthwhile to quote a relevant passage by Dreyfus in full:

> But absorbed coping is not just another name for involved coping. It is involved coping at its best. Experts experience periods of performance, variously called "flow," "in the groove" and "in the zone," when everything becomes easier, confidence rises, time slows down, and the mind, which usually monitors performance, is quieted. Yet performance is at its peak. Something similar happens to each of us when any activity from taking a walk, to being absorbed in a conversation, to giving a lecture [sic] is going really well. That is, whenever we are

[2] It is beyond the scope of this essay to consider the range of arguments brought to bear on this issue and I will focus here upon matters relevant to the understanding of the concept of flow.

> successfully and effortlessly finding our way around the world. Athletes in such situations say they are playing out of their heads, and in much of our everyday coping, so are we. (Dreyfus, 2007, p. 373)

In the paragraph quoted, Dreyfus is quite apparently referencing the concept of flow as described by Csikszentmihalyi and drawing a direct connection between the flow experiences of highly trained individuals engaged in objectively demanding activities in their area of expertise and the subjective experiences arising when we engage in a wide range of day-to-day activities that, objectively, are not that demanding when we do them. It is notable that neither Dreyfus nor McDowell make reference to the role played by the balance of challenges and skills as a condition for experiences of flow, though this was the element of flow to which Csikszentmihalyi (1975, 1990) devoted the greatest attention. The continuity Dreyfus perceives between the fully absorbed coping of experts and similar coping in day-to-day living is based solely on the absence of conscious awareness during the automatized actions in each instance.

Dreyfus makes the point that conscious thinking focused on automatized actions has a disruptive effect upon smooth coping. There is substantial research evidence in support of that observation (Jackson and Beilock, 2008; Wulf and Su, 2007). Montero (2013, 2015) has referred to this as the "principle of automaticity" but questions the ecological validity of the research on which it is based, as well as its applicability to expert performance. Montero is critical of Dreyfus's understanding of expert performance, pointing to the degree of difficulty involved in such activities and the need for continuing awareness as to whether performance is matching the expectations for it. By extension, this critique applies to his understanding of flow. Since a primary condition of flow is the presence of a balance of the challenges posed by a demanding activity and the skills one brings to it, performing in flow is not, and should not, be expected to be "easy." Further, as she describes, experts engaged in objectively challenging activities have an explicit desire to improve their performance, and that doing so requires conscious attention to performance, that is, engaged mindedness. She and her colleagues (Montero, 2015; Toner et al., 2015) have also described the ways in which automaticity itself can lead to disruptions in performance; disruptions for which conscious awareness can aid in rectification, that is, improved outcomes.

With specific reference to automaticity in the performing arts. Montero (2015) points out that "performing the same piece in the same way day in and day out can result in a performance without spark" (p. 314). If performing on autopilot, that is, while zoned-out, results in something stale and uninspired, performing with spark entails being in the moment consciously experiencing and expressing the emotion being enacted. The type of inspired performance Montero calls for appears a perfect fit with Csikszentmihalyi's conceptualization of flow. The consciousness that Montero views as essential to expert performance is not the

analytic, conceptual mindedness that Dreyfus seeks to exclude from such performance, but neither is it the pure, non-cognitive automaticity he perceives as being present.

Montero is correct in observing that the only way in which to succeed in a demanding undertaking is to give focused attention to what one is doing, including consciously monitoring regarding how the activity is being carried out. High levels of automaticity, what Dreyfus terms fully absorbed coping, are an essential element in expert performance as well, which Montero acknowledges. We are faced with the seeming paradox that unconscious automaticity and conscious, engaged mindedness are mutually incompatible, yet both are required for successful expert performance, and without successful performance, the subjective experiences of flow, if they were present, would not be long sustained.

The paradox just described is readily resolved by dual process theories of cognitive functioning. There is general agreement that both System 1 and System 2 processing are typically both on-going simultaneously and that information is processed in both directions (Evans and Stanovich, 2013). The automaticity in expert performance is a function of System 1 processing, while the necessary conscious monitoring of performance is a function of System 2. The two systems, in fluid, efficient, and coordinated fashion, maximize the likelihood of success in an activity, and with that success, generate and sustain subjective experiences of flow.

But what then is to be made of the principle of automaticity, that attention to automatized activity disrupts performance? This principle appears to run counter to both the resolution of the paradox just proposed and the presumption expressed earlier that the simultaneous engagement of non-conscious System 1 and conscious System 2 attentional processes should result in better performance than would automaticity in System 1 functioning alone. The principle of automaticity can now be clarified to state that when conscious attention is focused on the physical mechanics of performing an automatized activity, performance is likely to suffer. In contrast, when conscious attention is directed toward a fuller understanding of the situational context in which an activity is being performed, the quality of performance is likely to be enhanced. To return to the paradigmatic examples I have been using, the zoned-in ballplayer consciously deciding where to be positioned, should enhance the likelihood of success, whereas trying to consciously decide how fast to run toward the ball will interfere with automaticity and likely result in a decreased probability of success. Similarly, the likelihood of an automobile accident occurring will likely be greater if the zoned-out driver were to attempt to focus conscious attention on how great a movement should be made in the steering wheel when making an up-coming sharp turn, but reduced by paying greater attention to the location of other cars in the vicinity.

Bergamin (2017), building on the work of both Dreyfus and Montero, takes a different perspective with respect to flow in expert performance. He seeks to break down the occasions on which flow occurs into separate events when highly

automatized, non-cognitive action occurs and the gaps between such events when active conscious reflection may occur. With respect to the former, which he explicitly labels as flow, he is in concurrence with Dreyfus, but supportive of Montero with respect to the latter, though he considers the gaps as intervals between experiences of flow.

This division of experiences appears problematic in several respects. First, such a division is inconsistent with flow theory in that the elements of flow involving clear goals, a high level of concentration, and awareness of unambiguous feedback are as integral to experiences of flow as are the feelings of merging with an activity, the loss of self-consciousness, and transformations in time. This bifurcation of what is considered to be flow and what is not appears arbitrary. Second, research participants do not make this distinction in either the interview studies on flow or the ESM studies. Correlations between measures of absorption and mindedness during flow experiences are significantly positive and typically of moderate strength (Lavoie et al., 2022; Sheldon et al., 2015). Third, whereas many activities providing opportunities for flow experiences are sufficiently varied over time that a division can be made between automatized actions with gaps between them (for example, many athletic events and stage performances), this is not always the case. Flow associated with acts of artistic creation, such as those involving musical composition, art, choreography, and writing are not readily separated into the aspects posited by Bergamin, nor are activities related to scientific discoveries.

Reflecting on the ways in which the concept of flow has entered the philosophical debate reveals a definitional problem with respect to how the term absorption is being used. While automaticity in functioning is evident in the examples provided, both with respect to experts functioning in their area of expertise and coping in everyday life, the applicability of absorption, as it pertains to flow, is not. As Csikszentmihalyi (1975, 1990) presents the criteria for flow, absorption entails focused attention on the activity engaged in, which does apply to the actions of the experts described. However, with respect to coping in matters of everyday life, such as catching a frisbee, opening doors, or zoned-out driving, the actor is specifically not focusing on the action being performed. In this light, what Dreyfus is referencing is fully autotomized coping rather than fully absorbed coping. This alteration in wording does not affect Dreyfus's challenge to McDowell, since the phenomenological "I" is still absent in such instances, whether during the referenced actions of experts or during activities in everyday life. This change in wording does, however, reduce the risk of conflating automatization with absorption.

A different problem arises with how Dreyfus, McDowell, Bergamin, and other philosophers are conceptualizing flow as incompatible with engaged mindedness. An example used in the McDowell–Dreyfus debate of fully automatized coping is blitz chess in which five minutes are allotted for the entire game. Unlike classical chess, moves must be made with such rapidity that there is virtually no time to consciously think about the implications of the moves being made. These

conditions make successful performance in blitz chess almost entirely dependent on System 1 cognitive functioning. Skilled blitz chess players are said to be functioning in flow as Dreyfus and McDowell use the term. They are also in accord that if the blitz chess player were to be asked why a particular move was made, providing a conscious and thoughtful answer to the question would entail moving out of flow during the response. In classical chess matches, time constraints are considerably less restrictive, and after the opening gambits, players routinely give conscious thought when deciding which move to make next. As a consequence, these players would not be considered to be in flow by Dreyfus or McDowell when doing so. This runs directly counter to the descriptions of flow provided by the classical chess players who participated in Csikszentmihalyi's (1975) study in which the concept of flow originated. If both blitz and classical chess players are providing descriptions of their experiences that warrant being labeled flow, then experiences of flow are associated with both automatized System 1 functioning and System 2 engaged mindedness. Going forward, flow theory should be structured to accommodate both.

Controversies in Psychology Concerning Automaticity and Mindedness as They Pertain to Experiences of Flow

In several respects the controversies in psychology regarding the roles of automaticity and mindedness parallel those raised in the philosophy literature. Notably, Csikszentmihalyi (1975, 1997) posited a continuum between what was termed deep flow and microflow. The former, deep flow, reflects the type of flow experiences reported in interviews with individuals engaged in highly demanding activities such as rock climbers, artists, chess players, basketball players, and surgeons. The latter, microflow, reflects what he considered less intense experiences associated with everyday activities. Consider the following passage from Csikszentmihalyi (1975) regarding microflow: "We all engage in small, almost automatic behavior patterns which are not essentially rewarded yet appear to have a necessary function. These patterns include idiosyncratic movements, daydreaming, smoking, talking to people without an expressed purpose, or more clearly defined activities like listening to music, watching television, or reading a book" (p. 141). Or again, "Sports, games, and other *flow activities* provide goal and feedback structures that make flow more likely. A given individual can find flow in almost any activity, however — working a cash register, ironing clothes, driving a car" (emphasis in the original, Nakamura and Csikszentmihalyi, 2002, p. 91).

The proposal of such a continuum has clear parallels to Dreyfus's claim of continuity between experts functioning in their area of expertise and the fully automatized coping shown in the performance of day-to-day activities. However, whereas Dreyfus was clear with respect to a common element of strong automaticity in which consciousness is suppressed in both instances, Csikszentmihalyi

(1975) is less clear regarding the basis for continuity between deep flow and microflow. One possibility is that a continuum from deep flow to microflow is intended to reflect a difference in intensity with respect to the nine characteristics of flow experiences. Csikszentmihalyi (1975, 1997) did not make such a point-by-point comparison of the two versions of flow, but that he had this possibility in mind is reflected in the following statement: "Very rarely do people report flow in passive leisure activities such as watching television or relaxing. But because almost any activity can produce flow provided the relevant elements are present, it is possible to improve the quality of life by making sure that clear goals, immediate feedback, skills balanced to action opportunities, and the remaining constituents of flow are as much as possible a constant part of everyday life" (Csikszentmihalyi, 1997, p. 34). However, it is difficult to envision circumstances when watching television, relaxing, smoking, daydreaming and other of the activities Csikszentmihalyi mentions, while automatized to varying degrees, would be characterized by many of the elements he has identified with flow.

An alternative interpretation of a continuum between deep flow and microflow is that they share the presence of some elements, such as the absence of self-consciousness and transformation in the sense of time, albeit there are also elements present in deep flow that are absent in microflow. In addressing the question of "How often do people experience flow?" Csikszentmihalyi (1997) wrote: "That depends on whether we are willing to count even mild approximations of the ideal condition as instances of flow. For example, if one asks a sample of typical Americans: 'Do you ever get involved in something so deeply that nothing else seems to matter, and you lose track of time?' roughly one in five will say that yes, this happens to them often, as much as several times a day; whereas about 15 percent will say that no, this never happens to them. These frequencies seem to be quite stable and universal" (p. 33). This creates the impression, whether intended or not, that the presence of even one or two elements associated with flow may be sufficient for satisfying the criteria for microflow, even if all the other elements are absent.

Csikszentmihalyi's (1990) ambivalence about microflow is captured in the following passage: "These are the 'microflow' activities that help us negotiate the doldrums of the day. But how enjoyable an activity is depends ultimately on its complexity. The small automatic games woven into the fabric of everyday life help reduce boredom, but add little to the positive quality of experience. For that one needs to face more demanding challenges, and use higher-level skills" (p. 52). Whereas it is easy to see why Csikszentmihalyi would equate flow with optimal experience when all nine elements of flow are present, as in deep flow, it becomes progressively harder to justify calling an experience optimal, the fewer the number of flow elements said to be present. Therefore, the question arises as to what extent differences in the compositional elements in an activity represent categorically different types of phenomenological experience as opposed to a difference in the completeness of the same experience.

Questions regarding the roles of automaticity and mindedness in flow experiences also arise from inconsistencies in findings obtained by Csikszentmihalyi in studies using his interview methodology and those involving ESM. Whereas the interview studies of respondents engaged in highly challenging activities reliably demonstrated linkages among the nine elements characterizing flow, studies using ESM with broader samples of respondents, found varying levels of association between those elements including instances in which the associations were strongly negative. Most notable in this regard are findings Csikszentmihalyi termed "the paradox of work" (Csikszentmihalyi, 1997; Csikszentmihalyi and LeFevre, 1989). Whereas work related activities were found to be high with regard to a balance of challenges and skills and concentration (engaged mindedness), they were least likely to be characterized by autotelic motivation, nor were they enjoyed. In contrast, leisure activities, both active and passive, comparable or somewhat lower with respect to the balance of challenges and skills and lower in concentration, were reported to be intrinsically motivated and were enjoyed to a substantially greater extent. These findings are typically interpreted as indicating the importance of context for experiencing flow, but viewed from a somewhat different angle, they demonstrate that mindedness plays different roles with respect to flow depending on which other elements of flow are present (or absent).

Another line of research associated with the role of automaticity and mindedness in flow experience emerged from the advocacy by many sports psychologists of mindfulness training as a means to promote better athletic performance (Gardner and Moore; 2007; Kaufman et al., 2018). Given the theoretical linkage of flow experiences with expert performance, mindfulness training was viewed as a method to increase flow and thereby improve performance. In essence, sports psychologists are seeking to promote a form of engaged mindedness as a means of enhancing activities characterized by extensive automaticity. In contrast to Dreyfus and other philosophers who have been focused on the incompatibilities of mindedness and automaticity, many sports psychologists perceive them as mutually reinforcing.

Whereas flow as described by Csikszentmihalyi (1975, 1990) incorporates elements of engaged mindedness, including absorption (in conjunction with automaticity), Sheldon et al. (2015) examined the possibility that mindfulness may be incompatible with flow absorption. They reasoned that mindfulness training promotes maintaining reflective awareness of each moment whereas the latter, as Dreyfus suggests, involves losing the inner observer in the ongoing, automatized activity. However, other aspects of flow involve felt control during flow activities (for example, focused concentration and attention to feedback) which are compatible with mindfulness training. Sheldon et al. conducted a series of studies using various research methodologies and found, as expected, a negative association between mindfulness and flow, but only for absorption in the activities in which respondents engaged. Lavoie et al. (2022) found a similar two-factor structure for

flow experiences, labeling the dimensions absorption and fluency, with fluency having much in common with Sheldon et al.'s scale of felt control. These dimensions were found to be related to differing aspects of activities, with the fluency dimension more strongly related to familiarity with an activity, the skills brought to it, and improvement over time, whereas absorption was more strongly associated with motivation for activity continuation. However, in both sets of studies, the scales for felt control and absorption were positively correlated indicating that research participants perceived both as present in their flow experiences.

Similar to the analytics offered by philosophers, neither Sheldon et al. (2015) nor Lavoie et al. (2022) make reference to the balance of challenges and skills as an integral aspect of flow experiences and Sheldon et al. do not refer to autotelic motivation in their structural analysis of flow. As a consequence, there is the possibility that while the results are informative about absorption and felt control/fluency when one is engaged in activities, they may not clarify the nature of the construct of flow itself, if flow is to be defined as the full array of elements Csikszentmihalyi attributed to it.

A Possible Continuum of the Functioning of Experts in Their Area of Expertise and Successful Coping in Day-to-Day Activities

Given the positing of a continuum regarding flow between the functioning of experts in their area of expertise and successful coping in day-to-day living in the controversies discussed above, it is appropriate to focus on how each of these forms of action stand with respect to the nine elements of flow described by Csikszentmihalyi (1990). In doing so, I will use a different order of presentation than appeared in the opening of this manuscript so as to group together those elements associated with felt control/fluency and with absorption.

A Balance of Challenges and Skills

One of the most significant differences between the skilled performance of experts and activities in everyday life pertains to the level of challenges and skills present in the activities being enacted. Activities in the realms of athletics, the arts, the sciences, and others referenced in Csikszentmihalyi's interview studies all entail objectively demanding challenges encountered on an ongoing basis. Because high levels of challenge are typically present, being zoned-in becomes virtually a continuing requirement if performance is to be successful. In contrast, activities of daily living, while challenging when first mastered, become routinized to a degree that further challenges are experienced only rarely. It is the lack of challenge that allows us to become zoned-out.

Montero's (2015) point regarding the desire of experts to continually improve the quality of their performance echoes Csikszentmihalyi's (1975, 1990) observations

concerning the progressive nature of flow experiences. Because the balance of challenges posed by an activity and the skills being brought to it are in a dynamic relationship that changes over time, experiences of flow with respect to any given activity will also change. Starting from a point where the two are balanced and flow is present, further experience typically results in an increase in skills and a decrease in the level of challenges experienced, followed by an experiential change from flow towards boredom. In order to restore flow, the person will likely seek to increase the level of challenges undertaken, quite possibly to a level where the challenges present exceed existing skills and anxiety is experienced. By working through anxiety in addressing a more challenging task, skills improve, the balance of challenges to skills is restored along with experiences of flow. As this cycle repeats over time, the net effect is an ongoing progressive development of skills.

Whereas the progressive nature of flow is present for experts functioning in their area of expertise, it is notably absent in activities of everyday living. Once the skills associated with working a cash register, ironing clothes, or driving a car are mastered up to a certain standard, there is little incentive to increase the level of challenge in the task and any desire for improvement subsides. It is at that point that the activity begins to become increasingly automatized and disengaged mindedness during its performance becomes possible. One can now zone-out while engaged in the activity.

An Autotelic Quality to the Experience

Whereas the respondents in Csikszentmihalyi's interview studies were notable for their autotelic motivation for the activities in which they were engaged, it cannot be said that all experts functioning in their area of expertise are intrinsically motivated. There are certainly instances in which experts are extrinsically motivated or have experienced burnout accompanied by diminished motivation. However, given the association of flow with intrinsic motivation, the proportion of experts functioning in their area of expertise who are intrinsically motivated for the activities in which they are engaged is undoubtedly quite high. The same cannot be said for coping in day-to-day activities as studied using ESM. The paradox of work described by Csikszentmihalyi (1997) provides evidence that even when there is a balance of challenges to skills, respondents very frequently report that they would prefer to be doing something else and that they are not enjoying what they are doing, clear indicators that the employment or education-related activities in which they are engaged are not intrinsically motivating. Only for leisure activities involving hobbies, sports, and watching movies was intrinsic motivation evident as was a balance of challenges and skills (Csikszentmihalyi, 1997). Such leisure activities are certainly a part of day-to-day living, but the part in which we are most likely to be functioning as experts in our own specific

area of expertise. Other routine aspects of day-to-day functioning, such as those described by Csikszentmihalyi as involving microflow, typically are not characterized by intrinsic motivation.

Presence of Clear Goals

Whereas experts functioning in their area of expertise almost always have clear goals for what they are seeking to accomplish, the same cannot be said for activities in daily living. Even when clear goals are present with regard to the latter, there is typically a difference with respect to the nature of the goals being pursued. Because expertise is associated with a balance of challenges and skills and with intrinsic motivation, the goals being pursued are likely to be accomplishments for which there is a high degree of personal, intrinsic investment, for example, winning an athletic or other type of competition, creation of a work of art, or making a scientific discovery. In contrast, for day-to-day activities, the primary goal is the successful completion of the task, for example, ringing up a sale successfully, having neatly pressed clothing, or arriving at one's destination safely. It is not that such goals are unimportant or that there is an absence of personal investment in them, but all are instrumental, rather than intrinsic, such that one looks forward to their completion as an opportunity to move on to some other, preferred activity.[3]

Presence of Clear and Unambiguous Feedback

The presence of clear and unambiguous feedback, or more precisely, the awareness of such feedback is typically present both for experts functioning in their area of expertise and for functioning in everyday activities. For the former, clear feedback is immediate in athletic and other competitions and in artistic performances before a live audience. It is less immediate or clear in creative endeavors such as art, musical composition, or writing. In such endeavors, one criterion for success would be how well a creation matches the creator's inner vision, an ambiguous standard, or the eventual reaction of the intended audience for the creation, perhaps long delayed feedback. It should be noted that only immediate feedback has an impact on the occurrence of subjective flow experiences at the time of performance, though delayed feedback can have important implications for performance of an activity on subsequent occasions (and thus, impact future experiences of flow). For the latter, clear and unambiguous feedback is provided by whether the actions involved result in the intended outcome, for example, the sale is completed, the clothes are pressed, or the driver arrives at the destination safely.

[3] For some, driving is a preferred activity because it provides an opportunity for personal control and a means of escape from external pressures. In these instances, as well, the activity is instrumental rather than engaged in for the sake of the activity itself.

Concentration on a Limited Stimulus Field

Concentration on a limited stimulus field is typically present when experts are functioning in their area of expertise as concentration is a strong predictor of success at a challenging task. However, there are exceptions here, as when talented athletes devote less than their full efforts to the task at hand. On such occasions they would be described as "phoning in their performance." Similarly, experts may not concentrate fully when distracted by personal problems. It should be noted that when an expert is not concentrating fully on the task, the likelihood that other elements of flow associated with both felt control/fluency and absorption will be present is also greatly diminished.

With respect to functioning in everyday activities, full concentration at the task at hand is optional. The stronger the habit patterns associated with an activity, the less concentration is required. Since success at such tasks does not depend on a high level of concentration, one's mind is free to wander. This is clearly evident for the zoned-out driver. It is, of course, possible to concentrate mindfully on such tasks, though whether this will contribute to subjective experiences of flow is by no means certain given that the challenges posed are at a quite modest level.

The Paradox of Control

The respondents in Csikszentmihalyi's interview studies described a sense of personal control in situations that were objectively uncertain with respect to their outcome, and which were in many instances quite hazardous, such as rock climbing. Csikszentmihalyi wrote that what was lacking in their descriptions was "the sense of worry about losing control that is typical in many situations of normal life" (1990, p. 59). Such confidence is derived from the extent of preparation that was done to be ready to meet both the objective and subjective risks that might be encountered during the activity. During a difficult, challenging activity the person feels in control of what is taking place and a successful outcome serves as testament to one's actual abilities on such occasions, a highly positive experience.

The sense of personal control is different with respect to functioning in daily life. The experience of control is genuine for the reason that the skills the person brings to the task far exceed the level of challenges posed by it. However, because the challenges involved are minimal, there is also little personal satisfaction gained by the successful exercise of control.

A Loss of Self-Consciousness (The Absence of Self-Referential Thought)

Experts functioning in their area of expertise are highly invested in the activities in which they are engaged and, as described above, they concentrate on what

is necessary to succeed in the task at hand. Under most circumstances this has the effect of crowding out self-referential thoughts from conscious awareness, The result is full absorption in the activity. It is certainly possible that personal problems or other self-referential thoughts can intrude on consciousness, but if they do, the anticipated effect is to disrupt experiences of flow.

During highly automatized activities in daily living, what is taking place on a conscious level is inattention or mind-wandering, rather than focused attention on task performance. The content of consciousness when mind-wandering will almost certainly vary widely from person to person and from occasion to occasion and may or may not involve self-referential thought.

The Subjective Experience of Merging of Action and Awareness

The phenomenological experience of the merging of action and awareness is a strong indicator of absorption in a task and has been regularly reported as part of flow experiences by experts functioning in their area of expertise. The phrasing "becoming one with the action" strongly suggests that awareness is focused on the ongoing activity itself. In contrast, the mind-wandering associated with highly automatized activities of daily life implies that awareness is elsewhere, that is, not on the activity in which the person is engaged. This being the case, there can be no merging of action and awareness.

A Transformation in the Sense of Time

Perhaps the most iconic element in flow experience is the transformation in the sense of time, typically with extended periods of time appearing to pass quickly, but on some occasions with time seeming to pass in slow motion. This aspect of absorption is reported regularly by experts functioning in their area of expertise. The rapid passage in time has been attributed to task attentional demands during flow experiences (Im and Varma, 2018), which given the limited band width associated with System 2 consciousness, disrupts the normal mechanisms for keeping track of time. When a flow episode ends, and normal time tracking is restored, the length of the intervening interval is difficult to ascertain. The opposite transformation of time, time passing in slow motion, appears not to have been explained.

Interestingly, a foreshortening transformation in the sense of time also appears to be a feature of automaticity occurring with respect to activities of day-to-day living. When one is zoned-out, the normal time tracking process is also disrupted due to extended periods of mind-wandering. When the episode of being zoned-out ends, and the normal time tracking process is restored, the length of the intervening interval is again difficult to ascertain.

Conclusions

Regarding a continuum with respect to experts functioning in their area of expertise and functioning in day-to-day activities, there are many differences and few similarities. Even those similarities can be accounted for in different ways. Whereas Dreyfus is correct that both types of functioning may entail high levels of automaticity, he is mistaken with regard to continuity between the two with respect to experiencing most aspects of flow. Similarly, this analysis does not support the view expressed by Csikszentmihalyi (1975, 1990) that microflow in everyday life is a less intense or more limited version of deep flow. The presence versus absence of a balance of challenges and skills, autotelic motivation, and engaged mindedness constitute a categorical difference distinguishing the deep flow of experts functioning in their area of expertise from microflow experienced in day-to-day activities.

The categorical difference between deep flow and microflow corresponds to the difference between being zoned-in and being zoned-out. Further, System 1 and System 2 thinking appears to be central to the nature of the difference. Whereas deep flow involves both System 1 automaticity and System 2 engaged mindedness, for microflow only System 1 automaticity is involved. Therefore, within flow theory, the proposed continuum between deep flow and microflow should be rejected.

The Interrelationships of System 1 Automaticity and System 2 Engaged Mindedness in Flow Experiences

In considering how System 1 automaticity and System 2 engaged mindedness interrelate with respect to flow experiences, the starting point is the seeming incompatibility of both systems functioning in coordinated fashion at the same point in time. There appears to be a consensus within both the philosophical and psychological discussions of automaticity and mindedness that under at least some circumstances of high automaticity in embodied action, conscious thinking is suppressed. This led Bergamin (2017) to propose that individuals move into and out flow as they shift between automatized action and engaged mindedness. While I believe this points us in a productive direction, it incorporates an incompatible duality of System 1 and System 2 processing that is inconsistent with how cognitive theorists view the two systems.

System 1 processing involves rapid, parallel processing that is ongoing whether or not a person is engaged in System 2 deliberative, conscious decision-making. Its functions include not only control of automatized activities, whether when zoned-in or zoned-out, but also providing contextually relevant information into consciousness that may be useful with respect to the quality of the decisions to be made (Evans and Stanovich, 2013). It is proposed that it is the interplay between

Systems 1 and 2, and the associated coordination of automaticity and engaged mindedness that is at the center for understanding flow experiences. In advancing this proposal, it will be helpful to consider separately the three types of activities most frequently associated with flow that I referenced when introducing flow theory: athletics and other physically demanding activities, activities in the arts, including performances before live audiences, and activities that are primarily mental such as chess and scientific endeavors.

Athletics and Other Physical Activities

In athletics and other physical activities, it is usually easy to distinguish between those aspects of an activity associated with preparation for performance and the athletic performance itself. For the zoned-in ballplayer, preparatory activities include warming up for the game, reviewing information about the opposing team and, just before the play, the decision as to where to be positioned as well as increased alertness as the pitch is about to be delivered. The athletic performance itself is the making of the catch (or not). Similarly in sports such as golf, football, and soccer, considerably more time is spent in System 2 thinking during preparatory activity than in System 1, habit-based, automatized performance, which is often relatively brief on any specific occasion, though repeated throughout a game. In contrast, while automatized athletic performance is of more sustained duration in competitive races in track, swimming, and skating, the extent of System 2 preparatory activity is similarly extensive. The central point here is that the quality of System 1 based athletic performance is heavily dependent on the quality of the System 2 based preparatory activity. In turn, the quality of System 2 thinking is based in some substantial part on the quality of the contextual information provided consciousness from System 1 functioning via intuition or comparable means. The expression "Go with your gut" is an admonition to respect System 1 intuition.

Flow experiences in athletics and other physical activities will be most likely to occur under circumstances where there is an effective coordination of System 1 and System 2 functioning, in terms of both the quality of the information and the decision-making involved. Effective coordination also entails shifts between preparatory and performance activities that are as efficient and seamless as possible. In the absence of effective coordination between System 1 and System 2 functioning, not only is athletic performance likely to suffer, but experiences of flow become unlikely.

Artistic Endeavors

With regard to artistic endeavors, there are two quite different types of activities to consider. One group involves artistic performance in such areas as music, dance, and theater. The other involves artistic creation, such as music composition, dance choreography, and playwriting. In many respects achieving flow in

artistic performance mirrors the analysis of achieving it through athletic performance. Over-learned habits play a considerable role as musicians, dancers, and actors need to master their parts in a performance. The goal in each instance is to be able to perform their role without needing to think about which note, movement, or line comes next. Achieving this relies heavily on System 1 automaticity.

As with athletic activities, so too with artistic performance there is a large role to be played by preparatory activities. This applies most clearly with respect to learning the material to be performed. System 2 engaged decision-making is extensively involved throughout rehearsal activities and it is essential to the quality of the subsequent performance. Preparatory activities also occur just prior to the performance itself, such as the tuning of one's instrument, preforming limbering exercises before dancing, or applying make-up and attending to the props that are to be used on stage. While System 1 automaticity may play a role in these endeavors, System 2 monitoring is required for assurance that everything is indeed ready for the performance. Whereas there are differences between athletic and artistic performances in the timing of when System 1 and System 2 functioning are most extensive, and perhaps in the relative proportions of time spent in each, they are similar in that success is dependent on the effectiveness of their coordination over time as is the likelihood that flow will be experienced.

Artistic creativity appears to involve System 1 and System 2 functioning in ways that differ extensively from either athletic or artistic performance. First, while individuals engaged in such activities may have rituals they employ to achieve the frame of mind in which creativity is likely to occur, with System 1 automaticity being an element in such rituals, they are not, in themselves, central to the creative process. More importantly, System 1 processes of inspiration and intuition play a crucial role here, but it is not immediately evident how automaticity is involved. The following appears plausible as an account of how System 1 automaticity and System 2 engaged mindedness are coordinated in creative endeavors, and that coordination, in turn, gives rise to subjective experiences of flow.

Any field of creative endeavor has sets of rules for how artistic elements fit together to generate potentially successful outcomes. The nature of these rules varies across artistic disciplines and sense modalities. In the process of professional training such rules are learned as mental habits that operate in much the same way as habits involving physical activity. Someone appropriately trained with respect to such rules develops the capability to "think ahead," such that starting from Point A, only so many options exist that lead to a Point B worth considering, and on to Points C, D, and E, and so on. And of the available options, many will be familiar, often employed connections that lack freshness or novelty. It is the capacity at the level of System 1 functioning to recognize those connections that are both novel (or relatively so) and with the potential to "work" consistent with the applicable rules, that provides the basis for creative inspiration. Here again it is because System 1 functioning is fast and with broad bandwidth that such thinking ahead is

possible. There is extensive mental automaticity in the process. It may be that thousands of possible sequences are evaluated at the System 1 level, before something is identified as potentially viable. Whereas automaticity in athletic and artistic performances is readily observable, by its nature, mental automaticity is not.

While there are stories of a musical composition entering a composer's consciousness fully formed, even if true, these would be the exception. Creative music, choreography, or theater is not the work of System 1 functioning alone; it is an initial step providing inspiration for conscious, deliberative System 2 thinking. In effect, following inspiration, the composer, choreographer, or playwright thinks something to the effect of "I can work with this." Actually making the connections between Points A, B, C, and on involves a reflective process of selection among the various forms A, B, and C might take. And while this process is active in consciousness, System 1 functioning continues to influence the unfolding product. Some forms of A, B, or C may "feel right" in ways that other available forms do not. In this context, System 1 is functioning as intuition rather than as inspiration. Such intuition is the product of the years of experience the creative artist spent learning and honing the talents involved. So again, it is the effective coordination of System 1 and System 2 functioning, here alternating in more rapid succession than in the examples previously discussed, that accounts for both successful creativity and for accompanying experiences of flow.

In the previous paragraphs I have made use of the concepts of inspiration, intuition, and feelings of rightness. In doing so, I am referring to the interface of System 1 and System 2, that is, how information is being transferred between systems. This bears a striking similarity to what William James referred to as "fringe consciousness," a form of communication between the non-conscious (unconscious) and the conscious (Mangan, 2014). As Mangan describes it, "Since consciousness's limited resources are apparently less taxed when information is presented at lower resolution, fringe experiences need only to be distinct enough to reliably deliver their message. It is inefficient to burden consciousness with detailed information if simply informing it of a conclusion will do" (p. 167). But if conclusions are being presented at relatively low resolution, there is a greater likelihood that their significance might be missed. In a variation on Pasteur's observation that "chance favors the prepared mind," it is the artist's years of experience that prepares the mind to recognize the potential value in particular intuitions, even at low resolution.

Mental Endeavors

Similar to artistic creativity, it is proposed that other mental endeavors associated with flow experiences involve mental automaticity functioning in tandem with engaged mindedness, with both required for a successful outcome. An instructive example is blitz chess. As discussed previously, the extreme time

constraints involved minimize the involvement of System 2 functioning during the match, though such functioning *w*ould have been involved in developing a strategy going into it. During a match, success requires being able to think ahead about the implications of potential moves with remarkable speed, something that can only be accomplished by automatized System 1 processing. Classical chess, in contrast, allows for System 2 thinking to become an integral part of the competition as well. A skilled chess player can think multiple moves ahead for the multiple potential next moves under consideration. Here again, such thinking ahead is an automatized, System 1 mental process providing the player with multiple options, each with its own set of probabilities. What allows for System 1 effectiveness is the wealth of past experiences a skilled chess player has accumulated, experiences that have resulted in the creation of the necessary mental habits. For a novice chess player there is no equivalent scaffolding, such that a chess match involves System 2 processing nearly in its entirely.

The capacity to make discoveries in the fields of science or other areas again parallels in many respects the description provided for artistic creativity. It starts at a conscious, deliberative level of thought with the problem one is seeking to solve. For there to be any serious likelihood of finding a solution, extensive training and experience in the relevant fields are required as these provide the conceptual tools that will be utilized not only in conscious System 2 analysis, but supplies the scaffolding for System 1 thinking as well. In essence, work on the problem proceeds simultaneously at both system levels. Mental automaticity at the System 1 level occurs as multiple potential scenarios are considered in parallel processing in the effort to identify possibilities that may advance the project at hand. Inspirations and intuitions arise in System 1, including novel and unconventional possibilities, since such thinking is not constrained by the usual rules of logic typically applied in System 2 thinking. Once such ideas enter consciousness, and if recognized as possibilities worth pursuing, they are systematically evaluated and tested by System 2 functioning. While success by this process is by no means assured, flow experiences are a function of the efficient coordination of System 1 and 2 thinking itself and are not dependent on the outcome. Flow experiences will almost certainly be most intense, however, if a "eureka" moment is achieved.

Automaticity and Mindedness as Possible Necessary and Sufficient Conditions for Flow Experiences

Since Csikszentmihalyi (1975, 1990, 1997) did not seek to determine which of the nine elements of flow he described might serve as necessary and/or sufficient conditions for flow experiences, the wide variations of operational definitions of flow across research studies have created ambiguity as to whether the same underlying phenomenon being labeled "flow" is the referent. Whereas it is beyond the scope of this manuscript, to undertake such an analysis for the nine elements

described by Csikszentmihalyi, the foregoing analysis does provide the basis for doing so with respect to automaticity and the particular form of consciousness termed engaged mindedness on a challenging activity. I will address the matter of sufficiency first as it is the easier topic to resolve. Determining that some element is not a sufficient condition involves the search for instances in which the predictive quality is present, but the outcome being predicted does not occur. As the analysis advanced here demonstrates, neither automaticity nor engaged mindedness are sufficient to conclude flow is present.

Automaticity is associated with both zoning-in and zoning-out. As it frequently occurs with respect to functioning in day-to-day activities, it is not associated with a subjective condition that would warrant being considered as flow. Automaticity can occur in situations that do not entail a balance of a high level of challenges and a high level of skills being brought to those challenges. It can also occur in situations of an absence of autotelic motivation. And the presence of automaticity is often associated with an absence of focused concentration. To advance a claim that automaticity is a sufficient condition for flow would require concluding that none of these three elements are definitional aspects of flow.

Similarly, mindedness in the broad sense of conscious awareness is associated with both zoning-in and zoning-out, focused, engaged mindedness in the former case, disengaged, mind-wandering consciousness in the latter. Engaged mindedness can also occur under a wide array of circumstances that do not involve flow, such as conscious, focused attention directed toward handling personal problems in family life that are upsetting or distasteful. As a consequence, engaged mindedness also cannot be considered a sufficient condition for flow.

Questions as to whether automaticity and/or engaged mindedness constitute necessary conditions for flow are more complex. If it can be demonstrated that flow occurs in the absence of automaticity and/or engaged mindedness then either or both can be eliminated as necessary conditions. However, in all the examples of zoned-in activities used within this manuscript, both automaticity, either physical or mental were present as was focused, deliberative attention on the actions being taken. This constitutes prima facie support for viewing each as a necessary condition for flow experiences. This is not to say that the two, in combination, are sufficient conditions for experiences of flow as other conditions are almost certainly necessary as well. Principal among these are involvement in a demanding activity for which the person is intrinsically motivated and well-prepared to be successful (Waterman, 1990).

Concluding Comments

The principal conclusions reached in the preceding analysis are the following: (a) the deep flow experiences of experts functioning in their area of expertise are categorically different from microflow evident in day-to-day activities and

the proposed continuum between them should be rejected. The former entails both automaticity and absorbed, engaged mindedness. The latter entails automaticity without focused mindedness. The difference between them corresponds to the psychological states of being zoned-in and zoned-out. Going forward, flow theory should be revised to reflect this distinction; (b) the division of flow into preparatory elements involving conditions for flow and subjective experience of flow creates a false dichotomy. They are both aspects of an integrated event. Csikszentmihalyi identified a primary condition of flow as involvement in a challenging activity such that ongoing involvement of System 2 processing is virtually required if success is to be achieved. Automaticity, coordinated with engaged mindedness, is predictive of success when carrying out challenging activities. Without success in what one is doing, subjective experiences of flow are unlikely to arise, or if they were present during preparation, they will almost certainly not be sustained; (c) both automaticity and engaged mindedness appear to serve as necessary conditions for subjective flow experiences but are not, in themselves, sufficient. There are almost certainly other necessary conditions as well.

With respect to advancing flow theory, I am proposing that flow experiences arise when there is a high level of fluid, efficient, and coordinated interaction between System 1 and System 2 cognitive functioning. Within this context, System 1 functioning includes automaticity, whether in terms of physical and/or mental activity, as well as intuitive thinking and/or inspiration. System 2 cognitive functioning includes problem-solving preparatory activities prior to physical action, for example, in athletics or stage performance, full attentional absorption (that is, focused concentration on the task at hand), and ongoing monitoring of the feedback received to determine whether a shift in behavior is necessary in order to achieve success. System 2 cognitive functioning plays an even greater role in creative endeavors as there is ongoing monitoring of the match between the emerging creative product and the System 1 inner vision.

This perspective recognizes merit in Bergamin's (2017) observation of dynamic fluctuations in automaticity and engaged mindedness during episodes of flow, but focuses on their ongoing integration, rather than movement into and out of phenomenological states. Preparatory activities are as essential an aspect of flow as performance itself; with subjective flow experiences associated with both. If, as proposed, flow is the product of fluid, efficient, and coordinated interaction between System 1 and System 2 functioning, then the boundary between preparation and performance erodes.

A corollary to this proposal involves interpreting automaticity associated with everyday activities, being zoned-out, as predominate, if not exclusive, System 1 functioning relative to System 2 functioning. Whether at the level of consciousness there is mind-wandering or focused attention on matters other than the ongoing activity, the two systems are poorly coordinated, and flow experiences would not be expected.

Throughout this manuscript I have referred to experts functioning in their area of expertise. In doing so, I am endeavoring to coordinate my analysis with issues raised by Dreyfus. However, this may have created an impression that flow is experienced by a relatively modest proportion of the population rather than something with which most people are familiar. To the contrary, I believe flow is widely experienced, just not in the day-to-day activities as has been proposed by Dreyfus, Csikszentmihalyi, and others. For example, it has been widely reported that flow experiences occur when playing video games (Crowley et al., 2008; Jin, 2012; Lee et al., 2012). Indeed, video games are designed to provide multiple opportunities for encountering situations characterized by a balance of challenges and skills, with successful performance facilitated by the development of automaticity, and by engaged mindedness required to identify strategies for gaining experience points and leveling up. Further, it is possible to experience flow in any of a variety of forms of serious leisure (Stebbins, 2017), whether in sports at the amateur level, other forms of physical activity, chess, bridge, travel, birding, quilting, and so on. ESM research indicates that while most people do not experience deep flow at work, as evidenced by a lack of autotelic motivation, many people are engaged in forms of employment they do find intrinsically rewarding. I suggest that anyone who has identified intrinsically motivated activities in their life has established the foundation for flow and will have such experiences provided other necessary conditions can be satisfied.

The controversies discussed here are symptomatic of a critical problem regarding flow theory and empirical research on flow, namely a lack of consensus among scholars working in the area concerning both the conceptual and operational definitions of the construct. Whereas Engeser et al. (2021) considered the conceptual definition of flow to have changed little since the term was introduced by Csikszentmihalyi (1975), others have expressed concern over definitional problems that plague the field (e.g., Abuhamdeh, 2021; Gibson, 2016; Moneta, 2021; and Wright, 2016). For example, Rheinberg et al. (2003), Sheldon et al. (2015), and Lavoie et al. (2022) all created scales for assessing flow without items pertaining to either a balance of challenges and skills or autotelic motivation. Zimanyi and Schüler (2021) linked flow to antisocial activities not involving autotelic motivation. Seligman (2002), like Dreyfus, considered flow to exclude any form of consciousness, including concentration on a limited stimulus field and conscious awareness of unambiguous feedback. In contrast, Marty–Dugas and Smilek (2019) defined flow exclusively in terms of deep, effortless concentration. Lavoie and Main (2019) and Novak et al. (2003) questioned the value of considering a balance of challenges and skills as a criterion for the presence of flow. This lack of consensus regarding the definitional elements of flow invites confusion over the comparability of studies when flow is defined by differing criteria.

I will close with some observations about the assessment of flow that follow from the conclusion that there are two, likely more, conditions necessary for flow

experiences, but none that are sufficient in themselves. Because flow is a complex construct with multiple necessary defining elements, efforts to study the components singly, or even in incomplete combinations of necessary elements, are problematic if the goal is to better understand functioning in flow itself.

My recommendations with respect to research on flow going forward are, first, to identify the full panel of conditions necessary for constituting flow. Second, develop separate measures for each of the defining conditions, with the expectation that they will be positively correlated to a moderate degree, since all will be present when flow experiences occur but present on other occasions as well. The work of Sheldon et al. (2015) and Lavoie et al. (2022) represents a start in this direction for several elements of flow. Third, in future research on flow the complete panel of measures of necessary conditions should be administered, flow itself being operationally defined as present only when all necessary conditions are met. Comparisons of outcomes when all necessary conditions are present with instances when all but one condition are met should yield valuable information on the role in flow being played by the necessary defining element that is missing. In this manner, controversies regarding the nature of flow, such as those pertaining to automaticity and engaged mindedness, and other points of controversy as well, may be resolved through empirical research.

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