Mise en place: setting the stage for thought and action

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A school became safer after security measures were removed. Children can learn better in playful, rather than didactic, settings. At-risk students earned higher grades after writing about a personal value. A novel construct – *mise en place* – explains how small changes in context, such as these, can lead to large changes in behaviors by highlighting how the psychology of preparing to act within an environment shapes and is shaped by that environment.

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The John Paul Jones Middle School was infamous for being one of the most violent and chaotic schools in the Philadelphia system. Standard security measures, such as metal detectors, did nothing to help. When the school was taken over by American Paradigm Schools in 2012 this charter company chose not to tighten security, but to strip it away. With no metal detectors, no bars on the windows, and no security guards, the number of serious incidents reported at the school dropped – by 90% [1].

The changed physical environment of the school was not the only contributor to the drop in violence of course. However, cases like this, where small changes in context bring about large differences in behavior, present psychological puzzles. We propose a novel construct for explaining this and similar phenomena: *mise en place*. This French phrase refers to the preparations that chefs make before cooking, including physically altering their workspaces so that the necessary ingredients and tools are easily within reach. Although this preparation limits what a chef can make, it also facilitates the process of creating a given dish.

A psychological, rather than a culinary, *mise en place* refers to how one's stance towards a given environment places constraints on what one feels able to do within that environment, and how these assessments and predispositions impact the process of preparing to act. These contextual and dispositional factors unite to make a particular goal, or set of goals, easier to reach by emphasizing some choices and downplaying or eliminating others. This paper provides several examples of how using the psychological construct of *mise en place* can explain behavioral outcomes.

Many other theories have been proposed to describe how the contexts in which we find ourselves shape our behavior, perhaps even independently of our dispositions (e.g., [2,3]), possibly due to unconscious priming of internal scripts [4]. Although *mise en place* aligns with the predictions of these previous theories, and may operate by similar mechanisms, it carries a somewhat different emphasis. *Mise en place* delineates how both contextual and dispositional influences jointly affect individual approaches to a task by focusing on the interplay between these factors during the act of preparing to engage in a response. The defining characteristic of this concept is its focus on preparatory psychological processes, which occur before an action begins, and how these processes mediate the influence of contextual factors on behavior. Developing a fuller understanding of these preparatory processes can thus help us to predict when and how small contextual changes will have large effects on behavior (Box 1).

One illustration of the explanatory power of *mise en place* is the case of guided play. Guided play situations involve adults with specific pedagogical goals who structure the play environment and materials in service of these goals. However, within this prepared environment adults follow the lead of the children. Unlike more traditional classroom pedagogy, these carefully constructed situations invite children to take ownership of their learning and to bring a playful attitude to the task. Unlike free play, guided play channels children's interests and scaffolds their exploration, encouraging a disposition towards seeking out a meaningful learning experience. A focus on *mise en place* can explain why guided play, but not all types of play, successfully promotes learning (see [5]).

Evidence indeed suggests that children often learn better from guided play than from didactic situations ([6] for review). For example, Bonawitz and colleagues [7] presented preschool-aged children with a novel toy that had several functions: pulling one tube made a squeaking sound, pushing a hidden button inside a different tube turned on a light, and so on. When an experimenter taught children about the squeaker by saying: 'this is how my toy works', children reliably learned that function. But they failed to discover other functions of the toy when left to play on their own. By contrast, children who saw the experimenter discover the squeaker by accident did tend to discover the other functions when they played on their own.

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Box 1. Neural mechanisms of *mise en place*

Mise en place provides a framework for explicitly investigating the psychological processes of preparation, how these processes are shaped by factors in our experience and environment, and how the interaction of these factors in turn shapes behavior. One important mechanism for these processes is proactive control – mechanisms that govern behavior that are set into action before an impending trial stimulus is presented. Recent cognitive neuroscience investigations of cognitive control have made important theoretical advances by distinguishing proactive control mechanisms from mechanisms that are set into action only after the onset of a challenging trial stimulus (reactive control) [11,12]. Methods that directly examine dynamic changes in neural signals and neural modulation of pupil size in an online fashion during preparation for action have opened up a new window into the psychological and neural processes of anticipation and proactive control. Such signals predict reaction times on upcoming trials [12], change when one is anticipating a larger or smaller reward [13], and may differ substantially between adults of high and low fluid intelligence [11].

Applying this approach to the development of proactive control holds implications for children's abilities to adopt a given *mise* and the degree to which these abilities may be driven by factors under their own explicit control. Although 8- to 10-year-old children demonstrate clear signals of both proactive and reactive control, younger children and toddlers demonstrate a large developmental imbalance between these two processes. Signals linked to proactive control are much weaker than reactive control signals in 6-year-olds and are absent in 3- to 4-year-olds [14,15]. This is not to say that infants and toddlers are incapable of any sort of anticipation or preparation. However, this developmental imbalance provides insight into the growth of such skills in relation to other forms of control. This developmental pattern for proactive control can explain why having an adult-structured *mise en place* is especially important for young children. In the absence of self-generated proactive control mechanisms, guided play and other contextual influences may provide a critical external scaffold for young children's fledgling proactive control processes. This developmental pattern also predicts that the ability to explicitly manipulate a *mise* should develop from toddlerhood through late childhood in a manner that closely tracks the development of preparatory control mechanisms.

The link between this subtle contextual manipulation and the learning outcome can be understood in terms of children's *mise en place*. When the adult played the role of an expert with a specific piece of knowledge to impart, this shaped the children's approach to the learning situation and led them to assume that the toy had no other affordances. This context thus impacted children's approach to the toy even before a single independent learning opportunity arose. By contrast, when the demonstration was framed as an adult's accidental discovery, this suggested that the adult did not know everything there was to know about the toy. This context invited children to bring a more curious attitude to their future interactions with the object, leading them to think 'what else does this do?' rather than 'I know how this works.'

In general, if a playful environment is set up in the right way – if it fosters the right *mise* – children's exploration can lead to successful learning. In didactic environments, however, children are encouraged to adopt a passive stance as recipients of information, rather an active stance as seekers of knowledge. This conclusion has powerful implications for school environments that are based on high-stakes testing because it predicts that placing the highest value on learning the right answers would discourage precisely this kind of engaged learning.

Counter-intuitively, one additional prediction of this analysis of *mise en place* is that settings with more fantasy elements should lead to better learning than situations that are more realistic. Putting children into circumstances that break the laws of reality can signal the need for greater attention and consideration of more possible alternatives because these situations are different from those that children usually encounter. Such circumstances may also encourage greater reflection on why things are the way they are, as unrealistic thought-experiments do in philosophy and the sciences. In line with this analysis, research has found that children in playful or fantastical environments can learn and reason more effectively than children in didactic or realistic environments. Telling children to pretend or to imagine a faraway planet bolsters their ability to reason counterfactually [8]. Asking children to make judgments in the context of a fictional scenario leads to more accurate understanding of improbable events [9]. In addition, teaching children new words using a fantastical story leads to deeper understanding of these words than using a reality-based story (Weisberg, Ilgaz, Hirsh-Pasek, Golinkoff, Nicolopoulou, and Dickinson, unpublished data).

Successful applications of *mise en place* are evident for older students as well. One pervasive problem in education is the achievement gap between minority students, especially African-Americans, and their European-American peers. Although many programs have attempted to address this problem, recent work [10] takes advantage of the power of *mise en place* to achieve lasting effects with a simple intervention. These researchers randomly assigned middle-schoolers to write about either an important personal value or a neutral control topic such as their morning routine. African-American students in the intervention condition earned higher grade point averages at the end of the semester than those in the control condition. These effects were particularly pronounced for students who were initially low-achieving. Even more strikingly, these effects were maintained a full two years after the initial intervention. As with the Jones Middle School case and the effects of guided play on children's learning, a seemingly small event thus led to a dramatic change in behavior.

These authors explain their results with reference to a feedback loop whereby at-risk students perceive themselves as low-achieving, perform poorly in school, and thus receive evidence confirming their negative self-perception. The intervention interrupted this loop or prevented it from starting by changing these students' initial self-perception. To use the language of *mise en place*, this small contextual intervention affected the disposition with which these students approached their education. In addition, this disposition changed the context of their education; students in the intervention were less likely to be placed in remediation, possibly due to their teachers' changed assessment of their abilities. This case thus demonstrates how *mise en place* – one's preparation for action in a context – can shape behavioral outcomes. In addition, in the same way as these researchers found that their intervention most benefited the most at-risk students, *mise en place* predicts that a similar interaction effect would obtain in

other interventions because one's approach to an environment becomes a feature of the environment itself.

Mise en place provides a useful way to characterize and explain a variety of phenomena in psychology and education, and we believe that it has broad applicability throughout the cognitive sciences (see Box 1 for a discussion of a neural mechanism that may underlie its operation). Taking seriously the *mise en place* construct can make sense of otherwise puzzling behavior by encouraging a focus on the interplay among environmental settings, psychological attitudes, and behavior.

References

1 Deeney, J. (2013) A Philadelphia school's big bet on nonviolence. In *The Atlantic*. July 18 (http://www.theatlantic.com/national/archive/2013/07/a-philadelphia-schools-big-bet-on-nonviolence/277893/)

2 Gibson, E.J. (1988) Exploratory behavior in the development of perceiving, acting, and the acquiring of knowledge. *Annu. Rev. Psychol.* 39, 1–42

3 Kelling, G.L. and Wilson, J.Q. (1982) Broken windows: the police and neighborhood safety. *The Atlantic* 249, 29–38

4 Norman, D.A. and Shallice, T. (1986) *Attention to Action: Willed and Automatic Control of Behaviour*, Centre for Human and Information Processing Technical Report No. 99, 1980. Reprinted in revised form in *Consciousness and Self-Regulation: Advances in Theory and Research* (Vol. 4) (Davidson, R. et al., eds), Plenum Press, pp. 1–18

5 Lillard, A.S. *et al.* (2013) The impact of pretend play on children's development: a review of the evidence. *Psychol. Bull.* 139, 1–34

6 Weisberg, D.S. *et al.* (2013) Guided play: where curricular goals meet a playful pedagogy. *Mind Brain Educ.* 7, 104–112

7 Bonawitz, E. *et al.* (2011) The double-edged sword of pedagogy: instruction limits spontaneous exploration and discovery. *Cognition* 120, 322–330

8 Dias, M.G. and Harris, P.L. (1988) The effect of make believe play on deductive reasoning. *Br. J. Dev. Psychol.* 6, 207–221

9 Weisberg, D.S. and Sobel, D.M. (2012) Young children discriminate improbable from impossible events in fiction. *Cogn. Dev.* 27, 90–98

10 Cohen, G.L. *et al.* (2009) Recursive processes in self-affirmation: intervening to close the minority achievement gap. *Science* 324, 400–403

11 Burgess, G.C. and Braver, T.S. (2010) Neural mechanisms of interference control in working memory: effects of interference expectancy and fluid intelligence. *PLoS ONE* 5, e12861

12 Fan, J. *et al.* (2007) Response anticipation and response conflict: an event-related potential and functional magnetic resonance imaging study. *J. Neurosci.* 27, 2272–2282

13 Knutson, B. *et al.* (2001) Dissociation of reward anticipation and outcome with event-related fMRI. *Neuroreport* 12, 3683–3687

14 Chatham, C.H. *et al.* (2009) Pupillometric and behavioral markers of a developmental shift in the temporal dynamics of cognitive control. *Proc. Natl. Acad. Sci. U.S.A.* 106, 5529–5533

15 Jonkman, L.M. (2006) The development of preparation, conflict monitoring and inhibition from early childhood to young adulthood: a Go/Nogo ERP study. *Brain Res.* 1, 181–193