

Towards a neurocritique of dance

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1.

In recent years numerous studies have demonstrated that the unconscious exposure to a word, picture or event biases one's actions, perceptions and emotions. This is what in experimental psychology is referred to as priming. For example it frequently happens that once we have noticed a certain object we suddenly see it everywhere. This is not because it wasn't there before, but because we are now more susceptible to it: we have been primed. A word or event not only activates the neurons associated with its recognition, but a whole network of associations. Sensory inputs are like pebbles being thrown in a pond, creating ripples in all directions.

Using a two stage experimental set-up whereby participants are first primed with words such as 'love', 'cancer' or 'summer', it was shown that strongly positive or negative words influence people's mood accordingly. Another study showed that in a word reading test people read faster when the words were presented as part of the "Schumacher Word Reading Test" than as the "Shimuhuru Word Reading Test", perhaps because of an unconscious association with the famous Formula One driver. More controversially experiments have revealed how people are unconsciously biased by stereotypes.

The neural mechanisms underlying perception, emotion and judgment perform their function regardless of whether they are consciously activated by an act of will or unconsciously by features of the environment. Consciousness is relatively slow and costly in terms of energy consumption and so the brain will switch to autopilot whenever possible, allowing a speedy and efficient response. Learning a new movement sequence takes conscious effort, but after a few rehearsals the movements become as automatic as walking or chewing. The same is true of behavioral and thought processes. However, such automaticity comes at a price. Automatic processes are by definition unconscious and lack the flexibility of conscious responses. Patterns of thought can become stereotypes, learned responses default modes of behavior.

Experimental psychology dashes our hopes of watching a dance performance with an open mind. We always look through the fog of our own expectations and implicit assumptions. The name of the company and the choreographer, the title, the program booklet, reviews, press releases, interviews, the previous piece if it is a combined program, the day at the office, the argument with a friend who arrived late, all bias our thoughts and feelings.

What's more, as the psychologist Timothy Wilson has demonstrated in various experiments, introspection and trying to reason why we like what we like bears upon our judgment. In one experiment participants were asked to evaluate a number of art posters. Half were asked to argue why they liked their preferred poster, while the other half merely had to express their preference. After the experiment all participants could take the poster of their choice home. About a month later the researchers approached the participants again, asking them if they still had the poster, had hung it on a wall, planned to keep it and how they rated it on a 10 point scale. As it turned out people who had been asked to reason why they preferred the poster of their choice, were less satisfied with their choice, than those who had merely picked their favourite. Strikingly the same effect was found when people were asked to argue

why they liked their partners, but the effect only lasted for the duration of the experiment. None of the participants subsequently left their partner.

Reviews are an excellent source to look for examples of biases, habitual thoughts and errors of reasoning in watching dance. Right after the show the dance critic has to sit down behind his computer to write his review and meet the editorial deadline. And how does the brain respond when it is under pressure? Exactly, it falls back on automatic patterns of thought. Many critics resort to general notions and fail to apply their implicit criteria when they praise or criticize a piece (“it lacked a theme, content, dramaturgy etc.”) to other performances. They are frequently unaware of the geographical, hometown, bias in their thinking or how the name and fame of a choreographer, or lack thereof, influences their judgment, both positively and negatively. After two or three masterpieces the next piece by the same choreographer may disappoint, even though it may still be much better than most other performances. Conversely a critic may still praise a piece, which the famous choreographer himself considers a failure, because it carries his or her name.

Life is ambiguous and so is dance, but unconsciously we construe a single interpretation founded in our own implicit expectations. People generally base their conscious reports of their bodily emotions on theories about themselves, “I do/don’t like dance theatre/minimal dance/ballet etc.” or “I love the work of William Forsythe/Jiri Kylián etc.”, even when they are in conflict with their actual unconscious emotions. You were bored to death, but find a reason to still praise the piece, because it was by your favorite choreographer or you were captivated from beginning to end but don’t admit it to yourself. To be sure, in most situations unconscious responses are beneficial. I am not saying either that we should not think about what it is we like or dislike in a particular work and why. Analyzing the work itself, rather than our own feelings, may enhance our understanding and appreciation. The point is that there is knowledge embedded in our feelings, which may get distorted when we try to put it into words. It is no accident we are often lost for words when trying to express our deepest feelings and feel ill at ease with what we say. Reasoning has its own dynamics. Mistaking our feelings for someone as love may lead us to make the wrong decisions. Failing to realize that it was the music we liked and not so much the dancing, may lead us to prefer one choreographer over another, whose work was performed in silence. The best we can do is to expose ourselves to a variety of input, to nourish our unconsciousness and create what Timothy Wilson calls “informed gut feeling”. We can also try to understand what predisposes us to think in a particular way, if only in general terms. Not through introspection, but by “looking from the outside in”, for example by reading about psychology or the workings of the brain, which may enable us to better exercise our judgment.

2.

Every event can be the first of a series. And so every event creates a state of anticipation, raising the responsivity of some neurons above their base level. The lights in the audience dim. Conversations come to a halt. People adjust in their seats. One last cough. Suddenly a loud noise breaks the silence. William Forsythe, *Enemy in the Figure* (1989).

As I have argued elsewhere, when exposed to a sequence of events, whether sounds, light pulses or movements, part of the brain will automatically form a prediction of the next event in the series. A deviation between the actual and the anticipated event results in a prediction error. Prediction errors have been related to the release of dopamine, which in turn has been implicated in the regulation of attention and arousal. Anyone who has ever played a computer game will be able to confirm that such a link between failure to correctly predict an event and increased attention and arousal is plausible. A recent neuroimaging experiment by Kirsten Volz and her colleagues at the Max Planck Institute for Cognitive Neuroscience in Leipzig, revealed that brain regions associated with dopamine release are indeed activated as uncertainty in prediction tasks increases. While this does not account for our aesthetic response to each and every dance performance, it does explain why a mere sequence of movements has the *potential* to draw our attention and cause a state of arousal. It also

explains why we may get bored if the movements constantly match our expectations, for instance because we are familiar with the aesthetic, because the movements are repetitive or because there is hardly any movement at all. Since attention is not triggered by external events, it automatically drifts away unless we consciously apply it to the events on stage. Of course this may be the artist's objective, as in minimal dance or butoh, to invite the audience to pay attention to more subtle changes and differences.

As our attention is drawn to one dancer we are for a moment oblivious of what is happening elsewhere on stage. This is what in experimental psychology is called inattention blindness. In a classic experiment observers who were asked to watch a ball game and press a key at every pass, failed to notice a woman with an umbrella walking through the scene and even a man in a gorilla costume. This phenomenon has, of course, been used at nauseam in candid camera shows, but choreographers also frequently employ it. William Forsythe for instance has used it to great effect in many ballets. A related phenomenon is that we tend to be more surprised when an object suddenly *appears* than when it suddenly *disappears*. Quite often in a choreography we may become aware of a dancer having left, long after he or she has actually gone off stage. This 'effect' allows for the fluid transition between solos, as in William Forsythe's *The Vile Parody of Address* (1988). It also means that revisiting some pieces may be like seeing them for the first time.

The Italian neuroscientist Vittorio Gallese has proposed that the mechanism, which enables us to predict the trajectory of a ball and imitate someone else's movements, which he calls embodied simulation, also enables us to understand another person's intentions and feelings. We shiver when in *Indiana Jones and the Temple of Doom* a spider crawls over Indiana Jones and hold our breath if we see an acrobat walking on a suspended wire. We do so because part of our brain will automatically simulate the situation as if we ourselves were in it. And because the neural mechanisms operate automatically they are also activated by fictional events. Even consciously telling ourselves that it is only a movie does not prevent us from getting the creeps.

In many ways art enlarges the situations we encounter in our daily lives so as to intensify the accompanying emotions. The spider in *Indiana Jones and the Temple of Doom* is not just any spider, but a huge spider. Acrobats walk on ever higher suspended wires and perform ever more daring tricks. But just as a visual artist may create an abstract painting, taking great care the lines and shapes do not all of sudden form a face or some other figure, a choreographer or director may create a piece using repetitive, mechanical movements so as to keep the audience from responding emotionally. However, someone who believes that dance should "touch the heart" may be led to criticize a performance as 'autistic' when in fact this means the artist achieved his goal.

3.

When watching a dance performance or reading a novel we unconsciously try to make sense of what we see or read by fitting it into the expanding framework of what went before. Patterns emerge and with each pattern a set of expectations. Various experiments have demonstrated that we often act on the basis of patterns of which we are unaware and which are hard to learn consciously or to put into words. Call classical those pieces, which retrospectively resolve the audience's expectations, which make sense through their internal logic or their implicit reference to external events ("boy meets girl"). Balanchine, Jiri Kylián, Hans van Manen, but also Emio Greco/PC and Jan Fabre. Call modern those pieces, which unfold on a plane perpendicular to or independent of the audience's expectations. Merce Cunningham, Lucinda Childs. Some dance critics call this "lacking dramaturgy". Call postmodern those pieces in which the structure of anticipation is made explicit in the piece itself. Some dance critics call this "self-indulgent".

A male dancer takes center stage, performs a virtuoso jump, then pauses, looking intensely at the audience. The dancer can be seen breathing as the audience holds their breath. What's next? Then he performs the *same* jump again. We are projected into the future-past,

suddenly aware of our own prior expectations. William Forsythe *In the middle somewhat elevated* (1987). The performance begins before the final call has sounded and the audience has entered. William Forsythe *Artifact* (1984), *Steptext* (1985), *Firsttext* (1995) etc. The curtain comes down in the middle of the performance. *Artifact* (1984). ALIE/NA(C)TION (1992). In *Artifact* the dancers move into a different configuration while the curtain is down, disrupting the brain's tendency to extrapolate a movement.

If we are familiar with the work of a certain choreographer we know what to expect when we go to see another performance. Usually this is also the reason we return, we liked it, for whatever reason. Still, the audience's expectations can be challenged. Consider William Forsythe's new work in the season 2003/04: *Ricercar*, *Wear*, *We Live Here*; 2002/03: *33/3*, (*N.N.N.N.*), *Decreation* and 2001/02: *Wolf Phrase*, *The Room as it Was*. Or consider the difference between the various sections in *Impressing the Czar* (1988) and *The Loss of Small Detail* (1991). Some dance critics call this "a lack of consistency". One could also see it as exploring a field rather than extending a line.

Perhaps more unexpectedly some pieces, which appear postmodern for their (movement) aesthetic, such as William Forsythe's *Wear* (2004), are classical in their structure, in the definition given above. At the back of the stage, somewhere to the left, stands a shack built out of pieces of felt. Three persons in large anoraks wander across the stage. Two have their hood pulled up over their head. The third person wears a huge Afro wig. Questions abound. Unconsciously. Automatically. What's inside the shack? Another dancer? Will a dancer go inside? Will the dancers take off the anoraks and the wig? What are they doing anyway? These questions remain *implicit*, but when the expectations they imply are met, we feel a silent comfort. If they remain unresolved we feel frustrated. If we can fit the unresolved questions into a larger whole we call it mystery. The dancers enter the shack, the wig is taken off and at the end of the piece the dancers dress down until their underwear, thus creating an opposition between beginning and end. Closure.

The purpose of these concepts is not to enter into a renewed debate about the meaning of modern or postmodern, but to show how neuroaesthetics can offer a different perspective and a different framework to analyze dance and choreography. Cognitive neuroscience and experimental psychology have a critical dimension in that they reveal the properties of the neural mechanisms, which determine how we see, feel and judge. Both can therefore be said to extend the critical program of structuralism and post-structuralism, which showed how language, historical and social structures shape the way we think. Indeed Claude Lévi-Strauss already held that in the end a structural analysis of cultural phenomena hits upon the principles of the human brain, which make that some and not all forms of organization emerge.

4.

The spatial organization in ballet has been the subject of much critical theorizing. Gerald Siegmund, for example, dance critic for the *Frankfurter Allgemeine Zeitung*, wrote with reference to Michel Foucault, that "the use of space in ballet corresponds to the disciplinary model of power" and that today "ballet can do nothing but mourn the loss of the central perspective". Here is how a scientist might approach the same question.

She might first observe that the center is privileged not just in ballet, but in all forms of dance across cultures and that when an audience is free to choose, as in street theatre, they will form a semi-circle around the performers, with the performers in the center. She might observe that a similar privilege is also present in painting and photography and that, when taking a picture herself she tends to position the subject in the center. She may move on to notice that when talking to someone or looking at something she also centers the subject in her field of vision. She might point out that if in dance or the visual arts, the spatial distribution were random, in some pieces the dancers or objects would also have to cluster near the edges. She might then advance the *hypothesis* that, because we center the object of interest in our field of vision when we look at something, we *tend* to position a subject in the

center if we are free to manipulate it. This being a hypothesis it would have to be tested experimentally, for example by comparing large and small stage productions, and may be proven wrong. The scientist will emphasize that these are *tendencies*, dominant directions, not absolute truths. Precisely because we automatically turn our eyes, head and body to center the object in our field of vision, an artist can manipulate the viewer's gaze by placing something near the edge, thereby making a scene, whether a photo or a stage setting, more 'interesting'. A solo by a dancer who has her back turned to the audience for its full duration is intriguing *because* we cannot see her upfront (Trisha Brown, *If You Couldn't See Me*, 1994). Our scientist may point out that in dance other factors may also influence the privileging of the center. From the center a dancer can move in all directions while still remaining visible to the audience, but again, disappearing from view can be used creatively.

Excited by her preliminary findings our scientist might venture upon another project. Confining herself to dance as performed in a theatre she lists the ways in which a performance can begin. Starting from the moment the audience enters, the stage can be empty or the dancers can already be on stage. If the stage is empty it may be lit or dark, either because the curtains are down or because the stage lights are out. When the lights on stage come on, the dancers can already be on stage or the stage can be empty. If the stage is empty, a dancer can enter from the left, the right, the back or the audience. If there is more than one dancer they can all enter from the same side or from multiple sides. Having listed all possibilities our scientist moves on to the next stage, analyzing the beginnings of 1000 different dance performances, from William Forsythe to Sasha Waltz, from Balanchine to Pina Bausch and from well known to obscure, making sure that her sample has no geographical, stylistic or other biases. If she finds a pattern she will move on to trying to find an explanation, which can be anything from mundane practical considerations to implicit biases in perception for which she will have to do further research and might find inspiration in cognitive neuroscience. She may recall a study in experimental psychology, which showed that people tend to prefer objects on the right and subsequently confabulate all kinds of reasons to argue their choice, even though all objects were identical.

An artist who has seen a number of dance performances may also notice a pattern in the way most performances begin or in their use of space and try something different. Having the performance start before the audience has entered and taken their seats or having the dancers enter from the audience for example. If the pattern is real, the performance will deviate from the audience's expectations and may be considered radical or novel. If the sample on which the pattern is based is biased, for instance because it only contained ballet performances or was confined to a geographical region, other audiences may not perceive the performance as novel. A deviation from the audience's expectations may also lead the performance to be misunderstood.

The difference between art and science is their relation to truth. The scientist is committed to pursuing the truth. The artist isn't. But in pursuing new forms of expression and organization he or she may reveal an implicit pattern in previous works or a bias in the audience's expectations. In doing so the artist's aim is not to enhance our cognitive knowledge but to intensify our perceptual powers and sharpen our sensibility, to give way to new meanings without specifying them. Since his appointment as artistic director William Forsythe has made the Ballett Frankfurt into a laboratory for contemporary dance. In collaboration with his co-workers and using the audience as the participants in his experiments, he has tested how people respond to various constellations of dance, music, text, light, stage and costume design. I am glad he has chosen to present his findings in the form of performances. I am glad his research has not reached a conclusion and look forward to his follow-up studies. But of course, I am biased.

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William Forsythe, *The Vile Parody of Address*. Dancer: Francesca Caroti. Photo © Joris-Jan Bos.



William Forsythe, *We Live Here*. Dancers: Yoko Ando, Fabrice Mazliah and Heidi Vierthaler. Photo © Joris-Jan Bos.