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Metaphor, metonymy, and binding*

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Abstract

Conceptual integration – also known as "blending" is a basic mental operation whose uniform structural and dynamic properties apply over many areas of thought and action, including metaphor and metonymy. Conceptual integration creates networks of connections between mental spaces. Some of these mental spaces serve as inputs to a new, blended mental space that typically develops emergent meaning not contained in the inputs. In the case of metaphor, a source and a target serve as inputs to the blend. Creating the blend often involves the exploitation of metonymies.

Keywords: blending, blended space, causal structure, conceptual integration, conceptual projection, cross-space mapping, event shape structure, frame structure, generic space, inference, input space, metaphor projection, metonymic connection, metonymic distance, metonymy projection, optimality principle, topology.

Conceptual integration – also known as "blending" – is a basic mental operation whose uniform structural and dynamic properties apply over many areas of thought and action, including metaphor and metonymy. (Analyses of conceptual integration are given in Coulson 1996 and n.d., Fauconnier & Turner 1994, 1996, 1998, in press, and in preparation; Oakley n.d.; Turner & Fauconnier 1995, in press a, and in press b, Fauconnier 1997, and Turner 1996a and 1996b. The website is http://www.wam.umd.edu/-mtum/WWW/blending.html.)

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Contemporary accounts of metaphor and analogy have focused on structure-mapping from a source (or base) onto a target. Such mappings can exploit existing common schematic structure between domains, or project new structure from the source onto the target. The work on conceptual blending has shown that in addition to such mappings, there are dynamic integration processes which build up new "blended" mental spaces. Such spaces develop emergent structure which is elaborated in the on-line construction of meaning and serves as an important locus of cognitive activity.

1. "If Clinton were the Titanic, ..."

"If Clinton were the Titanic, the iceberg would sink" is a striking conceptual blend that circulated inside the Washington, D.C. Beltway during February, 1998, when the movie "Titanic" was popular and President Clinton seemed to be surviving political damage from yet another alleged sexual scandal. The blend has two input mental spaces – one with the Titanic and the other with President Clinton. There is a partial cross-space mapping between these inputs: Clinton is the counterpart of the Titanic and the scandal is the counterpart of the iceberg. There is a blended space in which Clinton is the Titanic and the scandal is the iceberg. This blend takes much of its organising frame structure from the Titanic input space – it has a voyage by a ship toward a destination and it has the ship's running into something enormous in the water – but it takes crucial causal structure and event shape structure from the Clinton scenario – Clinton is not ruined but instead survives. There is a generic space that has structure taken to apply to both inputs: one entity that is involved in an activity and is motivated by some purpose encounters another entity that poses an extreme threat to that activity. In the generic space, the outcome of that encounter is not specified.

The cross-space mapping between the inputs is metaphoric, with the Titanic scenario as source and the Clinton scenario as target, but the blend has causal and event shape structure that do not come from the source, indeed are contrary to the source and in some cases impossible for the source, and the central inference of the metaphor cannot be projected from the source. If Clinton is the Titanic and the scandal is the iceberg and we project inferences from the source, then Clinton must lose the presidency. But the contrary inference is the one that is constructed: Clinton will overcome any political difficulty. The blend has emergent structure: in the blend, the Titanic is unsinkable after all, and it is possible for ice to sink, not merely to be submerged.

The source does not provide these inferences to the blend, but neither are they copied into it from the target. In the original target space with Clinton and the scandal, the relative status of the elements and even the nature of their interaction is far from clear. In that target, Clinton merely seems to be surviving the scandal. But these elements take on much sharper and more extreme status in the blend: the scandal-iceberg is the greatest conceivable threat, something that "sinks" even the "unsinkable," and the Clinton-Titanic survives even this greatest conceivable threat. The extreme superiority of Clinton as a force and the extreme status of the scandal as a threat are constructed in the blend, as is their predictive inference that Clinton will survive. This structure, which is not available from the source or the target, is constructed in the blend and projected to the target to reframe it and give it new and clearer inferences.

Further inferencing is possible if we know that the threat to Clinton comes principally from special prosecutor Kenneth Starr's use of the scandal to investigate whether Clinton is guilty of perjury and subornation to perjury. In that case, not only the scandal but also Starr can be projected to the iceberg in the blend. Originally, the antagonism between Clinton and the special prosecutor is understood as asymmetric: the President is at risk, not the special prosecutor. In fact, this asymmetry yields a strong match between the original source and target – just as the iceberg can sink the Titanic but not the other way around, so Starr can ruin Clinton but not conversely. (Technically, the President can fire the special prosecutor, and Nixon did fire a special prosecutor, but firing in this special case is tantamount to beatification.) Accordingly, models that view metaphor or analogy as the retrieval of two concepts and the location of the

"strongest" match between them must stop with the inference that Clinton is doomed. But in this case, the sinking of the iceberg by the Titanic emphasises the ferocious attack on Starr by Clinton and his allies, featuring Hilary Clinton's accusation that Starr is part of a "vast right-wing conspiracy," "trying to overturn the results of two elections." In the blend, but in neither the source nor the target as originally framed, the contest is symmetric. Starr can be ruined, and he will be ruined. You thought that special prosecutors, like icebergs, were unsinkable, but not so. This reframing, constructed in the blend, is projected to the target.

The emergence of meaning and inference in blended spaces was overlooked as a theoretical issue in earlier work on basic metaphor, probably because the focus on abstract mappings at the superordinate level obscured some of the principles of on-line construction of meaning in actual, specific cases. It is uncontroversial that cases like the Clinton-Titanic example involve the basic metaphor PURPOSEFUL ACTIVITY IS TRAVELLING ALONG A PATH TOWARD A DESTINATION – the traveller projects to the agent, reaching the destination projects to achieving the goal, and so on, as analysed in Lakoff & Turner (1989, passim), Lakoff (1993, passim), and Turner (1996b: 88–90). But that metaphor cannot by itself yield the complex inferences outlined above. It is in the blended space that we construct and run the complex counterfactual scenario in which the Titanic sinks the iceberg, and it is that scenario which projects to the input of politics and society to provide the appropriate inferences regarding Clinton, Starr, and the effect of the scandal. This scenario is newsworthy by virtue of what actually happened to the Titanic, and by virtue of the connections from the blend to the current political situation. It would not have been newsworthy before April 14, 1912, given the expectation that "The Wonder Ship," double-bottomed and able to float with as many as four of its sixteen compartments flooded, could not be sunk.

2. Binding, metonymy, and basic metaphors

Actually, it is possible to find in even the most studied of basic metaphors blending and its interaction with metaphor and metonymy. George Lakoff (1987) and Zoltán Kövecses (1986) provide an impressive analysis of metaphoric understandings of anger summarised in *Women, Fire, and Dangerous Things* (Lakoff 1987: 380–416). This analysis reveals the required mapping between folk models of heat and folk models of anger. In this mapping, a heated container maps to an angry individual, heat maps to anger, smoke/steam (a sign of heat) maps to signs of anger, explosion maps to extreme, uncontrolled, anger. This is reflected in conventional vocabulary: *He was steaming, She was filled with anger, I had reached the boiling point, I was fuming, He exploded, I blew my top.*

Lakoff and Kövecses also note the important metonymic basis for this metaphor in the folk theory of the physiological effects of anger: increased body heat, blood pressure, agitation, redness in face. The metonymy linking emotions to their physiological effects allows expressions like the following to refer to anger: *He gets hot under the collar, She was red with anger, I almost burst a blood vessel.*

The metaphor and the metonymy define the following kinds of correspondences:

Table 1. Conceptual correspondences in the ANGER IS HEAT metaphor and in the metonymy linking emotions to physiological effects

SOURCE	TARGET	
"physical events"	"emotions"	"physiology"
container	person	person
heat	anger	body heat
steam	sign of anger	perspiration, redness
explode	show extreme anger	acute shaking, loss of physiological control
boiling point	highest degree of emotion	

The metaphor can be elaborated in various ways:

(1) God, he was so mad I could see the smoke coming out of his ears.

The ears are now mapped onto an orifice of the container in the source. Notice that in this example, and also in the more conventional ones like *He exploded,* the description of the emotion is *presented* as a physiological reaction of the individual. Something is happening to his body, e.g. smoke coming out of the ears. But the *content* of this physiological reaction is *not* obtained through the metonymy in the target. It comes from the *source* (physical events pertaining to heated containers – smoke coming out, explosion, etc.).

The phrase *the smoke coming out of his ears* does not describe anything directly in the source (where smoke comes out of kettles on fire) or in the target (where people's physiology does not include internal combustion). There is selective projection from both inputs, leading to a novel frame in the blend: although there are no ears in the source domain and no smoke in the target domain, the organising frame of the blend has both and they interact.

The following set of correspondences holds:

Table 2. Correspondences in the ANGER IS HEAT conceptual integration network

SOURCE	BLEND	TARGET	
Input Space 1 "physical events"	*Blended Space*	*Input Space 2* "emotions"	*Input Space 3* "physiology"
container	person/container	person	person
orifice	ears/orifice		ears
heat	heat/anger	anger	body heat
steam/smoke	steam/smoke	sign of anger	perspiration, redness
explode	explode	show extreme anger	acute shaking, loss of physiological control
boiling point	boiling/highest degree of emotion	highest degree of emotion	

In the conceptual integration network model, Lakoff and Kövecses' important observation about the correlation of the physiological reactions with the source domain of heat and fire can be reflected theoretically. "Explosion" cannot be a physiological reaction in the source (where there is no physiology) or in the target (where there is in fact not much heat), but it can in the blend, where a body can explode from anger.

In the blended space, we find the people and their emotions projected from a target input space; we find the corresponding physiological reactions projected either from the Source Input of physical heat, explosion, and boiling, or from the Target Input of the body physiology linked to the emotions.

If the Blend stood by itself, it could not be interpreted in the real world because anger does not produce smoke or explosion. But in the integration network model, the Blend remains linked to the Inputs. A sentence like *He was so mad I could see the smoke coming out of his ears* is directly identifying the blend, but inferences in the blend – e.g. smoke is a sign of great anger – are projected back to the Target Input Spaces – he was extremely angry and was showing physiological signs of it. (What these signs actually were is irrelevant.) Of course, the structure of the Blend itself is highly dependent on the conventional metaphorical mapping of heat to anger.

In addition, we find an explanation for the actual grammatical structure of the sentences with mixed vocabulary, like *He exploded, I could see the smoke coming out of his ears.* This analysis explains why the sentence evokes an integrated scene unavailable in either source or target; it applies directly to the Blend. It provides a frame (seeing somebody in an abnormal and dangerous state, with corresponding emotions, etc.) not available in the source or target.

Next, the blend can have a life of its own, not fully determined by the inputs. So, we can say, with some hyperbole:

(2) God, was he ever mad. I could see the smoke coming out of his ears – I thought his hat would catch fire!

It is easy to see how this works: in the blend, the hat on fire is a sign of even greater heat, hence even greater anger, emotions, etc. But there is no counterpart for the hat in the source: the elaboration is in the blend, where the frame of somebody on fire is used (not the boiling kettle anymore), and the existing mapping operates towards the source (greater heat) and towards the target (greater anger, but also greater loss of control, greater social danger, etc.)

The Lakoff–Kövecses analysis underscores the essential role of physiological reaction metonymies in the formation of the metaphorical system for emotions. The metonymic correspondences are in the target – body heat, redness, etc. That maps directly onto the blend, in the sense that in the blend (but not in the target), the physiological reactions are smoke, explosion, etc. This is done by mapping *hot* (in the target, for people with a certain physiology) to *hot* in the source (for containers with quite different physical properties), and then from source to blend, where the new set of physiological reactions is constructed.

3. Metonymy projection in metaphoric blends

The interaction of metaphor, metonymy, and binding is particularly evident in the canonical representation of "death" as "the Grim Reaper," a sinister, skeleton–like character holding a scythe and wearing a cowl (see Turner & Fauconnier 1995). The Grim Reaper arises by blending many spaces: (1) a space with individual human dying; (2) a space with an abstract pattern of causal tautology in which an event of a certain kind is caused by an abstract causal element: e.g., Death causes dying, Sleep causes sleeping, Smell causes smell, Sloth causes laziness, and so on; (3) a space containing a prototypical human killer; and (4) a space with reapers in the scenario of harvest.

This complex blend allows non–counterparts to be combined by virtue of metonymic connections in the inputs. Reapers and skeletons are not counterparts in the cross–space mapping. But Death as a cause is metonymically associated with *skeleton* as an effect. In the blend, the killer–reaper is combined with the skeleton in a way that fits the frame in the blend (people have skeletons). Similarly, Death in the input space of human dying is metonymically associated with priests: priests are stereotypically present at an event of death, and their institution is concerned with death and afterlife. Reapers and priests are not metaphoric counterparts. In the blend, the attire of The Grim Reaper can be the attire of a monk: the metonymy between death and priests in the input is projected to a part–whole relation in the blend. The cowl, for example, pulled over the head of The Grim Reaper at once evokes both religious connotations of death and the impression of Death as mysterious, unknown, solitary, and set apart from norms of human society.

In Fauconnier & Turner (1998), we offer evidence for the following competing optimality principles on integration networks:

Integration

The blend must constitute a tightly integrated scene that can be manipulated as a unit. More generally, every space in the network should have integration.

(Example: a ship hitting something and sinking it is a well–integrated scene, although in this case it is somewhat fantastic for somebody who knows that icebergs cannot sink.)

Web

Manipulating the blend as a unit must maintain the web of appropriate connections to the input spaces easily and without additional surveillance or computation.

(Example: as the Titanic blend gets elaborated, the connections to the inputs are not altered; compare with "If Clinton were the Titanic, the Titanic would be the iceberg.")

Unpacking

It is optimal for the blend alone to allow reconstruction of the inputs, the cross–space mapping, the generic space, and the network of connections between all these spaces

(Example: "I could see the smoke coming out of his ears. He exploded with anger." The literal meaning is impossible, which makes it easy to assign "smoke" and "explode" to the HEAT input, and "he" and "anger" to the EMOTIONS input.)

Topology

For any input space and any element in that space projected into the blend, it is optimal for the relations of the element in the blend to match the relations of its counterpart.

(Example: The Titanic's hitting the iceberg in the TITANIC input matches the Titanic's hitting the iceberg in the blend. The strength and buoyancy of Clinton versus Starr in the POLITICS input matches the strength and buoyancy of the Titanic versus the iceberg in the blend.)

Good reason

All things being equal, if an element appears in the blend, there will be pressure to find significance for this element. Significance will include relevant links to other spaces and relevant functions in running the blend.

(Example: Once the anger–heat blend is launched, we are unlikely to interpret "He was smoking" as purely incidental information about his use of tobacco at the moment.)

Metonymy projection constraint

When an element is projected from an input to the blend and a second element from that input is projected because of its metonymic link to the first, shorten the metonymic distance between them in the blend.

(Example: the skeleton becomes the bodily form of The Grim Reaper.)

We saw above that blending can combine non–counterpart elements from a single input, such as Death, the cowl of the priest, and the skeleton of the person who has died. The metonymic distance is large between abstract death as the general cause of all deaths and the cowl worn by a certain kind of participant in a ritual associated with particular deaths. But in the blend, the metonymic connection is direct: the cowl is the attire of Death. Similarly, the skeleton after decomposition of the body is a distant product of death. But in the blend the skeleton is actually a body part of Death. The fact that metonymy is preserved in such cases can be viewed as a consequence of topology. The metonymy projection constraint additionally specifies that metonymies get tighter under projection.

Satisfying the metonymic projection constraint is not a matter of blindly projecting metonymic links. The internal integration of the blend provides opportunities for some acceptable metonymies but not for others. Since Death is an active person in the blend, and active persons are known to have skeletons (although they are not normally visible), the part-whole metonymy skeleton-body becomes available as the counterpart of the distant metonymy in the input. Tightening metonymies under projection typically optimises Integration in the blend, since it helps build a tighter and more easily manipulated unit.

Now consider some additional cases that show how metonymy projection operates. Take the example of a cartoon representing a powerful newspaper company about to succeed in a hostile takeover of a weaker automobile company that will be eliminated by selling off its assets. The cartoon shows a giant printing press smashing a car. This is a metaphorical blend: Input 1 has the stronger and weaker

objects; Input 2 has the contest between companies. The cross-space mapping is the basic metaphor that maps stronger objects destroying weaker objects to winning and losing. The strong heavy object is mapped onto the powerful newspaper company; the weaker object is mapped onto the weaker automobile company. But in the blend, we find the printing press as the strong heavy object and the car as the weak object. This is an efficient exploitation of internal connections: the printing press is a salient instrument of producing newspapers, and cars are the salient products of automobile companies. In the input, the printing press is not an instrument of destruction, but it has a force-dynamic function associated with crushing which can be associated with a car-smashing machine of the sort used in recycling automobiles. In the blend, the printing press is fused with both the company and the car-smashing machine.

What is going on here? The blend must achieve three goals. First, given that the cartoon is a visual representation, the blend must be concrete and specific. Second, it must fit the frame of stronger and weaker object. Third, these objects in the blend must be properly connected to the companies in input two. The companies in input two, being abstract, cannot in themselves provide the corresponding concrete elements in the blend. The weaker and stronger objects in inputs are concrete but not specific, and so cannot in themselves provide the corresponding specific elements in the blend. But we can exploit internal connections in the inputs to make the elements in the blend adequate. The printing press and the car are concrete, specific objects associated with the companies that can also be fitted into the frame of the stronger object destroying the weaker object. They fit this frame in part because the printing press intrinsically has force-dynamic structure capable of destruction and in part because we are familiar with car–smashing machines. In the blend, two elements are simultaneously present: (1) two concrete, specific objects; (2) a stronger object destroying a weaker object; and (3) two companies.

Clearly, such a blend is creative. Not just any connections will do. There has to be a search for elements that simultaneously satisfy a number of constraints. The printing press and car have topology in the blend (the press crushes and the car is crushed) that their counterparts in Input 2 do not have (the press is an instrument of making newspapers and the car is a salient product of the automobile company). Additionally, the printing press and car in Input 2 have no counterparts in Input 1. Interestingly, the elements that did not project their input-topology (printing press and car) end up being the only objects in the blend. The cartoon of the printing press smashing the car is remarkable because it is a case where integration and topology are maximised by recruiting special internal connections in Input 2. Because the topologies of strong and weak object on the one hand and competing companies on the other will match only at a very abstract level, we find that in addition to the companies, objects closely connected to them are projected to the blend in a way that closely matches and elaborates the Input I topology of strong and weak objects.

This example emphasises that conceptual projection is a dynamic process that cannot be adequately represented by a static drawing. Once the conceptual projection is achieved, it may look as if the printing press has always corresponded to the stronger object and the car to the weaker. But in the cross-space mapping, the printing press and the car play no role; they have no counterparts in Input 1. Rather, the cross-space counterparts are stronger object and newspaper company, weaker object and automobile company. Under metonymy projection from Input 2, the printing press *in the blend* becomes the counterpart of the stronger object in Input 1, and the car *in the blend* becomes the counterpart of the weaker object in Input 1.

This example also shows that identity is metonymy of zero distance. The metonymic relation in Input 2 between company and commercial product is transformed into identity in the blend, where the printing press is identically both a printing press and the newspaper company to which it is metonymically related as an instrument (in one of the inputs).

Suppose the cartoon now contains the newspaper magnate operating the printing press to smash the car, which is being driven by the car magnate. Here the blend structure becomes elaborate through the recruitment to the blend of an additional adversaries-with-instruments frame in which adversaries fight with opposing instru-

ments, and in which the winning adversary has the superior instrument. Now the printing press and car in Input 2 have counterparts in the adversaries–with–instruments frame: in Input 2, the printing press is a symbol of a capacity for productivity that is an instrument of corporate competition, and the car is a product that is an instrument of corporate competition; these instruments in Input 2 are the counterparts of the instruments in the adversaries-with-instruments frame. Now, the topology of opposing instruments in the blend matches the topology of opposing instruments in the adversaries–with–instruments frame. This frame has the useful property of aligning superiority of instrument with superiority of adversary. In this case, we see that exploiting special internal connections in Input 2 makes it possible to recruit a frame that makes topology much stronger in the blend structure.

4. Binding in hell

Our last extended example is a literary example, Dante's celebrated portrayal of Bertran de Born in the *Inferno,* canto 28, lines 139–142. While living, Bertran had instigated strife between the King of England and the King's son and heir, tearing father and son apart. When seen in hell, Bertran consists, spectacularly, of two parts: a headless body and its separate head. The body carries its head in its hand, lifting the head manually to talk to Dante as he passes by on his journey through hell. Bertran cites his punishment as the appropriate analogue of his sin:

Perch'io parti' così giunte persone,
partito porto il mio cerebro, lasso!
dal suo principio ch'è in questo troncone.
Così s'osserva in me lo contrapasso.

'Because I parted people so joined,
I carry my brain, alas, separated
from its root, which is in this trunk.
Thus is to be seen in me the retribution.'

This is an impossible blending, in which a talking human being has an unnaturally divided body. There are many parts to the development of this blend.

First, there is a conventional metaphoric understanding: dividing people socially is understood metaphorically as dividing a joined physical object. This metaphoric projection is not at all novel. We can say conventionally that a homewrecker has "come between" a married couple by creating "distance" between them. "Till death do us *part*" is not a vow to hold hands; "what God has *Joined together,* let no man *put asunder*" does not mean that husband and wife are surgically sutured. We can speak of the breaking of a business bond, of a bond of belief, of a bond of loyalty, of a bond of trust. None of this inherently involves the specific information of dividing a head from a body.

In this conventional metaphor, proximity, junction, and separation are projected to an abstract generic space that applies to any number of specific targets, including targets concerned with social and psychological relations.

But in Dante's portrayal of Bertran de Born, the generic space is fleshed out to create a blended space. Dante's blended space takes, from the target, the specific sin and sinner, and, from the source, the source *counterpart* of the sin – the separation of a joined physical object. *In the blended space, the source counterpart of the sin is visited upon the target sinner as punishment.* We can derive a sense of justice in this situation by recognising figural retribution: the sinner has his own sin visited upon him not literally but figurally; the projection to the sin is traced backward to its source, and this source analogue of the sin is visited upon the sinner. The specific information from the source – physical separation of a joined physical object – is applied impossibly to the target human being in a blended space. The blended space contains something impossible for both source and target: a talking and reasoning human being who carries his detached but articulate head in his hand like a lantern.

In the case of the portrayal of Bertran de Born, the power and even the existence of central inferences of the projection come not from the source space and not from the target space but only from the

blended space. This portrayal is often quoted out of context as an example of the kind of horrible punishment found in the *Inferno* – many more people are familiar with this portrayal than have read the *Inferno*. Those familiar with the passage (out of context) typically take it as signifying not merely badness, but badness of a specific description: unnatural, ghastly, violent, destructive of a worthy whole. The bodily division is taken as a sign of profound and specific wrong. A sophisticated reader of this passage in its context may have already concluded that Bertran has sinned, given that he is in hell, and that Bertran has sinned in a particular way, given his location in hell. But even such a reader may derive all the central inferences from the portrayal itself. It is possible to know an abstract definition of a sin while having only the thinnest corresponding conception.

Where are these central inferences constructed? Let us consider the background metaphoric projection. In the source space, there may be nothing wrong with separating a joined physical object, like a nut. In the target space, there may be nothing wrong with setting two people against each other, or, more specifically, in setting son against father (perhaps the father is an evil infidel warrior, for example). The background metaphoric projection does not necessarily carry the inference that division is wrong – "breaking up" can be good. Many readers, informed of the relevant history, would not even agree that Bertran de Born's actions were sinful, much less treacherous. But we all know there is something ghastly and horribly wrong about a decapitated human body that operates as if it were alive. We see the amazing spectacle of Bertran carrying his detached head, and read this division as symbolising something unnatural, ghastly, violent, inappropriately destructive. The inference is established in the blended space before Bertran de Born begins to tell his story to Dante in hell – which is to say, before we are told the history of the target space.

As we have seen before in metaphor-metonymy interactions, the blend can combine non-counterparts, provided the appropriate metonymic connections are in place. In the metaphoric cross-space mapping, the divided object in the source is the counterpart of the "divided" father and son in the target, not of Bertran de Born in the

target. In the target, Bertran de Born is the sinner, the *agent* of the dividing, not the *victim* of the dividing. But Bertran de Born is, in the target, metonymically associated with the divided father and son as the cause of their division. He is projected to the blend as the sinner and the agent of the dividing, but he is also combined there with the divided object itself. It is not that the blend could not have made use of the correspondence between the divided physical object and the father–son. A different blend might have shown de Born pushing father and son apart and suffering some horrible punishment as he does so. But instead, the blend combines the divided physical object with de Born. The blend has exploited metonymies to create a combination of non–counterparts to provide a blended scene that signifies appropriate retribution.

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