Planarian worms, shock generators and apathetic witnesses: Teaching psychology and graphic novels

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Comics and graphic novels have made a greater impact on popular culture in recent years and can be used for enhancing the learning experience of psychology students. One of the best known and respected comic book writers of the last 30 years is Alan Moore, who has included a number of detailed references to psychological studies and experiments in three of his best known comic book works. These are described in context and the psychological work they refer to examined with a view to using this material as starting points for the study of the psychological phenomena by students.
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COMIC BOOKS have undergone a change of image in recent times. Their 're-branding' as graphic novels has led to the acceptance of comics as a more legitimate art form worthy of academic study. The recent creation of two academic journals devoted to the study of comics suggests how far the medium has advanced from its perception as a children's reading material that is worthy of little serious attention.

Comics are also now a major influence on popular culture, especially in Hollywood, where blockbuster movies of comic book characters attract large mainstream audiences that may never have experienced the source material. This is one of the influences that is likely to have contributed to the elevation of comics' image since, as Gravett (2009) has suggested, even poor film adaptations of comics will bring new audiences to the originals. In addition, since the 1980s, comics have also attracted more serious creators who want specifically to work in comics. Successful screenwriters and novelists, for example, have written a number of high profile comic book stories. However, within comics one writer's name stands out, that of Alan Moore.

The incredible impact of Alan Moore's work on the field of comic books and graphic novels is difficult to overestimate. His scripts have brought to mainstream comics a literary and rich quality that was arguably missing from the majority of Anglo-American comics. Part of Moore's success and popularity could lie in the cultural and literary references that litter his work. He is clearly well read and informed on a variety of subjects. His work references a number of topics including the occult and magic, Victorian fiction, environmental issues, political ideology, erotica, and comic book history. It is undoubtedly this level of detail that imbues an Alan Moore story with a high level of interest and involvement. Moore has stated that he is interested in stories that have some sort of meaning attached to them and clearly referencing these different areas goes some way to fulfilling this goal (Moore, 2003).

In several of Moore's early works, specific references are made to psychological studies and ideas that are not very well known outside of academic psychological circles. This suggests that Moore also has some fairly specialised knowledge of psychology and its inclusion is interesting from an educational point of view as it affords the opportunity to introduce students of psychology to these studies and be a launch pad for further study.

The idea of using comic books to teach is not a new one. There have been various suggestions such as teaching science (Cheesman, 2006) and history (Aiken,

2010). Indeed we have previously discussed how comics may help children to enjoy reading (Aleixo & Norris, 2007) as well as investigating the possibilities of comics as educational materials (Aleixo & Baillon, 2008; Aleixo & Norris, 2010).

However, the idea in the present article is to explore the possibilities of using Alan Moore's works to help students study certain aspects of psychology. We aim to explore Moore's use of psychological research in three key texts (all readily available in reprint format), detail some of the research that is referenced and provide some suggestions as to how these may be used in a teaching environment.

Alan Moore and Psychology

In the three texts discussed herein, Moore uses real psychological work to create realistic-sounding backgrounds for his characters. It is, therefore, interesting to speculate why Moore has chosen academic research as a basis for his character's origins. American super-hero characters are often endowed with motivating origins. For example, Batman is motivated by the death of his parents and a need for revenge against criminals, and Spider-Man is motivated by failing to act when he could have prevented the death of his beloved uncle. Moore goes further and uses real evidence and theories of human behaviour to motivate his characters.

There is evidence from early on in his career that Moore clearly had (and indeed may still have) an interest in psychological work. In a short science-fiction story published in a December 1981 issue of the classic British comic *2000AD*, Moore references the 'autokinetic effect' as a way to make a character sound very intelligent (Moore & Tiner, 1981). David Lloyd, artist on *V for Vendetta* and part of a group of influential comic book creators in the UK in the early 1980s, suggests that there was a conscious effort by those creators to move away from what he calls, 'the usual comic capers' to produce stories that were drawn from real-life and that were a product of and influenced by the creators' knowledge and interest in a variety of different ideas and topics. He also notes that Alan Moore was more knowledgeable in many areas than many others. Although beyond the scope of the present text, it would be interesting to explore the origins of Moore's knowledge of psychology in more detail and the implications this has for the influence of psychological work on popular culture in the present day.

Graphic Novel 1: V for Vendetta and Obedience to Authority

Alan Moore first made his name as a comic book writer in the British anthology comic *Warrior*. Moore wrote two strips: *Marvelman* (later published in the US as *Miracleman*) and *V for Vendetta*. It is the latter that references experimental psychology. Written by Moore and drawn by British artist David Lloyd and serialised in all 26 issues of *Warrior* between 1982 and 1985, *V for Vendetta* is a complex political thriller set in a future where Britain is a fascist police state. The strip garnered a number of awards within the comic book industry. It remained unfinished in *Warrior* and was completed by Moore and Lloyd and published by DC Comics in 1988 (see Gray, 2010, for a brief description of the strip's history). *V for Vendetta* deals with issues of anarchy and the individual responsibility for the governance of a country, while still remaining an entertaining melodrama. The narrative involves the character known only as 'V' and his attack on the state. Near the beginning of the story, V targets all those individuals who were involved in his earlier incarceration. In Chapter 10 of book 1 (originally published in *Warrior* in 1983), V visits and kills Doctor Delia Surridge using a lethal injection. This doctor had been responsible for carrying out experiments on V and other inmates in a concentration camp several years previously. Before she dies, she calmly attempts to explain the reasons for the horrific acts she committed. It is at this point that Moore references psychological work to provide this explanation:

> *'I heard of an experiment once, one the Americans did. They had volunteers working a shock generator. The volunteers were told that it was wired to a patient in an adjoining room… It wasn't, there was only an actor, whose voice could be heard through the intercom. The volunteers were instructed by a doctor to start administering electric shocks. They were told to gradually increase the voltage. The 'victim' began begging them to stop. They were told to increase it again. This time the victim started screaming. After a while the screams were choked off to be replaced by silence. The volunteers were told to increase the voltage once more… Nearly 80 per cent of those tested carried on administering the shocks after the 'victim' begged them to stop. Nearly 60 per cent continued even after they believed that they'd killed him. They were ordinary people and they were prepared to torture a stranger to death just because they were told to by someone in authority.'* (Moore & Lloyd, 1988, p.15)

Moore is using psychological work in order to create a motivation for his character. He uses the work to suggest that human beings can carry out despicable acts under the influence of someone in charge. The idea of the darker side of human behaviour is something he returned to later in *Watchmen*.

Stanley Milgram and the Studies on Obedience

The reference in *V for Vendetta* is to one of the most well known experiments in social psychology. This is, of course, a reference to the famous series of studies by Stanley Milgram, the American psychologist working at Yale University, who used experimental methods to investigate the question of how far ordinary individuals would go to harm another human being when directed to do so by an authority figure (e.g. Milgram, 1974).

These studies are extremely well known and their details will not be repeated here. Their basic format is, however, very well described by Moore in *V for Vendetta* (although he only sticks to one of Milgram's variations of the study – that of the voice-feedback condition). Colman (1987) provides a good summary of both the history and the research in this area.

Graphic Novel 2: Swamp Thing and the Biology of Memory

Alan Moore's work for *Warrior* led to his first work in the US. This was to write the *Saga of the Swamp Thing* for DC Comics. Swamp Thing is not well known outside of comics and was originally created by Len Wein and Bernie Wrightson in 1971 as the main protagonist of an on-going horror story. The basic premise of the character was that Dr Alec Holland was involved in an accident that turned him into a monster made of vegetation. His early adventures featured his quest to find a way to turn himself back into a man and ran until 1976 when the comic was cancelled. The character was revived in his own comic book series in the early 1980s to mixed success. By the time Alan Moore took over the writing on the series, the basic premise seemed to have run its course and sales were reportedly low. Moore's solution to inject some interest in the character was to turn the concept of the Swamp Thing on its head – by using experimental psychology. In the landmark issue 21, *The Anatomy Lesson* (Moore's second issue with a publication date of February 1984) Dr Jason Woodrue (a typical 'scientist' in comic book terms), after examining the apparent corpse of the Swamp Thing, comes to the conclusion that all that was known about the Swamp creature was wrong:

> *'…You see, a while ago some people did an experiment. They taught a planarian worm to run a simple maze. They educated it. Then they chopped it up and fed its remains to a batch of planarian worms that couldn't run the maze… except that after digesting their educated comrade, the worms could run the maze perfectly!'* (Moore, Bissette & Totleben, 1984, p.10)

This is used to explain that the Swamp Thing is not a man turned into a plant but instead that the memories and personality of Alec Holland were absorbed by the vegetation

and created a creature that thought it was Alec Holland.

In one fell-swoop, Moore (along with artists Stephen Bissette, John Totleben and Rick Veitch amongst others) managed to change the entire direction of the Swamp Thing comic book and went on to write many more stories to critical and sales success. This also cemented Moore as one of the best writers in the Anglo-American comic book industry. Moore went on to write more comics for DC which included what is argued to be one of the most important comics of the 20th century: *Watchmen* (more about this later).

The Real planarian worm studies

Unlike Milgram's obedience studies, which led to a bestselling book and a documentary film, the studies that Moore refers to in *Swamp Thing* are not as well known in general academic psychology and thus are worth summarising here.

In a study published in 1955, PhD students James McConnell and Robert Thompson investigated the possibility of conditioning invertebrates using techniques and principles developed by behavioural psychologists using animals with more complex central nervous systems (usually mammals and birds). They developed a technique that attempted to teach planarian worms simple conditioning responses. Contrary to Moore's description and Bissette and Totleben's accompanying artwork, however, they did not teach planarian worms to 'run a simple maze'. Instead, they tried to teach the planarians to associate a light with an electric shock whilst they were moving along at the bottom of a trough-like aquarium (Thompson & McConnell, 1955).

This work seemingly answered an important question in psychology – that invertebrates could be conditioned along similar lines to vertebrates. After this initial work, McConnell (along with others) continued to explore learning in planarian worms. The most pressing interest in the physiology of learning at the time was concerned with the physical and biochemical basis for learning. In other words, researchers were interested in the physical representation of learning in the brain: for example, some thought that learning represented a change in the connections between different areas of the brain (e.g. Lashley, 1950). Thus, in one series of experiments, McConnell and his colleagues used the incredible regenerative powers of planarian worms to examine how learning would transfer once a worm was cut in half (McConnell, Jacobson & Kimble, 1959). If planarian worms are cut in half, each piece will regenerate into a new individual animal; thus the question was: which piece would retain the learning?

Amazingly, McConnell and his colleagues found that the learning transferred to both new animals. Furthermore, when the worms were cut into three or more pieces, each piece regenerated into a new worm which also retained the original learning. The researchers, therefore, reasoned that there must be some chemical affected by the learning which was distributed throughout the animal which was transferred to the new parts of the regenerated creatures. It was postulated that this chemical could be RNA (which is closely associated with DNA).

Following this train of thought, in a subsequent experiment, McConnell (1962) tried to transfer the learning from trained planarian worms into naïve ones. Initially, he attempted to inject ground up pieces of trained worms but this proved unsuccessful. Instead, he found that hand feeding small pieces of trained animals to untrained worms produced the required transfer of learning. So McConnell had shown that the chemicals that were affected by learning had been transferred to naïve animals through cannibalism.

However, despite this apparent success, McConnell was not without his critics. Many were sceptical about conditioning in invertebrates and he was criticised for his method. Particular criticism came in the form of potential experimenter bias in terms of deciding whether each individual planarian

worm had actually learned the avoidance response (by, for example, turning round). Clearly, it is difficult to visually detect changes in a planarian worm's behaviour.

Despite making changes to his methodology in subsequent experiments, McConnell was never truly able to shake off his critics, especially given that other researchers were unable to replicate McConnell's findings. These criticisms were compounded by McConnell's standing in the academic community. He was also criticised for making wild claims in the media about the transfer of memory. McConnell gave interviews and wrote many articles in popular magazines such as *Esquire* (McConnell, 1968); *Psychology Today* (McConnell, 1970) and *Fanfare* (McConnell, 1987). In these, he made claims about the possible extensions of the planarian memory transfer studies for which he had no direct evidence. For example, he helped to popularise the idea that the day would come when learning would be in tablet form.

In a review of McConnell's work, Rilling (1996), whilst arguing that McConnell should be given credit for his pioneering invertebrate conditioning work, presents McConnell as a 'maverick' who dabbled in the 1960's counter-culture. He wrote several science fiction stories and founded his own journal-come-humour magazine called *The Worm Runner's Digest.*

It is, of course, McConnell's work on cannibalism in planarians that Moore referenced in the Swamp Thing story.

Graphic Novel 3: Watchmen and Bystander Apathy

Watchmen is generally accepted to be one of the most important comics/graphic novels of the 20th century. It was named as one of *Time Magazine*'s 100 best English-Language novels since 1923 – the only comic book/graphic novel on the list and it was also the winner of The Hugo Award in 1988 from the World Science Fiction Society.

Written by Moore and drawn by British artist Dave Gibbons and first published in 1986, *Watchmen* represents the creators' deconstruction of the super-hero genre wrapped up in a who-dunnit detective story. In it, Moore and Gibbons create super-hero prototypes that they explore in a modern context. In essence, *Watchmen* asks the question: What if super-heroes really existed? Unusually for Moore, *Watchmen* is firmly rooted in the era in which it was written given that the plot relies on the preoccupations of the Cold War.

One of the most popular characters in *Watchmen* is Rorschach, named after Herman Rorschach's inkblot test. Based on *The Question and Mister A* (Kavanagh, 2000), both created by Steve Ditko (the co-creator and original artist of Spider-Man), Rorschach is Moore's version of an extreme vigilante who uses violence and intimidation to fight crime. This type of super-hero character became extremely popular in the 1980s and Moore created a realistic justification for Rorschach's behaviour.

For character motivation, Moore once again looked to psychology. However, this time, rather than refer to a psychological experiment, he refers to a case-study that led to the investigation and description of a social psychological phenomenon. In chapter VI of *Watchmen*, Rorschach (real name Walter Kovacs), who has been captured by the authorities, is interviewed by a psychiatrist. On page 10, Kovacs explains his motivations for becoming the vigilante:

> *'Kitty Genovese. Raped. Tortured. Killed. Here. In New York. Outside her own apartment building. Almost forty neighbours heard screams. Nobody did anything. Nobody called cops. Some of them even watched. Do you understand? Some of them even watched. I knew what people were, then, behind all the evasions, all the self-deception. Ashamed for humanity, I went home.'*
> (Moore & Gibbons, 1987, p.10)

The Kitty Genovese murder and Bystander apathy

The case of Kiity Genovese, who was sexually assaulted and murdered on the 13 March 1964 in Queen's, New York, is well known to

most psychologists. The case is also known to have inspired the work on 'bystander apathy' by Bibb Latané and John Darley, where an individual is more likely to intervene in a situation where another needs help when that individual is alone than when others are also present (e.g. Darley & Latané, 1968; Latané & Darley, 1968, 1970; Latané, 1981). However, the details of the case of Kitty Genovese have since been re-examined and are worth briefly outlining here (see Manning, Levine & Collins, 2007).

The case was reported in an article in the *New York Times* by Martin Gansberg on 27 March (Gansberg, 1964) and subsequently in a book by A.M. Rosenthal, *The Thirty Eight Witnesses* (Rosenthal, 1964). They explained how Kitty Genovese was murdered in front of 38 witnesses who did not intervene, even to the extent to failing to call the police. The murderer took over 30 minutes to commit the crime during which he returned several times. These reports of the case sent ripples of shock around the world.

In recent years, since the publication of Moore's work, the Kitty Genovese murder has been re-evaluated. Manning, Levine and Collins (2007), looking at transcripts of the trial of Genovese's murderer, showed that there is actually little evidence for the idea that 38 witnesses observed the murder over a 30-minute period without helping. In fact, they found that several witnesses called the police and that some even shouted at the murderer from their apartments which caused him to leave the scene temporarily. Furthermore, they showed that the evidence suggests that the murder was not committed in full view of all those 38 people. This, however, does not detract from the robustness of the bystander apathy findings.

Using the graphic novels in teaching

The three examples described here can be used as stimulus materials (either separately or in combination) for teaching the psychological concepts covered in them to undergraduate students (and possibly A-level students).

It is not our intention to be prescriptive or indeed exhaustive in our suggestions for the use of this material in teaching. As William James put it, 'Psychology is a science, and teaching is an art; and sciences never generate arts directly out of themselves. An intermediary inventive mind must make the application, by using its originality' (James, 1899, p.23).

We are, therefore, only making suggestions that may be used or adapted for individual teaching purposes.

Example 1: Using the graphic novels to stimulate discussion

The graphic novel examples outlined above could be used as source material for a small group discussion. For example, students could be asked to read the source graphic novel and suitable academic references as preparation for small group work. During the session, students could address the following questions:

1. How accurate is Moore's portrayal of the relevant studies?
2. What do you think are the reasons why Moore's descriptions differ from the real work?
3. How do the psychological studies inform real life?
4. Are Moore's use of the studies in fiction justified?

Example 2: Using graphic novels to encourage research skills

Another way to use these sources is to provide students with them and ask them to explore the actual research. At introductory levels, *V for Vendetta* and Milgram's work on obedience would be appropriate as this material is quite straightforward. For more advanced work the less well known work of McConnell would be more appropriate, as would be the more complex area of bystander apathy and the veracity of the Kitty Genovese case.

The idea here would be to ask students to act as 'detectives' attempting to discover what the reference in the graphic novel

refers to and to produce either written summaries with correct references or instead to discuss it in small group work.

One such issue that could be explored would be the extent to which Moore's justifications for the character's behaviour be upheld upon examining the actual research in greater depth.

Example 3: The graphic novels as the impact of psychology on popular culture

For more advanced students, the graphic novels could be used as a source for coursework on how psychology has influenced popular culture and possibly to investigate other popular culture sources that may either reference or rely on psychological work. Another suggestion is to explore the impact of psychological findings upon the general public in more recent years using Moore's graphic novels as a springboard. Allied to this, there is the more philosophical concept of the popularisation of psychology and the responsibility that researchers have in the way material is presented to the media which is particularly relevant to the work and life of James McConnell. This could also form part of a discussion in a course on conceptual or philosophical issues in psychology.

Final words

We have shown how Alan Moore's references to real world psychological investigations can be used as a launch pad for teaching students of psychology some important psychological research and go on to explore the history of the science and the issues that the studies raise. It is noteworthy that the medium of comics is primarily consumed by approximately 14- to 25-year-olds and as such means that the graphic novel material would be especially useful in engaging traditional undergraduate students.

It is interesting to speculate on the reasons for Moore's interest in psychology although there appears to be little exploration of these either by the author himself or by others. It is also of note that two of these stories (*V for Vendetta* and *Watchmen*) have resulted in big budget Hollywood movies. However, whilst being seen as faithful re-creations of the comic book material (although without any involvement from Moore) and indeed the *Watchmen* movie script containing lines identical to those that appear in the graphic novel, neither movie references the relevant psychological studies. It would appear that either these are not considered interesting enough for a movie-going audience or perhaps it is considered that these kinds of motivations for super-hero characters are not required or easily portrayed, in the film medium. Therefore, the use of the films in a teaching context is less useful in this regard.

It is worth noting that it is extremely interesting to see information such as obedience to authority and bystander apathy (including the use of the Kitty Genovese case as demonstration of bystander apathy) which are taught in undergraduate psychology degrees and indeed the less well known research on conditioning in planarian worms presented within popular culture which provides exposure to this information in an extremely accessible manner.

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