## *DISCUSSION PAPER*

# QUALITATIVE ANALYSIS OF REPERTORY GRIDS: INTERPRETIVE CLUSTERING

**Viv Burr and Nigel King**

Department of Psychology, University of Huddersfield, UK

*In this discussion paper, we present a new form of qualitative analysis of repertory grid data that we have called 'Interpretive Clustering'. Although numerous existing publications report having performed qualitative analyses of repertory grid data, upon inspection this is usually a content analysis of constructs. In our research, used as an illustrative example here, we explored people's constructions of nature through images of outdoor spaces using repertory grids. Through visual inspection we used patterns of responses across constructs in each participant's grid to identify construct 'clusters'; these clusters are therefore constituted by constructs that hold implications for each other and are examples of 'constellatory construing'. We would like to invite comments from academics and practitioners on both the process and potential usefulness of Interpretive Clustering.*

Key words: *repertory grid, clustering, qualitative analysis, interpretive analysis*.

At the EPCA (European Personal Construct Association) conference in Edinburgh, 2018, we presented material from our ongoing research project using Repertory Grid interviews to explore peoples' construal of outdoor spaces. In analysing our data, we have been developing a method for qualitatively analysing Grids. Grids are predominantly analysed quantitatively, using computer software, but in this paper we will introduce a method for analysing grid data qualitatively that we have called 'Interpretive Clustering', which is an extension of the method of 'Visual Processing' described by Stewart & Stewart (1981. We present Interpretive Clustering here to invite comments from academics and practitioners on both the process and potential usefulness of this form of analysis (please find our contact details at the end of this paper). We are primarily interested in receiving comments on this method of analysis, rather than in suggested revisions to the paper itself.

Researchers frequently claim to have used Repertory Grids qualitatively but in actuality this often means a content analysis of elicited constructs, perhaps followed by a quantitative analysis of the grid data itself. Jankowicz (2004) describes a process for performing such a content analysis and this has been adopted in previous research reporting qualitative analyses of repertory grids; for example, Kreber & Klampfleitner (2013) used this method to derive themes in constructs elicited in relation to teacher effectiveness as perceived by lecturers and students, and Home, Bauer & Hunziker (2007) used it to analyse constructs around urban green spaces.

We believe that Interpretive Clustering offers a truly qualitative analysis of grid data and therefore constitutes a useful addition to research methods for both PCP researchers and practitioners and for qualitative research more generally. Additionally, when compared to other qualitative methods of analysis, such as thematic analysis (for example, Braun & Clarke, 2006), Interpretive Clustering arguably represents a more participant-led approach, rendering the analysis more faithful to the participant's own meanings.

Constructs are thought to be related in a larger system of meaning-making; they are often related to each other so that if the person construes a situation as 'challenging' they may also be highly likely to see it as 'anxiety-provoking' and 'threatening' too. This is what we under-

stand as 'constellatory construing', if the person sees something in terms of one construct they are also likely to see it in terms of other, related constructs.

This relationship between constructs has been very valuable in clinical practice. For example, a person may see others in terms of constructs such as 'helps others – selfish' and 'taken advantage of by others – assertive', but if these constructs are related in their system it may mean that they can have difficulty in becoming more assertive because for them this also implies becoming more 'selfish'. This relatedness of constructs has been helpful in clinical practice, and it is also valuable for the qualitative researcher, as it enriches and extends our understanding of the person's experience.

## Repertory Grids and construct clusters

Repertory Grids enable the researcher to examine what constructs the participant applies to a particular realm of experience and how these constructs are related to each other. A simple example of a grid can be seen in Tab. 1.

Tab. 1: *A simple repertory grid using chocolate bars as elements*

| Preferred pole 5 | Mars | Kit Kat | Snickers | Milky Way | Lion Bar | Bounty | My ideal bar | Non-preferred pole 1 |
|---|---|---|---|---|---|---|---|---|
| not too sweet | 2 | 4 | 5 | 1 | 4 | 4 | 5 | too sweet |
| has bits | 1 | 3 | 5 | 1 | 4 | 3 | 5 | smooth |
| hard | 2 | 3 | 4 | 1 | 4 | 3 | 5 | soft |
| satisfying | 5 | 4 | 5 | 1 | 4 | 4 | 5 | still hungry |
| chewy | 4 | 3 | 5 | 1 | 4 | 3 | 5 | not chewy |
| solid | 4 | 3 | 5 | 1 | 4 | 4 | 5 | insubstantial |

Here, chocolate bars have been used as the elements and a 5-point rating scale chosen as the scoring method. In the case of each construct, a score of 5 represents the left hand, preferred pole and a score of 1 represents the right hand, non-preferred pole; the preferred pole is the pole of the construct that the participant says they would usually choose. The participant was asked to consider each construct in turn and to apply it to each element, choosing a number between 1 and 5 in each case to represent how far towards one pole of the construct or the other they felt that element sits.

Grids have principally been analysed in order to examine how constructs are related or 'clustered' together. Constructs are related to each other to the extent that they show similar patterns of ratings across the elements, i.e. they are applied to the elements in similar ways. Some form of factor analysis is typically used to explore how the constructs cluster together. Just by simply visually inspecting the grid in Tab. 1 it can be seen that two elements, the Snickers and the Lion Bar, are most closely related to the person's 'ideal bar' and the Milky Way least like it. Also, the patterns of scores for the last three constructs are very similar, so for this participant the constructs 'satisfying – still hungry', 'chewy – not chewy' and 'solid – insubstantial' are related to each other and form a construct cluster or constellation.

However, sometimes it isn't feasible or desirable to use statistical analyses in order to examine construct clusters. They become less reliable when relatively few elements (fewer than 12) are used to elicit the constructs, but a researcher might choose to use a smaller number of elements where they want to explore the participant's construing in depth as part of a qualitative interview. They are also less reliable where different elements are used with different participants, as we did in our research; again this is

something a qualitative researcher may wish to do because they want the participant to select which elements to rate their constructs against. There is also some debate about whether the various programmes for analysing grids produce psychologically meaningful or trustworthy outputs (Bell, 2018). The Interpretive Clustering method described below allows the researcher to consider a number of possible construct clusters for a participant and to interpret these using the interview material gathered during the construct elicitation process. We will now illustrate the method using data from our research on the meaning of outdoor spaces.

**Using Interpretive Clustering to explore the meaning of outdoor spaces**

Thirteen participants were interviewed using Repertory Grids. The elements were images of a range of outdoor spaces (some urban, some rural or wilderness, and some mixed) and constructs were elicited using the triadic method. In the case of each construct, the participant's preferred pole was identified and a simple binary scoring system (ticks and crosses) was used to complete the grids. Elements that were 'out of range of convenience' of a construct were scored with a 0.

Below is a detailed account of how we did the analysis, using examples from this research.

**Step 1**

To simplify the early steps in the analysis we numbered the constructs in each grid, to avoid having to enter the full construct titles at each stage.

**Step 2**

The first decision is about what to accept as an indication that one construct is related to another. In the case of our research, we had 7 elements in our grids and initially decided that two constructs must show identical responses on 5 out of the 7 constructs. We felt that accepting fewer than 5 'matches' would render the comparison too near to chance levels, but insisting on 6 or 7 matches might be so stringent as to eliminate potentially important relationships. We experimented with using both criteria in our research; accepting 5+ matches sometimes resulted in a great number of clusters for some participants, which were difficult to interpret. On the other hand, using only 6+ matches meant that, for some participants, no clusters were identified. There may be an argument for varying the criterion slightly between participants in order to simplify the clusters for participants where there is a great deal of interrelatedness in their grid and to make sure this is captured for participants where it is much less pronounced but still evident. The analysis in the remainder of the steps below is based on a criterion of 6 or 7 matches. We decided on this criterion as several of our participants demonstrated a considerable amount of interconnectedness in their grids and using 5+ matches which led to a very complex picture that was hard to interpret.

**Step 3**

For each grid, we produced a matrix showing the number of matches that each construct had with every other construct. This entailed comparing each construct with every other construct in the grid and counting, for each construct pair, the number of elements where there is an identical response, i.e. where the elements are placed at the preferred or non-preferred pole of both constructs. Tab. 2 shows the matrix for one of our participants, Richard. Just the construct numbers, rather than full construct titles, have been used; we elicited 17 constructs with Richard.

Tab. 2: *Richard's matrix*

| Construct | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Con1 | * | 4 | 0 | 6 | 3 | 7 | 6 | 6 | 5 | 5 | 6 | 5 | 4 | 4 | 2 | 3 | 4 |
| Con2 | 4 | * | 3 | 5 | 4 | 4 | 4 | 5 | 4 | 4 | 5 | 3 | 4 | 5 | 2 | 4 | 7 |
| Con3 | 0 | 3 | * | 1 | 4 | 0 | 0 | 1 | 2 | 2 | 1 | 0 | 2 | 1 | 2 | 4 | 3 |
| Con4 | 6 | 5 | 1 | * | 4 | 6 | 5 | 5 | 6 | 4 | 5 | 5 | 4 | 5 | 2 | 4 | 5 |
| Con5 | 3 | 4 | 4 | 4 | * | 3 | 2 | 2 | 3 | 1 | 2 | 3 | 3 | 3 | 4 | 5 | 4 |
| Con6 | 7 | 4 | 0 | 6 | 3 | * | 6 | 6 | 5 | 5 | 6 | 5 | 4 | 4 | 2 | 3 | 4 |
| Con7 | 6 | 4 | 0 | 5 | 2 | 6 | * | 6 | 4 | 5 | 6 | 4 | 4 | 5 | 3 | 2 | 4 |
| Con8 | 6 | 5 | 1 | 5 | 2 | 6 | 6 | * | 4 | 6 | 7 | 4 | 5 | 4 | 2 | 2 | 5 |
| Con9 | 5 | 4 | 2 | 6 | 3 | 5 | 4 | 4 | * | 5 | 4 | 4 | 3 | 4 | 1 | 3 | 4 |
| Con10 | 5 | 4 | 2 | 4 | 1 | 5 | 5 | 6 | 5 | * | 6 | 3 | 4 | 3 | 1 | 1 | 4 |
| Con11 | 6 | 5 | 1 | 5 | 2 | 6 | 6 | 7 | 4 | 6 | * | 4 | 5 | 4 | 2 | 2 | 5 |
| Con12 | 5 | 3 | 0 | 5 | 3 | 5 | 4 | 4 | 4 | 3 | 4 | * | 5 | 3 | 3 | 2 | 3 |
| Con13 | 4 | 4 | 2 | 4 | 3 | 4 | 4 | 5 | 3 | 4 | 5 | 5 | * | 3 | 4 | 1 | 4 |
| Con14 | 4 | 5 | 1 | 5 | 3 | 4 | 5 | 4 | 4 | 3 | 4 | 3 | 3 | * | 4 | 3 | 5 |
| Con15 | 2 | 2 | 2 | 2 | 4 | 2 | 3 | 2 | 1 | 1 | 2 | 3 | 4 | 4 | * | 2 | 2 |
| Con16 | 3 | 4 | 4 | 4 | 5 | 3 | 2 | 2 | 3 | 1 | 2 | 2 | 1 | 3 | 2 | * | 4 |
| Con17 | 4 | 7 | 3 | 5 | 4 | 4 | 4 | 5 | 4 | 4 | 5 | 3 | 4 | 5 | 2 | 4 | * |

N.B. *The figures on the table show the number of elements for which each pair of constructs matches. Thus, Construct 1 matches on four elements with Construct 2, zero elements with Construct 3, six elements with Construct 4, and so on.*

'Matches' could be either two ticks or two crosses (since '0' means that the construct can't meaningfully be applied to that element it would not make sense to count two 0s as a 'match'). It was important to remember that constructs may be negatively related, such that the preferred pole of one construct is related to the non-preferred pole of another. These negative relationships can indicate tensions and contradictions within the person's construing. So in inspecting the construct pairs we also identified any pairs where this was the case. So we looked for construct pairs where there were 6 or 7 mismatches, i.e. 1 or 0 'matches'. Tab. 3 illustrates this by comparing the patterns of responses on two constructs from the grids for participants Harry and Sylvia.

Tab. 3: *Comparing construct pairs for Harry and Sylvia*

Comparing two of Harry's constructs

| **Construct no.** | **Preferred pole ✓** | **C3** | **C4** | **A4** | **B4** | **C2** | **B1** | **B2** | **Non-preferred pole X** |
|---|---|---|---|---|---|---|---|---|---|
| 11 | Not what I'm used to | x | x | ✓ | x | ✓ | ✓ | ✓ | Very familiar |
| 12 | Sense of wonder | x | x | ✓ | x | ✓ | ✓ | ✓ | Nothing to be discovered |

Comparing two of Sylvia's constructs

| Construct no. | Preferred pole ✓ | A6 | C5 | B4 | C3 | B2 | A3 | B1 | Non-preferred pole X |
|---|---|---|---|---|---|---|---|---|---|
| 7 | cosy | x | ✓ | ✓ | ✓ | ✓ | x | x | chaotic |
| 10 | Massive sense of space, expansive | ✓ | x | x | x | ✓ | ✓ | ✓ | Railed off, small world |

Harry's constructs are positively related because they 'agree' on all 7 elements. Sylvia's constructs are negatively related because there are 'disagreements' on 6 out of 7 elements.

**Step 4**

The next step is to create a list, for each of a participant's constructs, of all the other constructs with which it has the requisite number of either positive or negative matches- in our case, 6 or 7. Tab. 4 shows the lists of construct matches for three of Sylvia's seventeen constructs as an example.

Tab. 4: *Construct lists for 3 of Sylvia's constructs.*

The left hand pole is preferred, and poles in bold font are related.

**Verdant** – dead, nothing thriving

**Exciting, a lot going on** – flat, unvarying, depressed, unenergetic
**Solitude** – cut off
**Wild, free** – controlled, contained
**Dramatic** – unvarying, goes on and on
**Massive sense of space, expansive** – railed off, small world
**Freedom, wildness**- conventional
**Variable** – doesn't change

**Exciting, a lot going on** – flat, unvarying, depressed, unenergetic

**Verdant** – dead, nothing thriving
Cosy – **chaotic**
**Dramatic** – unvarying, goes on and on
**Variable** – doesn't change

**Wild, free** – controlled, contained

**Verdant** – dead, nothing thriving
Cosy – **chaotic**
**Massive sense of space, expansive** – railed off, small world
**Freedom, wildness**- conventional

**Step 5**

Next, we identified clusters of constructs from each of the construct lists compiled in Step 4. What counts as a 'cluster' is open to researcher discussion and agreement – in our research we decided that a cluster was a group of at least 3 constructs that were all related to each other, i.e. they all had 6 or 7 matches with each of the other elements in the cluster. This is done by checking each construct in a list against every other one in that list and retaining only those that are related to the others; one list may generate several possible clusters involving different combinations of constructs. The task is repeated for every construct list until all possible clusters are identified.

**Step 6**

The process described in Step 5 inevitably produces replications and overlaps, so we then examined all the clusters identified from a grid and eliminated any that were identical or where all the constructs in one cluster were already contained within another, larger cluster. The remaining construct clusters are then recorded as all the clusters for that participant. The final list of clusters for Sylvia is shown in Tab. 5, and a visual representation (rather like a Venn diagram) of the relationships between these clusters is shown in Fig. 1. We have found such visual representations very helpful in showing the level and complexity of inter-relationships between clusters.

Tab. 5: *Sylvia's clusters*

| |
|---|
| **Cluster 1** |
| **Wild, free** – controlled, contained |
| **Massive sense of space, expansive** – railed off, small world |
| **Freedom, wildness**- conventional |
| Cosy – **chaotic** |
| **Cluster 2** |
| **Wild, free** – controlled, contained |
| **Massive sense of space, expansive** – railed off, small world |
| **Freedom, wildness**- conventional |
| **Verdant** – dead, nothing thriving |
| **Cluster 3** |
| **Verdant** – dead, nothing thriving |
| **Exciting, a lot going on** – flat, unvarying, depressed, unenergetic |
| **Dramatic** – unvarying, goes on and on |
| **Variable** – doesn't change |

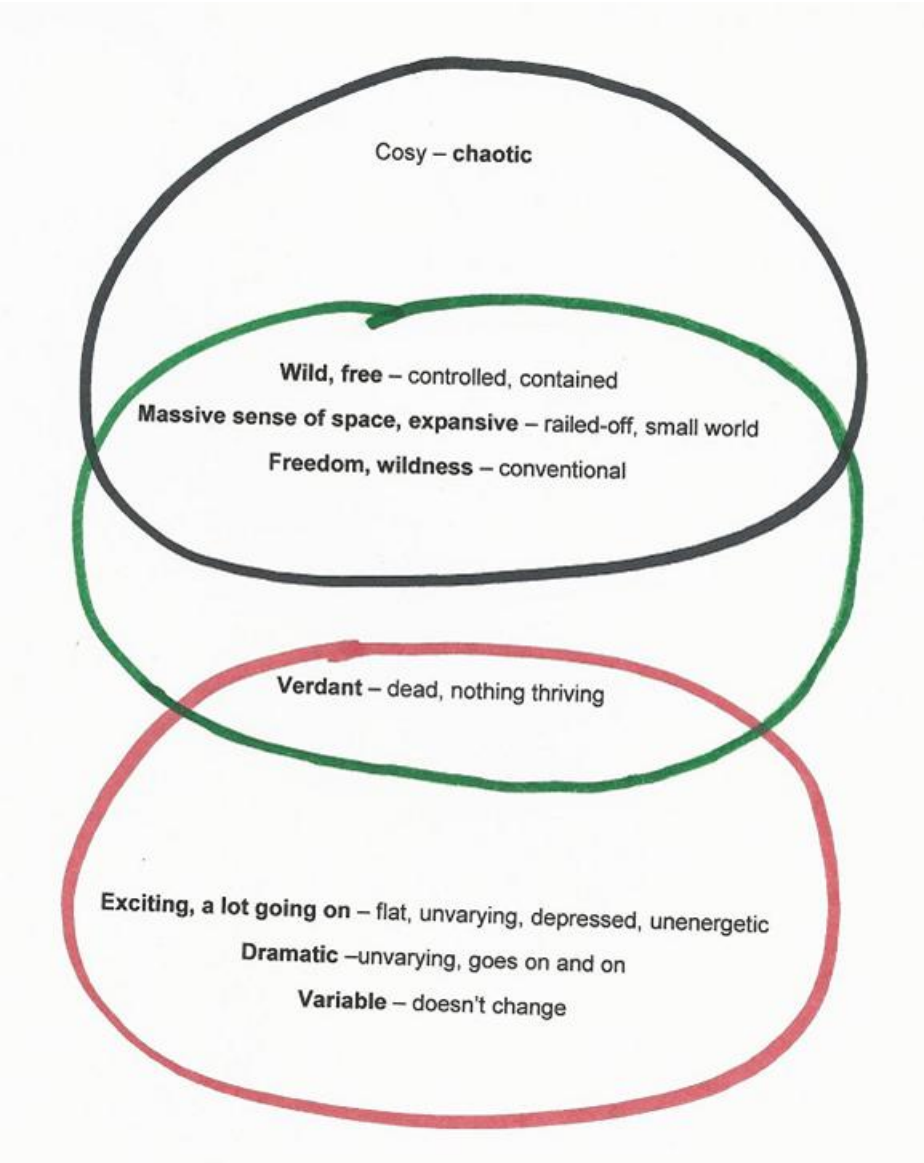


Fig. 1: *Sylvia's cluster*

**Step 7:** Interpretation

This is the point at which the researcher interprets the clusters, and therefore different researchers may make rather different interpretations as with other forms of qualitative analysis. In Sylvia's case there are three clusters, one of which partially overlaps with the other two. As can be seen, there is an interesting relationship between 'cosy – chaotic' and the other constructs in her first cluster. Whilst 'cosy' is Sylvia's preferred pole, 'cosy – chaotic' is negatively related to several other constructs where wildness, a massive sense of space and freedom are preferred (to control and containment, and conventionality). This appears to be an area of tension in Sylvia's construing. On the one hand, she seems drawn to wildness, freedom and massive spaces, spaces that are not constrained, closed off or rather mundane (and perhaps where people are also not constrained). On the other hand, these spaces are perhaps sometimes too 'chaotic' for her and she wants the safety of being 'cosy'. Such issues could potentially be explored with Sylvia in a follow-up interview. Wildness, freedom and a massive sense of space

are also in a positive relationship with 'verdant-dead, nothing thriving', forming another cluster. This suggests that for Sylvia such spaces are associated with life (rather than death), where things (plants and humans?) are free to thrive. The final cluster also includes 'verdant – dead, nothing thriving', this time clustered with 'Exciting, a lot going on – flat, unvarying, depressed, unenergetic', 'Dramatic – unvarying, goes on and on' and 'Variable – doesn't change'. In this cluster, the drama and excitement of some spaces is associated with being 'verdant' through their variability, perhaps through the constant change that is involved in things that grow and thrive.

## CONCLUSIONS

The method we have described here is admittedly time-consuming; comparing all construct pairs in order to identify those that are related can be a lengthy process, especially if there are many constructs in the grid and numerous participants. Some of this manual process could potentially be computerised and we are currently looking into the development of a simple programme for doing this that could be available through open-access. However, despite its time-consuming nature, we believe that Interpretive Clustering offers an innovative addition to the repertoire of methods for qualitative research for two main reasons:

Firstly, Interpretive Clustering does not perform the same function as thematic analysis, the most popular form of qualitative analysis, and therefore potentially adds another layer of understanding to the data. The data from grid interviews can be analysed thematically, either within or across cases, drawing out key issues, similarities and differences. But theming and clustering are not different ways of achieving the same analytic ends; whereas a thematic analysis aims to make sense of a data set by drawing out similarities and differences, Interpretive Clustering identifies the implications that constructs hold for each other. For Sylvia, the closely related constructs of 'Exciting, a lot going on – flat, unvarying, depressed, unenergetic', 'Dramatic – unvarying, goes on and on' and 'Variable – doesn't change' do not constitute three different instances of the same idea or experience (as in a theme). Rather, for her 'variable' also implies 'exciting' and 'dramatic'; if an environment is construed by her as 'variable' it is also likely to be seen as 'exciting' and 'dramatic'.

Secondly, it is a particularly participant-led analysis. This does not mean that the participant is actively involved in producing the analysis, rather the interpretive process is grounded in the participant's construing. In other forms of qualitative analysis, such as various types of thematic analysis, the researcher similarly attempts to remain 'close to the data' in the early stages of coding; this means trying to remain faithful to the participant's meaning and trying not to over-interpret the data. However, researcher-led interpretation inevitably occurs relatively early in and throughout the analysis process. For example, the researcher is deciding which sections of text are relevant to the research question and therefore to be considered for coding, then defining codes, clustering them into themes and so on. In contrast, by completing the Repertory Grid, the participants themselves are implicitly 'telling' the researcher how their constructs are related to each other, although they may struggle to articulate this if asked. By deriving construct clusters from the data, the researcher is arguably remaining faithful to the structure of the participant's construing and delaying researcher-led interpretation until the final stage of analysis.

We invite your comments on this discussion paper – please email us at v.burr@hud.ac.uk and n.king@hud.ac.uk.

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## ABOUT THE AUTHORS

*Viv Burr* is Professor of Critical Psychology at the University of Huddersfield, UK. She is principally known for her book 'Social Constructionism' (3rd edition 2015) but also has also published widely in the field of Personal Construct Psychology and is author of 'Invitation to Personal Construct Psychology' (2nd edition 2004, with Trevor Butt.) She is especially interested in the potential of PCP methods for qualitative researchers, and her previous research has applied these methods to topics such as developing reflexivity in social work students (with Nigel King) and exploring cross-cultural perceptions (with Trevor Butt and Massimo Giliberto). With Nigel King, she is currently engaged in a qualitative research project using PCP methods to explore how people construe a range of natural and urban environments.

*Nigel King* is Professor in Applied Psychology at the University of Huddersfield, UK. He has a long-standing interest in methods for applied qualitative research, and is well-known for his work on the Template Analysis style of thematic analysis. More recently he has developed an interest in the use of participant-led diagrams in qualitative interviewing, including the Pictor technique which he developed with colleagues at Huddersfield. He is author of 'Interviews in Qualitative Research' (with Christine Horrocks and Jo Brooks; 2nd edn, Sage, 2018), and 'Template Analysis for Business and Management Students' (with Jo Brooks; Sage, 2017).

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Received: 11 February 2019 – Accepted: 24 February 2019 – Published: 28 March 2019