Article:

Hutter, R.R.C, Wood, C. and Turner, R.N. (2013) Individuation Moderates Impressions of Conflicting Categories for Slower Processors. Social Psychology, 44 (4). ISSN: 1864-9335

https://doi.org/10.1027/1864-9335/a000108

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Word Count: 5547

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As social creatures living in groups, human beings have always experienced multiple and simultaneous demands when responding to and thinking about others. In modern life, the cognitive demands created through interaction with others can take many forms, whether in the office, at home, or when socializing. Humans have therefore evolved means of processing information about others in a way that reduces cognitive demand, freeing up valuable cognitive resources in order to allow other competing tasks to be undertaken. Macrae, Milne, and Bodenhausen (1994) have argued that to enable efficient use of resources, humans have developed a system that allows thinking and classification of others based on cognitive representations of social categories, such as gender or occupation. In other words, humans often form impressions of others through categorical thinking. This fast and efficient process requires little effort on the behalf of perceivers because it does not necessitate their attention or awareness (Macrae et al. 1994). In general, this system works quickly and efficiently, allowing people to go about their daily business and form impressions of others concurrently.

Occasionally, however, there are times when forming impressions based on social categories is not as effective at minimizing cognitive demands as humans would ideally like. For example, when meeting a person who holds membership of two conflicting social categories, such as a female bricklayer or a female mechanic, it is not as easy to form a clear impression in terms of their categorical membership. In this context, an alternative system of impression formation might be more effective. Fiske and Neuberg (1990), for example, outline a continuum model of impression formation in which perceivers attempt to classify others according to their categorical memberships by default, but when this is not possible rely more heavily on individuated features of the target. Individuated features are attributes that are independent of targets' categorical memberships, for example, the observation that a female mechanic is 'brave'.

In short, although categorization is the default classification system and remains the most efficient way to gain coherent impressions of others, it is perhaps less useful when perceivers encounter a target sharing conflicting categories. In the present research, we investigate whether the application of traits or features not usually associated with a conjunction's constituent categories accompanies the formation of individuated impressions for incongruent conjunctions. Hutter, Crisp, Humphreys, Waters and Moffitt (2009) found that participants applied traits including 'independent' and 'strong-willed' to the conjunction female mechanic, but not its constituents (i.e. female and mechanic). Moreover, we consider whether people with a slower, deliberative processing style are more likely to think in this way as a means to gain coherent impressions.

Conflicting social categories

The term category conjunction describes the *representational* consequences of combining category memberships. Representation of a combination or conjunction (the terms are interchangeable), sometimes extends beyond the knowledge or contents derived from the constituent categories, resulting in an *interactive* relationship between the constituent categories, leading to modification. The modification of one category when simultaneously activated with a second category changes the contents of a conjunction and thus the resulting representation differs from the contents of the constituents alone (Bodenhausen, 2010). Interactive relationships are particularly likely when forming impressions of persons with conflicting social category memberships. Perceiving conflicting memberships result in incongruent or surprising category combinations or conjunctions (Hastie, Schroeder, & Weber, 1990; Hutter & Crisp, 2005; Kunda, Miller, & Claire, 1990).

When forming impressions relying on category conjunctions in others, trait application has two potential outcomes. First, a conjunction draws on traits or attributes from the constituents that comprise the conjunction. For example, when describing a male nurse, the constituent attributes ‘strong’ (based on gender), or ‘caring’ (based on occupation) may be applied. In addition, the application of novel or *emergent* attributes (absent when considering the two constituents in isolation from one another) is possible, for example the use of ‘unconventional’ or ‘non-materialistic’. Relatively *more* emergent and *fewer* constituent attributes constitute the contents of incongruent relative to congruent conjunctions (Hutter & Crisp, 2005). Therefore emergent attributes are particularly likely to arise when attributes associated with one constituent conflict with the other constituent (e.g., Hampton, 1987, 1988; Kunda et al., 1990). So why does this happen?

Hastie, Schroeder, and Weber (1990) two-stage model

According to Hastie et al.’s (1990) two-stage theory, when encountering incongruent combinations, perceivers first attempt to fit the target to a simple categorical frame based on simple averaging of attributes from the constituents (see also Hampton, 1987, 1988). This process of categorization, based on social category structures stored in long-term memory (LTM), is likely to fail when initially attempting to form impressions of incongruent conjunctions. Indeed, a reduction in application of traits associated independently with the constituent categories occurs when describing such conjunctions (e.g., Hutter & Crisp, 2005, 2006). This activates a second stage consisting of three possible resolution strategies. First, participants attempt to recall previous experiences with similar others. Second, they may use general rules from personal experience. Third, they may engage in a mental simulation process aimed at determining the type of person who might assume the role. It is during this stage that new, *emergent* attributes are used, that apply to the combination but not to the constituents (e.g., Barsalou, 1987, 1989; Estes & Ward, 2002; Hampton, 1997; Hutter et al., 2009; Siebler, 2008; Wilkenfield & Ward, 2001).

This suggests that for incongruent combinations, impression construction will draw not only on schematic information stored in LTM, but also on alternative processes leading to the application of non-stereotypic attributes. Through this process, encountering novel category combinations can lead to the creation of new, complex categories (e.g., Barsalou, 1987, 1989; Brewer, Dull, & Lui, 1981; Stangor, Lynch, Duan, & Glass, 1992). Considerable support exists for the two-stage model. Hutter et al. (2009), for example, tested the premise that social perceivers do not *immediately* generate emergent attributes when encountering an incongruent combination, but do so after social categorization fails. It emerged that when generating a fixed number of attributes, describing incongruent conjunctions took longer than congruent conjunctions. Hutter et al. (2009) also showed emergent attribute generation was greater in the *second* half of the attribution generation task for incongruent category combinations (see also Siebler, 2008). Both findings are consistent with the two-stage model. Furthermore, given that processing is complex in the second stage, it follows that it should be more cognitively taxing. Hutter and Crisp (2006) showed that participants subjected to an additional cognitive load (and who therefore had limited executive resources available), experienced impairment in the number of emergent, but not constituent, traits generated relative to a control condition.

Processing speed and emergent traits

Although the impact of experimentally induced cognitive load on emergent trait application has now been established, little research has examined a related individual differences factor: processing speed. Slower processing speed is often indicative of reduced executive ability, and may attenuate emergent trait generation in the same manner as increased cognitive load. However, there are also grounds for expecting the opposite. In a recent study, Hutter, Wood, and Dodd (2012) found not only that an aging sample more readily applied emergent attributes to incongruent conjunctions, but also that processing speed mediated this effect. There was no such effect for a younger sample. It is possible, therefore, that regardless of age, perceivers with a generally slower deliberative processing style may also be more likely to take the time and effort to apply more emergent features when describing incongruent conjunctions. Indeed, cognitive slowing in processing speed (e.g., Verhaeghen & Basak, 2005; Verhaeghen & Salthouse, 1997) is associated with a reduction in executive ability (and aging) and a more ordered, structured, and rigid way of thinking, in the form of higher Personal Need for Structure (PNS, Hess, 2001).

Those perceivers thinking more slowly should therefore be more likely to engage in effortful inconsistency-resolution processes when forming impressions of incongruent conjunctions because incongruent targets initiate deliberative thinking (Hutter et al. 2012). Accordingly, although perceivers with a slower processing speed tend to show reduced executive abilities, they may ironically need to recruit relatively more of these resources when encountering incongruent social category conjunctions, and generate more emergent traits to explain the conflict.

Individuation

Although contemporary research on the processing of incongruent categories has generally relied on Hastie et al.'s (1990) two-stage model, the model itself is also potentially compatible with broader models of impression formation, including Fiske and Neuberg's (1990) continuum model. According to this account, a continuum runs from heuristic, category-based impressions through to more systematic, attribute-based individuated impressions. Perceivers initially try to form an impression by searching for a social category that matches an encountered target. If this search is successful, categorization occurs, and (possession of) the activated prototypic characteristics (associated with the category) become linked to the target. If the categorization process is unsuccessful, however, there is a move towards individuated perception by invoking an attribute-by-attribute approach to form an impression of the target person. In summary, Fiske and Neuberg's model predicts that if fitting a target to a category proves difficult, definition of the target more in terms of individuated characteristics will come to the fore. This process is analogous to the second stage of Hastie et al.'s model. It would therefore follow that the generation of emergent attributes when perceiving incongruent category conjunctions may be reliant on individuation, a process not addressed in Hastie et al.'s model. Accordingly, we draw on both models in order to test our prediction that individuation moderates the effect of perceiving incongruent conjunctions on emergent attribute generation.

The current research

In order to provide evidence for individuation we include a measure of individuation (Hutter, Wood, Waters, & Turner, in submission). Hutter et al. (2009) suggested (but did not test) that emergent attributes occur when perceivers individuate incongruent conjunctions. In addition, a potentially important factor in the application of emergent attributes following individuation, which to date has received little empirical attention, is processing speed. It is our contention that slower processors individuate and then apply inconsistency-resolution processes more readily, requiring additional time to resolve the inconsistency (Hutter et al., 2012). For these individuals, who are more likely to take additional time and effort when describing incongruent conjunctions, individuation will be associated with more emergent features.

We therefore examined whether individuation would moderate perception of category conjunctions differentially, depending on perceivers processing speed. We measured this using the Digit Symbol Substitution Test (DSST, taken from the Wechsler Adult Intelligence Scale: WAIS, e.g., Salthouse, 2000; Sliwinski & Buschke, 1999). Slower processors need to work harder, we believe, to resolve the inconsistency for incongruent conjunctions. Thus, although these perceivers tend to process more slowly, they are ironically more likely to invest greater cognitive effort in to resolving incongruent conjunctions. We therefore expect to find that individuation moderates impressions of incongruent conjunctions resulting in emergent attribute application for slower but not faster processors. In contrast, for congruent conjunctions, no effect is expected. We contend that slower processing ability is a key factor in forming impressions based less on a target's group affiliations and more on individual attributes, in order to explain away the inconsistencies inherent in incongruent category combinations. In addition (and in line with previous research, e.g., Hutter et al. 2012), we predicted the application of more emergent attributes to incongruent versus congruent combinations. The application of constituent attributes across combination was not expected to differ. Furthermore, we did not expect or predict differences in processing speed across combination. However, we hypothesized greater individuation to be associated with incongruent versus congruent combinations.

Method

Participants and Design

Eighty undergraduate participants (71 females, mean age = 20.51 years) were randomly allocated to a one factor (combination) between subject design with two levels (incongruent vs. congruent). Two continuous potential moderating variables were also included (individuation and DSST). Participants were recruited via the departmental research participation scheme in exchange for £5 (approximately €5.75 or $8). We tested four orthogonal gender-occupation combinations in total: 'male bricklayer', 'female nurse', 'female bricklayer 'and 'male nurse', which pilot testing had revealed to systematically differ in how surprising and familiar they were (Hutter et al., in submission). Manipulation of target gender and occupation occurred between subjects, such that participants described one gender-occupation combination (and associated constituents). However, as gender and occupation were not of theoretical importance independently per se, for the purpose of analysis 'female bricklayer' and a 'male nurse' were collapsed to form the incongruent combinations and 'male bricklayer' and 'female nurse' were collapsed to form the congruent combinations. Together, the collapsed incongruent and congruent combinations formed two levels for the combination. Ratings of surprise and familiarity for the collapsed combinations are reported later (see Results and Discussion).

Procedure

Each participant read an information sheet clarifying that participation involved impression formation. Participants first completed a computerized trait generation task in which they were required to list at least five traits to describe each of three people that appeared sequentially on the computer screen. Each participant read the following instructions: ‘In this study, we are interested in how you think and feel about different types of people. For the first part of the study, the computer will present a label that describes a type of person. Please type the characteristics into the computer (pressing ENTER after each characteristic). You will have two minutes in which to come up with as many characteristics as you can. You will see descriptions of three different kinds of people in total. (Press the SPACE bar when you are ready to begin)’. On each trial, participants were presented with a category label on the computer screen and were given two minutes to enter as many descriptive characteristics as they could, using the computer keyboard. The trait generation task was repeated with two different labels for two additional trials, so that each participant described a category combination (either a congruent or an incongruent combination depending on allocated condition) and its respective two constituent categories. The order of presentation was randomized for each participant. For example, a participant in the incongruent condition might first have generated descriptive traits for a ‘female’, followed by a ‘bricklayer’, and finally a ‘female bricklayer’. This procedure was similar to those described by Hastie et al. (1990) and Hutter et al. (2012)[1]. On concluding the trait generation task, participants rated the surprise and familiarity of each person described and then completed a five-item individuation measure for the constituents and category conjunction.

The order in which the constituents and conjunction were rated on these three measures was randomized for each participant. Thus, *all* participants listed attributes for the constituent categories and conjunction *before* exposure to the surprise, familiarity, and individuation scales for the first time. Following this, participants completed the processing speed measure (DSST) according to the instructions outlined in the WAIS. Participants studied a piece of paper depicting nine symbols, each of which corresponded with one of nine digits. Below the symbols were seven rows of digits with empty spaces underneath them. The experiment required corresponding symbols to be filled as quickly and accurately as possible within 120 seconds. Finally, the experimenter thanked and debriefed each participant.

Dependent Measures

The main dependent measure was the number of emergent versus constituent attributes used to describe category conjunctions. The total number of correct substitutions formed the measure of processing speed on the DSST. Additional measures were assessed using rating scales. To assess surprise, participants were asked to indicate, “How surprised would you be to meet the type of person described above?” (*1 = not at all surprised, 7 = very surprised*). To assess familiarity, they were asked, “How familiar is the type of person described above?” (*1 = not at all familiar, 7 = very familiar*). In order to assess individuation, participants responded to the following five items (Hutter et al., in submission)[2]: “How much did you view the person described above as...” (*1 = an individual, 7 = a group member*); “On first meeting the person described above, I would most likely think of them as...”, (*1 = an individual; 7 = a group member*); “To what extent do you think of the person described above as a unique individual?”, (*1 = not at all; 7 = very much*); “To what extent does the type of person described above qualify as a group member?”, (*1 = not at all; 7 = very much*); and “How similar are individual members of the above group to other members of the same group?”, (*1 = not at all similar; 7 = very similar*). Item 3 was reversedcoded, such that higher scores on each item represented reduced individuation. A mean individuation index score was then calculated for each participant. Scale reliability was acceptable $\alpha = .74$.

Results and Discussion

Perceptions of Combinations

Consistent with the pilot test, the two incongruent combinations were significantly more surprising ($M = 3.85$; $SD = 1.56$) and less familiar ($M = 1.88$; $SD = 1.04$) than the congruent combinations (*Ms* = 2.28 and 3.70; *SD's* = 1.52 and 1.84), t (78) = 4.57, $p < .001$ and t (78) = -5.45, $p < .001$.

Coding

Calculation of the number of emergent and constituent attributes generated for combined categories followed a procedure derived from Hastie et al. (1990). Designation as emergent attributes occurred for attributes only applied to the category combinations, while definition as constituent attributes occurred for attributes common to both a category combination and the constituents. Independent coders first screened within-participant response sets for synonyms and counted each once only. For example, 'happy' and 'chirpy' were both coded as ‘happy’ and only one counted. Next, the coders classified attributes generated by participants as either ‘emergent’ or ‘constituent’ according to the criteria above, and calculated the total number of emergent attributes and the total number of constituent attributes generated by each participant. For example, emergent attributes used to describe a female bricklayer included ‘butch’ and ‘brave’, while those defined as constituent attributes comprised ‘attentive’ derived from the female category, and ‘strong’ from the bricklayer constituent.

The number of emergent and constituent attributes generated across coders was compared using a Pearson’s correlation for each participant, resulting in acceptable inter-rater agreement for *emergent attributes*, $r = .77$, and for *constituent attributes*, $r = .87$. We then took the average score for each type of attribute across coders to form a single index reflecting the number of emergent attributes generated and a single index constituting the number of constituent attributes generated.

Processing Speed as a Moderator

We were interested in the moderating effects of individuation on the application of emergent attribute generation in category combinations, depending on DSST, and therefore used moderated regression analyses (Aiken & West, 1991). To investigate these effects we computed four interaction variables. First, we contrast coded combination level as -1 and +1 (incongruent vs. congruent) and multiplied this by the standardized individuation scores for each participant to create the combination by individuation interaction. Second, we followed the same procedure in calculating a combination by DSST interaction variable and an individuation by DSST interaction. A three-way interaction for combination by individuation by DSST was then calculated by multiplying combination by the standardized scores for individuation and DSST.

We entered these interaction variables into a multiple regression on a second step following the insertion of the combination, individuation, and DSST factors independently at Step 1. The generation of (standardized) emergent attributes formed the dependent variable in the regression, allowing us to model in particular, the combination × DSST interaction moderated by individuation that was of most interest here[3].

This analysis revealed non-significant effects of combination on emergent attribute generation, $\beta = -.21$, $p = .12$, and individuation on emergent attribute generation, $\beta = -.46$, $p = .65$, at Step 1. A significant combination × individuation interaction was observed, $\beta = .30$, $p = .02$. We decomposed this by conducting separate simple regressions for incongruent and congruent combinations. A significant effect of individuation was found for the incongruent combinations, β = .38, p = .03, while the congruent combinations showed only a marginal effect, β = .32, p = .08. These findings support the idea that individuation is more likely to play a role in the perception of incongruent than congruent combinations. There were no interactive effects observed for combination × DSST, β = .16, p = .36, or for individuation × DSST, β = .074, p = .63 on the generation of emergent attributes. There was however, a significant combination × DSST × individuation 3-way interaction as expected, β = -.31, p = .05, R-squared change = .11[4].

Separate individuation × DSST interactions were computed across combinations, which revealed a non-significant effect for the congruent combinations, β = -.23, p = .27, while in contrast a marginal effect was found for the incongruent combinations, β = .38, p = .09. We next unpacked this effect for the incongruent combinations only, by comparing the unstandardized regression coefficients for individuation and DSST. This revealed a marginal difference, Z = -1.54, p = .06, in which greater individuation was positively associated with emergent attribute application for low DSST perceivers, but not high DSST perceivers (see Figure 1). The finding suggests that the application of emergent attributes, moderated by individuation, is more likely to occur among people with slower processing ability.

Further Analyses

A one factor (combination) with two levels (congruent vs. incongruent) between-subjects Multivariate Analysis of Variance (MANOVA) resulted in the predicted increased application of emergent attributes when describing the incongruent combinations, relative to the congruent combinations (M = 1.50 vs. M = 0.93), Wilks' Lambda = 0.667, F (1, 78) = 4.83, p = .031, η_p^2 = .06. The number of constituent attributes applied when describing incongruent versus congruent combinations was only marginally significant, F (1, 78) = 3.41, p = .068. There were no significant effects on participants processing speed (DSST) across incongruent and congruent combinations, F (1, 78) = 0.005, p = .10. Furthermore, an increase in individuation was observed for the incongruent combinations ($M = 3.53$), relative to congruent combinations ($M = 4.91$), F (1, 78) = 33.81, $p < .001$ (see Table 1 for means and standard deviations and Table 2 for intercorrelations between variables).

Discussion

In this study, we have identified two of the processes underlying how perception of incongruent category combinations can result in the application of emergent attributes. Individuation moderated the effect of category combination on emergent trait application, but only for slow processors. That is, although individuation was associated with a greater application of emergent attributes in the incongruent condition, this was less likely in the congruent condition. Moreover, individuation and processing speed interacted to influence production of emergent attributes in the incongruent condition. Specifically, greater individuation was positively associated with emergent attribute application for those who processed information slowly, but not those who processed information quickly. These findings have a number of important implications for theory and research into how humans resolve conflicting category information when forming impressions of others.

Individuating incongruent combinations

Supporting Fiske and Neuberg's (1990) continuum model, these findings are among the first to identify individuation as a process underlying the effect of perceiving incongruent information on emergent attribute application. When people encounter a congruent combination, they are able to rely on simple categories in order to form impressions. However, when they encounter an incongruent combination, they must shift to a more individuated mode of processing in order to understand how one person could belong to two seemingly conflicting categories, resulting in emergent attribute generation. For example, when describing the female bricklayer, slower processors were more likely to use emergent attributes including 'unusual', 'individual', 'non-conformist', and 'unconventional'. While

Hastie et al.'s (1990) two-stage model can also be applied to understanding emergent attribute application, our findings suggest that these two models might best be used in combination with one another in order to fully understand this process.

Processing speed and incongruent combinations

Our findings also provide evidence that those with slower processing ability are more likely to use emergent attributes as a means of comprehending how a target might come to hold two conflicting social categories. These findings complement previous research showing that age-related slowing in processing is associated with the application of emergent attributes in descriptions of incongruent combinations (Hutter et al., 2012). A very similar impression formation process seems to be operating for those with slower processing ability, resulting in greater individuation. It seems that slower processors adopt a deliberative style when encountering incongruent conjunctions, relative to congruent conjunctions. Therefore, individuals with slow processing ability, rather than those with fast processing ability, most closely mirror the processes outlined in models of impression formation (Fiske & Neuberg, 1990; Hastie et al., 1990). However, Hutter et al. raise a concern that their results may be an artifact of the general tendency for older participants to show bias towards accuracy over speed (see Salthouse, 1979). This concern applies to the current research. Hutter et al. argue that a speed/accuracy bias is less likely to be problematic when employing DSST measures. Participant accuracy is near 100% on DSST and therefore at ceiling, leaving the number of correct substitutions unaffected.

Implications for executive function

We have shown that slower processors are more likely to recruit some forms of executive processing than faster processors when perceiving incongruent category conjunctions, because generating emergent attributes is more cognitively taxing than generating constituent attributes (Hutter & Crisp, 2006). This resulted in greater application of emergent features when describing an incongruent conjunction, which was moderated by individuation for those with slower processing ability (DSST). Despite slower processing ability, these perceivers seemingly dedicated more resources to deliberatively processing conflicting category conjunctions. They are clearly redirecting their resources to the application of emergent attributes because their extant stored constituent categories are less informative when attempting to form an impression of incongruent conjunctions. In the introduction of this paper, we argued that those with slower, deliberative processing styles were likely to apply emergent attributes to gain a coherent impression. Our findings support this notion: emergent attributes seemingly smooth category conflict and assist in forming coherent impressions following individuation.

Normally categorical ordering works well as a timesaving cognitive shortcut (Fiske & Taylor, 1991). Indeed, slower processors in the form of older adults more readily adopt stereotypical thinking (Henry, von Hippel, & Baynes, 2009; von Hippel, Silver, & Lynch, 2000) to assist perception. However, this is less adaptive when encountering a target that undermines categorical boundaries through dual membership of *conflicting* categories. Thinking about and processing these types of targets is problematic, because perceivers need to engage online executive resources. It is possible that discounting the incongruent target as unrepresentative (through generation of emergent traits) relies on these resources, thereby maintaining categorical boundaries. This strategy is particularly useful where the contents of stored categories are less flexible and category boundaries less fluid (Hutter et al. 2012). Furthermore, maintaining categorical boundaries facilitates speedy representation when processing more frequently encountered congruent category conjunctions. It therefore follows that higher orderliness in thinking (e.g., as measured using a Personal Need for Structure - PNS scale: Bartal & Guinote, 2002; Thompson, Naccarato, & Parker, 1989), could moderate impression formation for slow processors. Future research should examine the possible role of orderliness in thinking for slower processors when forming perceptions of incongruent combinations.

Conclusions

In this article, we investigated how social category conjunctions comprised of conflicting constituents are processed and the consequences this has for the type of impression formed. Emergent attribute application moderated by individuation, was associated with slower processing ability when describing incongruent conjunctions. Our findings suggest that when resolving conflicting thoughts associated with incongruent conjunctions, perceivers with slower processing ability switch from categorization to a more individuated mode of processing. These findings indicate that both Hastie et al.'s (1990) two stage model and Fiske and Neuberg's (1990) continuum model can be used together in explaining how slower and faster processors resolve inconsistency in order to understand how a target can come to share membership of two conflicting categories. This work contributes to the growing literature in which clearly defined and testable social processing differences are dependent on cognitive ability.

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Endnotes

[1]However, Hastie et al. (1990) presented the combination last while Hutter et al. (2005) presented the combination first.

[2] Hutter et al. (in submission) required one-hundred and sixty-two participants (138 women, mean age = 19.87 years) to rate five items designed to measure individuation (see main text) with reference to four category combinations (an Asian mechanic vs. a White mechanic, and an Asian tandoori owner vs. White tandoori owner). The extent to which a target conjunction member or category member was seen as an individual or group member was measured by first four items. The final item, assessed individuation, indirectly through group homogeneity. The item “To what extent do you think of the person described above as a unique individual?” was reverse coded. The scale generally reflects the nature of the Fiske and Neuberg’s (1990) continuum. Therefore, the measure reflects explicit perceived individuation versus group membership. In addition, the final scale item included was an *indirect* measure of individuation and group homogeneity. The nature of the continuum (from categorical to individuated perceptions) is linear and can be relatively narrow (despite the inclusion of group homogeneity).Variation in our scale anchors avoided scale items appearing too similar, and therefore the possibility of acquiescence in responding. The five items were summed then divided by five, resulting in a single, collapsed, average, individuation index score for each participant. Participants next undertook a 12-item measure of Personal Need for Structure (PNS) (Neuberg & Newsom, 1993; Thompson, Naccarato, & Parker, 1989). PNS reflects categorical thinking style (Bartal & Guinote, 2002) and as such should be negatively correlated with individuation in accord with Fiske and Neuberg’s (1990) continuum. Reliability for the scale was acceptable $\alpha = .76$. The individuation index was shown to be positively correlated with the PNS, $r = .28$, $p = .0065$, for incongruent conjunctions (i.e.,

greater individuation was associated with a lower PNS score) confirming convergent and content validity.

[3]The generation of constituent attributes formed an alternative second dependent variable.

[4]*Alternative constituent attribute analysis:* We tested the additional possibility that the effects reported when emergent attributes generation formed the dependent variable might also follow when constituent attributes formed the dependent variable. A non-significant combination × DSST × individuation 3-way interaction was found when constituent attributes formed the dependent variable, β = -.24, p = .131, R-squared change = .16. We observed no other significant main effects or interactive effects. However, we conducted further analyses to ensure that the non-significant pattern of constituent trait application did not mirror the significant pattern of emergent trait application found (i.e. increased application for incongruent conjunctions). We first split the non-significant combination × DSST × individuation 3-way interaction according to combination, computing separate individuation × DSST interactions for each combination. This revealed a significant effect for the congruent combinations, β = -.41, p = .03, while in contrast a non-significant effect was found for the incongruent combinations, β = .04, p = .86 (the opposite to that observed for emergent attributes in the main analyses). The effect was further unpacked by comparing the unstandardized regression coefficients for the congruent combinations only, for individuation and DSST. This revealed a significant difference, Z = -1.65, p = .049, in which reduced individuation was positively associated with constituent attribute application for slower processors (low DSST perceivers). Together, these results rule out the possibility that constituent attributes are as equally informative to slower processors as emergent attributes following individuation, when forming impressions of *incongruent conjunctions*. However, it

appears that constituent attributes are more informative to slower processors when forming impressions of *congruent conjunctions* and this is associated with reduced individuation.

Tables

Table1. *Emergent and constituent attributes generated, DSST substitutions, and individuation as a function of category conjunction (non-standardized data).*

	Combination	
	Congruent	Incongruent
Emergent	0.93 (1.12)	1.50 (1.22)
Constituent	6.69 (1.93)	5.79 (2.40)
DSST	85.48 (11.58)	85.48 (10.02)
Individuation	4.91 (0.99)	3.53 (1.13)

Note: Standard deviations are in parentheses.

Table 2. *Pearson-product momentum correlational coefficients across measures*

	1	2	3	4	5
1. Combination	--	.21	-.24*	.00	.55**
2. Constituent	-21	--	-.16	.09	.24*
3. Emergent	-.24*	-.16	--	-.09	-.19
4. DSST	.00	.09	-.09	--	.13
5. Individuation	.55**	.24*	-.19	.13	--

Note: * $p < 0.05$, ** $p < 0.01$ (2-tailed).

Figures

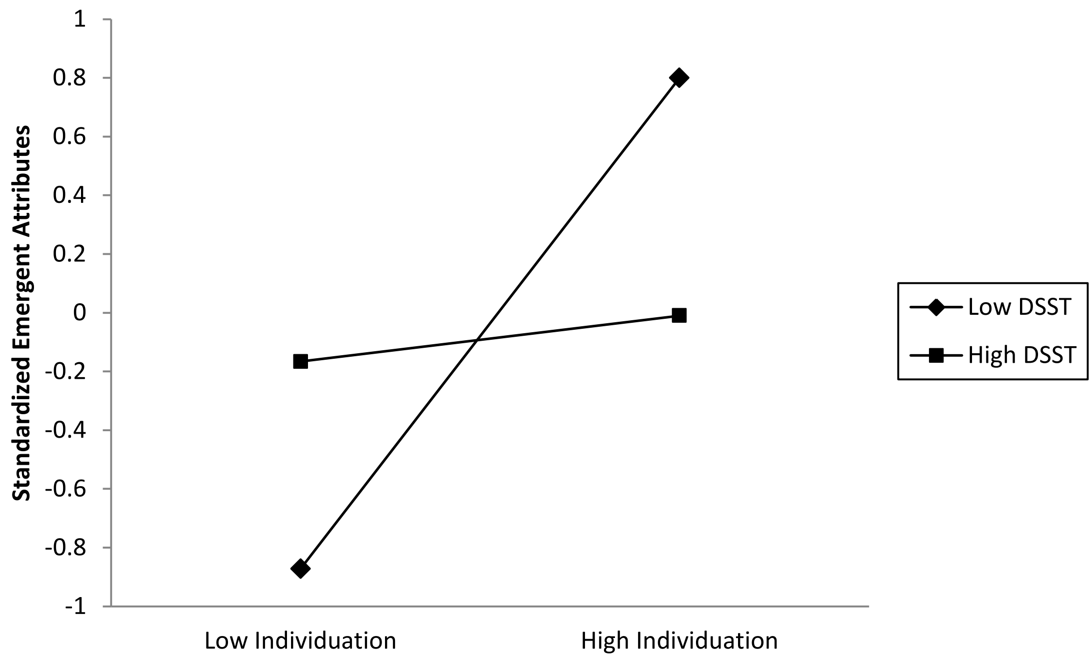

Figure 1. The contrasting relationship between low versus high individuation in the application of (standardized) emergent attributes across low versus high DSST perceivers for incongruent combinations.