Article

Mind the overlap in multiple categorization: A review of crossed categorization, intersectionality, and multiracial perception

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Abstract
Research on social categorization continues, with one growth area being multiple categorization. Various approaches study questions that, although different in scope and content, potentially tap the same underlying processes. Current models that aim to understand judgments about targets who belong to multiple social groups include algebraic and nonalgebraic models of crossed categorization, as well as theories related to intersectionality and multiracial categorization. The literature on these models and theories highlights some strengths and limitations. The review discusses potential overlap between models that have mostly advanced independently of each other. Future research can take a more encompassing stance to acknowledge this overlap.

Categorization is one of the most fundamental ways in which people make sense of the world (Bodenhausen, Kang, & Peery, 2012; Macrae & Bodenhausen, 2000). Some forms of categorizations—such as those using visual features of race, gender, and age—arguably occur automatically upon encountering others (e.g., Ito & Urland, 2003). Categorization allows people to track and distinguish others while using only a small amount of cognitive resources. However, categorization can also lead to unwarranted bias and prejudice (Dovidio, Love, Schellhaas, & Hewstone, 2017; Tajfel, 1970).

Categorization encourages people to think in terms of "us" and "them," which can in turn lead to intergroup bias (Allport, 1954), as widely studied by social psychologists. However, the majority of these studies have focused on simple, single demographic categorization, or distinctions between two groups, such as the consequences of categorizing

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others as Black, gay, or female (Crisp & Hewstone, 2007). Although useful in understanding basic categorization, many distinctions drawn in the real world involve many more than two categories. Often, both people in an interaction belong to multiple groups that are salient simultaneously. Consequently, current categorization research has begun to focus on targets who can be categorized into multiple social groups, whether along the same categorical space[1] (e.g., both Black and White for race) or different spaces (e.g., race and gender). Given an ever more socially diverse world, for example in terms of racial mixing (e.g., Office for National Statistics, 2013; U.S. Census Bureau, 2011), furthering our understanding of multiple social categorization is of increasing importance.

Theories of Multiple Categorization

A number of models propose to explain the interaction of two crossed, orthogonal categories at the broad level of in-groups and out-groups. The additive and the averaging models are two of the most widely studied examples (e.g., Singh, Yeoh, Lim, & Lim, 1997), applying arithmetic operations to the multiple group memberships of the target. After early studies uncovered some crossed-categorization patterns (e.g., Vanbeselaere, 1987), research into algebraic models grew considerably starting in the mid-1990s (e.g., Hewstone, Islam, & Judd, 1993). More recently, nonalgebraic models (Urada, Stenstrom, & Miller, 2007) have also received considerable support for some kinds of group combinations. We discuss these models in more detail in the following sections. Other variations of the ways that two group spaces can interact have been discussed (e.g., equivalence, where the multiple groups that a target belongs to are evaluated equally positively or negatively; see Crisp & Hewstone, 2007), but they have not received as much support and are not discussed in depth here.

All of the approaches mentioned so far have been studied under the terminology of crossed categorization, and take into account group memberships of both the target and the perceiver. The majority of this research focuses on how people evaluate others who belong to several of their in-groups or out-groups on different dimensions (e.g., race and gender), as long as these dimensions are at an equal level of inclusiveness (i.e., when one of the categories is not subordinated to the other). Additional theories that we do not review here deal with multiple categorization at different levels of inclusiveness (e.g., the common in-group identity model; Gaertner, Dovidio, Anastasio, Bachman, & Rust, 1993).

The crossed-categorization approach attempts to specify general models of multiple categorization that apply across specific group spaces. Crossed-categorization research was particularly developed by European social psychologists, potentially influenced by a strong tradition under the social identity approach (e.g., Hogg, Abrams, & Brewer, 2017). As such, crossed categorization has excelled at understanding general principles of multiple categorization, which should theoretically apply to all social groups (with variation across the different models for specific combinations).

Other approaches to studying multiple categorization, historically pursued primarily by American researchers, have addressed the consequences of belonging to combinations of socially salient groups such as gender, race, and age. Thus, these approaches often take into consideration the features and stereotypes of social groups when trying to understand judgments of multiply categorizable targets. For example, studies on emergence (e.g., Kunda, Miller, & Claire, 1990), the intersection of visual categories (e.g., race and gender; Johnson, Freeman, & Pauker, 2012), or the categorization of multiracial targets (Nicolas & Skinner, in press) start from the assumption that different group memberships might interact to give rise to complex judgments of social targets.

Unfortunately, many of the approaches discussed here are currently developing mostly independently from one another, despite shared interest and the potential for integrative insights. We aim to start acknowledging that overlap. First, we provide a brief summary of these models and

approaches, identifying gaps that future research should address, and attempting to identify commonalities between them.

Additive Model

The additive model (Crisp & Hewstone, 2000; Singh et al., 1997) suggests that in-group members will judge a person belonging to two in-groups (crossed) instead of one in-group (simple) more positively, whereas they will judge someone belonging to two out-groups instead of one out-group more negatively. If someone belongs to both an in-group (along Dimension A) and an out-group (along Dimension B), then the person is neutrally rated. In other words, the effects of each individual dimension are summed together, which means that people will discriminate more against a person who belongs to multiple out-groups, as opposed to someone who belongs to a single out-group.

This area of research has been prolific, but it has not yet distinguished whether rating a double out-group more negatively is simply the addition of two main effects, or an interaction between the two spaces being judged. This issue is not unique to the crossed-categorization additive model, and goes back to classic distinctions between algebraic and configural models of information integration (e.g., Asch, 1946); the configural model would argue that the meaning of the presented groups shifts in an interactive way to allow for an integrated judgment. Additionally, Singh et al. (1997) and Vanbeselaere (1991) both urge caution with the additive model, stating that their results have been mixed and could be interpreted as supporting several intergroup interaction models.

Averaging Model

The averaging model differs from the additive model in predicting that bias toward one out-group is the same as bias toward more than one out-group. The averaging model proposes that belonging to an in-group both in the simple case (one in-group) and in the crossed case (two in-groups) should be evaluated equally positively, and belonging to the out-group in the simple (one out-group) and crossed (two out-groups) cases should be evaluated equally negatively (Singh et al., 1997; Urada et al., 2007). In the mixed groups, the evaluations should be neutral, similarly to the additive model. In other words, the effects of each of the dimensions are averaged. This is unlike the additive model because the additive model accumulates the effects of the different dimensions.

Overall, the additive model is more predictive than the averaging model, and evidence for the averaging model has not been as strong (Crisp & Hewstone, 2000; Singh et al., 1997). Nevertheless, uncovering the factors that could lead to the use of either an additive or an averaging model is a promising avenue for future inquiries. Furthermore, how algebraic models translate into judgments of targets who belong to more than two groups is still unclear, given perceivers' limitations in performing arithmetic on multiple abstract pieces of information such as evaluations of social groups (Urada et al., 2007). Some nonalgebraic models have been the only major successful attempt at understanding perceptions of highly complex multiple categorization.

Nonalgebraic Models

The nonalgebraic models theorize that the strength of the respective categories can affect what happens when the categories are crossed. One model, category dominance, proposes that crossed categorization uses one category evaluation and ignores the other (Macrae, Bodenhausen, & Milne, 1995; Roccas & Brewer, 2002). For example, when one category was primed, that category was used for evaluation, and the other category was inhibited and harder to access. Macrae et al. (1995) theorized that this came from the inhibitory mechanisms that acted on competing activation processes.

Category conjunction, which is studied more extensively than category dominance in crossed-categorization research, occurs when an in-group is considered only if people belong to the in-groups along both dimensions. An example of

category conjunction would be a White male considering only other White males as part of his in-group and considering both non-White males and White females as out-groups (Brown & Turner, 1979; Eurich-Fulcer & Schofield, 1995; Mullen, Migdal, & Hewstone, 2001; Vanbeselaere, 1991). This is based on the idea that the process of defining an in-group is not determined by competing dimensions, but rather by combined dimensions of equal importance.

Additional nonalgebraic models proposed for targets who belong to more than two different crossed groups are based on feature detection theory (Urada et al., 2007). Feature detection models propose that crossing more than two categories makes it too difficult to use a bottom-up strategy (e.g., adding or averaging) to combine the categories. Instead, people switch to a top-down strategy and try to decide if the person they are interacting with is "in-group like" or "out-group like" based on the categories that the other person inhabits.

Two factors are important in this process. The first is the number of in-group categories and out-group categories. For example, if the other person belongs to more in-groups than out-groups the person will be considered "in-group like." The other important part of the feature detection model is salience. Some categories are more important than others, and those categories have a larger influence on whether a person is considered "in-group like" or "out-group like."

Current Issues With Crossed Categorization

As noted, some limitations are inherent in each of these previous models, but also a number of considerations arise when evaluating all of these "crossed-categorization" models together. Although crossed-categorization research can be useful in understanding how people integrate categories, several concerns with the research stem from the complexity of the existing experiments. For example, Vescio, Judd, and Kwan (2004) claim that previous papers fail to use participants

who belong to different groups (usually using White participants of only one gender), and manipulate only the targets' groups. This is problematic because it does not fully test how differences in participants' in-groups affect responses toward their out-groups. To address these problems, Vescio et al. studied crossed categories both for the targets and for the participants by using White and Asian, male and female participants, and then analyzing the different categories separately instead of collapsing them. Using this approach, they did not find the bias reduction effect for crossed (vs. single) group evaluations that is usually found when only target group membership is manipulated (Vescio et al., 2004). This result highlights the difficulty of fully understanding the complex interactions provided by crossed categorization, requiring researchers to fully cross both the target's and the participant's group memberships.

Similarly, a meta-analysis of crossed-categorization research by Mullen et al. (2001) describes three ways to operationalize in-groups and out-groups for crossed data. In a first operationalization, the "in-group" can be considered the double in-group, the "out-group" can be considered the double out-group, and the two in-group–out-group combinations are considered to be in between. In a second operationalization, the "in-group" is the same as the previous in-group, but the "out-group" is considered any group combination that is not the double in-group. All three of the out-groups are combined and analyzed together against the in-group. The third operationalization considers all three out-groups separately and compares them each to the in-group. As Mullen et al. show, these measurement distinctions matter, because the different operationalizations returned different meta-analytic results. Bias was reduced toward the in-group–out-group combinations but increased toward the double out-group combination.

Another issue can be illustrated by Urada et al. (2007). In their case, because there were more than two dimensions to cross, the analysis was simplified in a specific way. Every target had

either a dominant in-group (I) or out-group (O), and then had several nondominant groups (e.g., i or o) opposite the dominant group (e.g., Ioo or Oii). The comparisons were done between the number of nondominant categories (e.g., O vs. Oi vs. Oii vs. Oiii). Targets in dominant in-groups were rated equally no matter the number of nondominant out-groups to which they also belonged. On the other hand, members of dominant out-groups were rated more positively when they belonged to two or three nondominant in-groups than when they belonged to none or one nondominant in-group. While these results were significant, many combinations of in-groups and out-groups were not tested. Clearly, adding more categories creates a problem of scope, because it is difficult to test and interpret all of the combinations properly.

Another concern is exactly how the study of multiple categories is put into practice. Crossed categorization is one way to study multiple categories, but other research focuses on categorization where the participant belongs to many different categories, but the target only belongs to a single category. For example, this is the method that Hall and Crisp (2005) employ. In this study, participants evaluate a target who is part of a single in-group or out-group, after the participant writes a list of all of the groups to which the participant belongs. Having multiple criteria for own categorization weakened intergroup bias. However, this is not the same as intergroup bias weakening with crossed categories, because in this case the target can only belong to one category and the participants are evaluating the target along that single category while having their multiple group memberships made salient. Although this result is valuable as well, the two kinds of multiple categorizations do differ, and this has to be taken into account when looking at research with multiple categories, especially because some studies combine both kinds of categorization (Urada et al., 2007). In general, these models should be further tested against each other, with a broader understanding of the multiple factors that could complicate judgments of multiply categorizable targets.

Emergent Stereotype Content

One of the classic studies on judgments of multiply categorizable targets (Kunda et al., 1990) investigated whether the integration of two social groups into a unified target judgement could lead to the emergence of novel properties. In other words, a target who belongs to two social groups could possess attributes or stereotypes that are not possessed by either of the constituent groups (i.e., emergent properties). To illustrate, one of the crossed-groups targets studied by Kunda and colleagues was a Harvard-educated carpenter. In addition to attributes inherited from the constituents (e.g., affluent for Harvard-educated, rugged for a carpenter), they found that people used unique attributes to describe the multiply categorizable target, including non-materialistic and nonconformist. One of the hypothesized reasons for emergent attributes is that targets such as Harvard-educated carpenters are surprising and the constituent categories are often associated with incongruent stereotypes. The social observer thus uses causal reasoning in order to arrive at a unified perception of incongruent combinations that cannot be retrieved from stored exemplars.

Research on the emergence of properties for crossed-group targets has grown to suggest that the use of originally constituent versus emergent properties follows a time course, with emergent attributes being more common in later stages of attribute generation (e.g., Hutter, Crisp, Humphreys, Waters, & Moffitt, 2009). However, a number of pending questions still limit our understanding of emergent properties for multiply categorizable targets, including for example, disentangling the role of target familiarity and how incongruent the constituent categories are (as these two are usually correlated; Wood & Hutter, 2011).

Additionally, much of the research on emergence has, with exceptions, mostly crossed categories that are incongruent in terms of their competence stereotypes (e.g., Harvard-educated carpenter) or more idiosyncratic traits. Future research could expand and disentangle how

incongruence on different stereotype contents could lead to different effects on algebraic, nonalgebraic, and emergence models. For example, the stereotype content model (Fiske, Cuddy, Glick, & Xu, 2002) posits two fundamental dimensions of stereotypical impression formation: warmth and competence. Warmth refers to the friendliness and morality of targets, while competence refers to their abilities and agency. Both content dimensions could vary independently, allowing for the examination of incongruence on both dimensions. Previous studies (e.g., Tausch, Kenworthy, & Hewstone, 2007) combining warmth- and competence-related traits instead of groups have found that combining the different contents leads to differences in information dominance in an averaging model. Specifically, warmth related to a negativity effect in which low-warmth behaviors and traits are weighted more heavily in general judgments of a target who possesses both. However, competence does not seem to show this pattern, and has sometimes been associated with an opposite positivity bias (i.e., positive competence information is given more weight). How might these bottom-up results (i.e., from observed traits to target judgments) translate into a top-down approach (i.e., from preexisting stereotypes to target judgments)? How would they differentially affect emergence instead of dominance?

Moreover, the use of emergent properties has been associated with greater individuation of targets (e.g., Hutter & Wood, 2014). That is, to the extent that causal reasoning and resolving conflicting social categories leads to more emergent attributes, it is also leading to a more piecemeal understanding of the target. However, additional research needs to further understand how integrating information from multiple categories could lead to greater individuation. In particular, existing models of individuation propose that how much a target is viewed in categorical versus individuated terms constitutes a continuum (Fiske & Neuberg, 1990). Thus, the different models of crossed categorization and emergence might map onto different levels of individuated processing. For example, a nonalgebraic dominance model might be the result of greater piecemeal processing when a simple averaging of social group information seems inappropriate.

Intersections of Specific Social Categories

A growing body of research is exploring the effects of category-specific combinations on judgments of targets, with a focus on socially relevant and visually identifiable categorical spaces such as race, gender, or age. A number of theories have emerged as a result of these efforts, some of which are reviewed here.

Studies looking at the intersection of race and gender have arrived at a number of (sometimes inconsistent) patterns. For example, the double-jeopardy hypothesis (Beale, 1970), similarly to an additive model, proposes that Black women would be victims of increased discrimination compared to Black men, due to their membership in two stigmatized groups. On the other hand, the subordinate-male hypothesis (Sidanius & Pratto, 1999) argues that Black males are most discriminated against, and the ethnic-prominence hypothesis (Levin, Sinclair, Veniegas, & Taylor, 2002) argues that discrimination is driven more strongly by the race than the gender of the target; both hypotheses are similar to dominance models wherein one group dominates the other.

Finally, a model that perhaps fits with an emergence perspective is the intersectional invisibility account (e.g., Purdie-Vaughns & Eibach, 2008), which proposes that Black women face unique consequences as a function of the interaction of their race and gender categories. Specifically, given the nonprototypicality of women to the Black category, their faces and spoken contributions (e.g., in a "who said what" task; Taylor, Fiske, Etcoff, & Ruderman, 1978) are less likely to be remembered (vs. Black men; Sesko & Biernat, 2010). Similar results have been found for other nonprototypical combinations, such as Asian men (Schug, Alt, & Klauer, 2015). These different hypotheses can be in conflict in a number of scenarios, and although some research has aimed at disentangling them, further clarification

should pursue when one or the other better predicts behaviors toward these targets.

Other lines of research have explored multiple categorization processes by looking at targets who may possess visual or stereotypical information congruent with more than one social category. For example, and related to the nonprototypicality findings, gendered-race theory (Johnson et al., 2012) has found differing overlap of both physical and stereotypic traits between specific races and genders. Thus, according to the theory, Blacks and men share facial traits and stereotypes more than other combinations, while Asians and women share stereotypes more than other combinations. These overlaps result, for example, in faster categorizations of intersections that share facial or stereotypic traits, as well as biased selection of Black versus Asian candidates to positions more strongly associated with masculine versus feminine traits, respectively (Galinsky, Hall, & Cuddy, 2013).

Other research has examined overlaps between stereotypes and facial cues from additional category intersections. For example, Remedios, Chasteen, Rule, and Plaks (2011) found that liking of gay and straight males varied depending on race, with Black gay men being more liked than Black straight males, but the reverse being true for Whites. Kang and Chasteen (2009) found that both positive and negative emotions were detected sooner and for longer for older compared to younger White faces, but detected sooner and for longer for younger compared to older Black faces. Faces also appear to become harder to differentiate by gender for older versus younger faces (e.g., Quinn & Macrae, 2005). Other studies have uncovered many more patterns of unique judgments of targets who possess features prototypical of specific group combinations.

Intersections on the Same Dimension: Multiracials?

Recent research has seen a boom of studying categorically ambiguous targets (i.e., those possessing traits associated with multiple groups within the same space, making them hard to categorize). Race is a useful category for studying ambiguity, given the natural occurrence of racial mixing and the reported lived experience of racially mixed individuals with being perceived as ambiguous (e.g., Tran, Miyake, Martinez-Morales, & Csizmadia, 2016). As a result, researchers have attempted to understand how mixed-race targets are perceived. Although racial ambiguity is not necessarily directly related to multiple categorization, some have advanced the possibility that racially ambiguous targets could be categorized as belonging to two races simultaneously. For example, Peery and Bodenhausen (2008) studied multiracial categorizations as the result of categorizing Black-White racially ambiguous targets as both White and Black across two blocks of a categorization task. Others have cast doubts over the feasibility of considering a multiracial category as a double categorization rather than as a category in and of itself (e.g., Chen & Hamilton, 2012). However, the issue is far from resolved, with additional research needed to better understand whether social observers can hold two active categorizations that are usually treated as mutually exclusive for the same target.

One recent model might shed some light on the extent to which multiple categories in the same space might be simultaneously activated, at least during initial person perception, before a final categorization is settled. The dynamic interactive model of social perception (Freeman & Ambady, 2014) posits that both top-down (e.g., activated stereotypes) and bottom-up (e.g., visual cues) information for multiple groups in the same space might be simultaneously activated during the initial presentation of a target who possesses attributes from these groups. For example, upon the presentation of a racially ambiguous face with both White and Black facial traits, both categories would be simultaneously active until a categorization decision is reached, when the activation of one category overpowers the other. Research on this model typically uses mouse tracking to show that when a target is, for example, a face with slightly more Black than White features, hand movements are "attracted" toward the White

category on one side of the screen before the participant decides on the Black category on the opposite side of the screen. This model however, does not currently support double categorizations in the same space, as the resolution of the patterns of activations is the selection of one category over the other. However, similar methods, and perhaps extensions of theory could probe whether sustained activation of two categories in the same space could result in a Black-White mixed-race target being considered to be both Black and White, or whether a single multiracial category could reflect similar levels of activations for both categories.

An additional consideration is that research on the categorization of mixed-race targets might currently be conceptualizing racial ambiguity through an essentialist lens (see Richeson & Sommers, 2016, for a related argument), leading to the treatment of phenotypical features (i.e., visible physical traits typical of a racial category) as elements combined in an algebraic fashion. As such, for example, current approaches assume that the combination of Black and White phenotypical features will lead either to a Black, White, or multiracial categorization. Particularly supported is hypodescent (e.g., Ho, Sidanius, Levin, & Banaji, 2011), which suggests a bias toward categorizing mixed-targets as the minority group, similarly to a nonalgebraic dominance model wherein one type of information (the minority traits) is given more weight. However, studies also show high rates of multiracial categorizations in some tasks, which can be considered as an algebraic averaging or additive model, depending respectively on a single mixed-race (e.g., Chen & Hamilton, 2012) or a double-category (e.g., Peery & Bodenhausen, 2008) conceptualization.

However, note two potential problems with current approaches to racially mixed categorization. First, current research has ignored one of the alternative models that could describe the combination of social information: emergence. It is possible that, when treating race as a dimension (e.g., from White to Black), perceptions of targets are not appropriately described by either of the constituent categories nor their combination's characteristics, but by an emerging category with

correspondingly unique properties (e.g., stereotypes). But even more fundamentally, treating racial mixing as the combination of two endpoints in a dichotomy might be inappropriate and the result of essentializing race. Instead, we imagine future research treating racial features as separable elements that interact to create different racial category prototypes in a multidimensional space. Such treatment would make parallels to the algebraic, nonalgebraic, and emergence models less evident, but as mentioned, these models themselves are probably bound to expand to account for the full complexity of multiple categorization.

Finally, the study of categorical ambiguity has important implications for the distinction between inter- and intra-group dynamics. Given that racially ambiguous targets can be considered to be somewhere near the boundary of multiple categories, the point at which a categorically ambiguous target is treated as an out-group member or an atypical in-group member can be unclear. Therefore, in order to clarify the domain of a particular effect, research using racially ambiguous targets could benefit from incorporating both typicality and categorization measures (see Maddox, 2004).

Conclusion

A number of models and theories propose to understand the way that observers make sense of information about multiple social groups. This review focused on two main camps that have developed largely independently from each other, and we attempted to find commonalities and areas for future integrative research. In particular, researchers following more closely a social identity framework have explored group combinations at a more abstract level, working from models that take into account not specific groups (e.g., Blacks, Muslims, etc.) but the relation of these groups to the participant's social identity (i.e., in-groups vs. out-groups). Other researchers have focused more exclusively on the intersections of specific social groups (e.g., males and Blacks). Both approaches can be, in some instances, reframed in terms of the other. Even when they do explore phenomena that cannot be

explained by the other's models, a better understanding of the overlap will allow the study of multiple group membership to make stronger and more coherent progress.

Funding

Note

1. Although most research to date refers to race and other set universes with multiple complementary categories (e.g., Asian, White, Black, for race) as dimensions, we believe that thinking of them as multidimensional spaces is more appropriate.

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