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A Meta-Analytic Review of Hypodescent Patterns in Categorizing Multiracial and Racially Ambiguous Targets

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Abstract
Research addressing the increasing multiracial population (i.e., identifying with two or more races) is rapidly expanding. This meta-analysis (k = 55) examines categorization patterns consistent with *hypodescent*, or the tendency to categorize multiracial targets as their lower status racial group. Subgroup analyses suggest that operationalization of multiracial (e.g., presenting photos of racially ambiguous faces, or ancestry information sans picture), target gender, and categorization measurement (e.g., selecting from binary choices: Black or White; or multiple categorization options: Black, White, or multiracial) moderated categorization patterns. Operationalizing multiracial as ancestry, male targets, and measuring categorization with binary or multiple Likert-type scale outcomes supported hypodescent. However, categorizing multiracial targets as not their lower status racial group occurred for female targets or multiple categorization options. Evidence was mixed on whether perceiver and target race were related to categorization patterns. These results point to future directions for understanding categorization processes and multiracial perception.

Keywords
multiracial, racial ambiguity, racial categorization, person perception, hypodescent

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Individuals identifying as multiracial increased by approximately one third from 2000 to 2010 in the United States (Humes et al., 2011), and according to some estimates comprise 6.9% of the adult population in the United States (Pew Research Center, 2015). Given the rising multiracial population in the United States and multiracial presence in other countries (e.g., 8.8% of the South African population is multiracial, Statistics South Africa Census, 2018), there is a need to understand the lived experience of multiracial individuals, which is shaped by how society perceives them racially (Pauker, Meyers, et al., 2018). People's categorization of multiracial and racially ambiguous individuals can "reveal how culturally entrenched social categories and norms guide, and even limit, social perceptions" (Ho et al., 2011). The past two decades have produced an increase in research on how people categorize multiracial (i.e., explicit multiracial heritage or identity) and racially ambiguous (i.e., not visually prototypical of one racial/ethnic group) individuals (for reviews, see Chen, 2019; Kang & Bodenhausen, 2015; Pauker, Meyers, et al., 2018). This research has largely focused on hypodescent, or a pattern of racial categorization where a multiracial or racially ambiguous individual is categorized as their lower status group (e.g., Chen, Pauker, et al., 2018; Cooley et al., 2017; Ho et al., 2015; Krosch et al., 2013; Noyes & Keil, 2018).

The term hypodescent is rooted in the history and culture of race relations in the United States. As a concept, hypodescent stems from defunct antimiscegenation laws enacted in some states in the United States that legally classified an individual with *any* known Black ancestry (i.e., "one drop" of blood) as Black (Banks & Eberhardt, 1998; Davis, 1991). Thus, historical and social contexts shape social categorization, especially racial categorization. Due to the development of hypodescent within an American context, hypodescent could plausibly be a U.S.-specific phenomenon that only applies to Black/White multiracial targets when ancestry is known or at least inferred. However, hypodescent

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has been applied in the psychological literature in a broader fashion. Psychological research has used hypodescent as a modern day prediction about how perceivers categorize multiracial individuals on samples outside of the U.S. context (e.g., Chen, Couto, et al., 2018), with multiracial targets from non-Black racial backgrounds (e.g., Asian/White; Ho et al., 2011), and using racially ambiguous faces instead of ancestry as an operationalization of multiracial (e.g., Halberstadt et al., 2011). Thus, hypodescent has been examined in a variety of research contexts outside of the specific historical contexts in which this term was originally developed.

Although research referencing hypodescent is widespread, empirical evidence supporting hypodescent is mixed. There is research that clearly demonstrates hypodescent patterns in the racial categorization of multiracial and racially ambiguous individuals today (e.g., Freeman et al., 2016; Ho et al., 2011, 2013, 2015, 2017; Krosch et al., 2013; Peery & Bodenhausen, 2008, S1; Roberts & Gelman, 2015). However, some work demonstrates that multiracial targets are categorized into groups other than their socially subordinate identity, such as multiracial (e.g., Chen & Hamilton, 2012; Pauker, Carpinella, et al., 2018; Peery & Bodenhausen, 2008, S2). Research also reveals the existence of alternative categorization patterns (e.g., minority bias; Chen, Pauker, et al., 2018) or suggests that categorization patterns can vary across racial group membership due to a perceiver's lifetime exposure to different racial groups (and thus provides evidence both consistent and inconsistent with hypodescent (e.g., attention theory; Halberstadt et al., 2011). In sum, evidence for hypodescent is mixed and to date there has not been a systematic evaluation of the methods and results from this area of research. Thus, a meta-analysis is needed to examine the extent to which hypodescent categorization patterns are replicable and generalizable and under what conditions they emerge. Here, this meta-analysis explores if and when racial categorizations of multiracial and racially ambiguous targets follow hypodescent patterns.

The literature on racial categorization patterns for multiracial or racially ambiguous targets appears across journals and fields (e.g., neuroscience, social psychology, cognitive psychology, developmental psychology) and draws upon diverse study designs, making it difficult to get a broad sense of categorization patterns. One typical design in cognitive psychology directs White and racial minority participants to categorize racially ambiguous Asian/White face morphs as "Asian" or "White" across a continuum of morphs to estimate each participant's perceived category boundary between Asian and White (e.g., Benton & Skinner, 2015). In social psychology, a common design directs participants to view ancestry trees designating a target's racial background (e.g., two Black and two White grandparents). These targets may be male, female, or not have a gender indicated, and typically White participants indicate their racial categorizations using Likert-type scales (e.g., Ho et al., 2011, 2017). As these two examples illustrate, there is considerable variability in how multiracial is operationalized (e.g., racial ambiguity vs. multiracial ancestry), the race of perceivers studied, the race and gender of the targets studied, and how categorization is measured. Despite the multi-field interest, to our knowledge, no systematic examination (i.e., meta-analysis) exists of these categorization patterns or the methods utilized in these studies.

To gain insight into the ways multiracial and racially ambiguous individuals are perceived and the methods used to date, this article critically examines extant research to test key moderators that may predict when patterns of hypodescent are observed. Although arguments can be made that hypodescent patterns are only possible when racial ancestry is known, we use a broader definition here to reflect the varied ways hypodescent has been operationalized in research (see Chen, 2019), as well as to explore the possibility that hypodescent patterns could apply outside of these narrow bounds. This definition includes populations within and outside of the United States, multiracial targets operationalized through visible racial ambiguity and explicit multiracial ancestry, and multiracial targets of non-White and non-Black backgrounds. Here, we focused on five key moderators which vary considerably across studies: operationalization of multiracial, perceiver race, target race, target gender, and categorization measurement. This meta-analysis uses research published from January 2000 to July 2018 to explore if and when categorizations follow hypodescent patterns and to test whether understanding the influence of these potential moderators helps to reconcile mixed findings.

Key Moderators Explored

Operationalization of Multiracial

Experiments have operationalized multiracial as racial ambiguity (e.g., Chen & Hamilton, 2012; Cooley et al., 2018; Halberstadt et al., 2011; Ho et al., 2011, S3), ancestral information (e.g., Ho et al., 2011, 2017, S1, S2; Roberts & Gelman, 2015), and a combination of both cues (e.g., Young et al., 2013). Although not all multiracial individuals are racially ambiguous, research on racially ambiguous categorization is often framed in terms of understanding perceptions of multiracial individuals. Thus, this meta-analysis will include research that uses either operationalization, recognizing that racial ambiguity and multiraciality are often conflated.

There are several advantages to including both multiracial and racially ambiguous targets in the current investigation, as well as categorization research more generally. Investigating racially ambiguous targets may be closer aligned with everyday person construal processes, but it may not clearly or accurately indicate a multiracial target. Ancestry may better capture biologically driven assumptions of racial categorization, but perceivers often lack access to ancestry information. Both operationalizations are important to understanding multiracial perception; however, they are different racial cues and may produce different categorization patterns. Thus, we will test whether racial ambiguity and explicit multiracial ancestry support hypodescent patterns.

Perceiver Race

Racial categorization choices may be moderated by perceiver race. For example, White perceivers are more likely to categorize Asian/White stimuli as Asian, but Asian perceivers are more likely to categorize the same stimuli as White (e.g., Halberstadt et al., 2011; Webster et al., 2004). Coupled with evidence that perceivers tend to exclude ambiguous others from the ingroup both in categorization (the ingroup overexclusion effect; e.g., Castano et al., 2002; Leyens & Yzerbyt, 1992) and face memory (the other race effect; e.g., MacLin & Malpass, 2001; Pauker et al., 2009), there is reason to believe that perceiver race will affect categorization. Hypodescent would predict that perceivers, regardless of their race, should categorize a multiracial target into their lower status group, and indeed there are studies demonstrating no effect of perceiver race on categorization patterns (e.g., Chao et al., 2013; Ho et al., 2017). If perceiver race moderates categorization patterns, however, other explanations are needed for these patterns. Meta-analysis provides an ideal opportunity to examine whether patterns of hypodescent vary by perceiver race across a wide range of studies, settings, and design features.

Target Race

The racial background of multiracial targets may also influence racial categorization. The U.S. historical context suggests that hypodescent may only apply to Black targets, and Black/White targets may be categorized more readily as monoracial minority than Asian/White targets (Ho et al., 2011). In practice, research on hypodescent has suggested that targets, regardless of their racial background, are categorized into their lower status group. However, it is important to examine the extent to which target race moderates hypodescent, as assuming one multiracial group is all encompassing of multiracial experiences obscures possible intergroup differences. Therefore, this review will critically examine categorization patterns across multiracial targets of different racial backgrounds (i.e., Black/White vs. Asian/White) to empirically assess whether hypodescent applies only to those with Black ancestry.

Target Gender

Gender is a mutually informative aspect of race construal. Some research suggests men are generally perceived as more typical of their racial category than women (Eagly & Kite, 1987; Goff et al., 2008), with masculine faces more readily categorized as Black (Carpinella et al., 2015), and Black faces less readily categorized as female (Goff et al., 2008; K. L. Johnson et al., 2012). Thus, we might expect stronger hypodescent patterns for male stimuli. It may also be possible that gender and race need to be considered jointly when crafting categorization predictions. Given prior research, this review examines whether patterns of hypodescent are present across target genders while also documenting the use of gender within previous study designs.

Categorization Measurement

Racial categorization options available to perceivers may also shift categorization patterns (Chen & Hamilton, 2012; Peery & Bodenhausen, 2008; Tskhay & Rule, 2015). For example, a multiracial categorization option in addition to single-race categorizations (e.g., "Asian" and "White") can result in a higher ratio of White relative to minority categorizations of racially ambiguous targets (Chen & Hamilton, 2012). Categorization measurement also affects the use of racial labels; for example, "Black" categorizations are more likely in dichotomous than free response categorizations of racially ambiguous targets (Nicolas et al., 2019). Given the importance of categorization measures, this review will document whether these task demands relate to hypodescent categorization patterns across the literature. This assessment is particularly important to pinpoint potential boundary effects and guide future replication efforts.

In sum, the current review will explore the impact of five key features (operationalization of multiracial, perceiver race, target race, target gender, and categorization measurement) on hypodescent categorization patterns using meta-analysis. It will address both if subgroup features support hypodescent patterns, and if effect sizes are different across subgroups. Addressing these questions will provide a map for future work on and theorizing surrounding multiracial categorization.

Method

Literature Search

We conducted literature searches of the online databases Academic Search Premier[1] and PsycINFO using the following keywords: ambiguous individual, biracial and categorization, multiracial and categorization, interracial offspring, ingroup overexclusion effect, interracial marriage, hypodescent, binary racial categorization, racially ambiguous, and racial categorization. We also sent out requests for papers through two major psychology email listservs—Society of Personality and Social Psychology and Society for the Psychological Study of Social Issues—and also targeted the Ford Fellows Listserv and researchers in the field of social perception.[2] After initial screening of abstracts, we performed a forward and backward citation search using included articles to identify relevant articles. This ensured inclusion of articles that used different terminology or did not frame their paper in terms of multiracial perception.

Selection Criteria

To be included in this review, studies must have (a) experimentally examined multiracial or racially ambiguous targets through either presenting information that indicated explicit multiracial status (e.g., ancestry or actual identity/racial label) or used faces that appeared racially ambiguous; (b) included explicit measures of racial categorization;[3] (c) been published in English; and (d) been published between January 2000 and July 1, 2018.[4] This time window was chosen to align with the change in measuring multiracial identity in the U.S. Census and the subsequent increase in research on this topic. Reproducing the search in PsycINFO in peer-reviewed English articles published before 2000 (without checking forward and backward citations) produced only one paper (Blascovich et al., 1997) that would have been eligible for inclusion in the current meta-analysis, though at least one paper not captured in this truncated search was brought to our attention during the review process (Hirschfeld, 1995).[5] Initial searches produced 337 possible papers, of which 67 met inclusion criteria (see Table 1 for all included studies).

Study Information

Three levels of data were coded: manuscript level, study level, and outcome (effect-size) level. Manuscripts could include one or more studies. Within a manuscript, only individual studies, and within a study only individual outcomes which met selection criteria were used in analysis. Studies could contain outcomes that were between (e.g., Black and White participants rate Black/White targets) and/or within (e.g., participants rate both Black/White and Asian/White targets) subjects. When available, effect sizes were extracted for multiple conditions within a study. That is, if a study manipulated socioeconomic status of a target, effect sizes were recorded separately for each condition.

General study characteristics. Perceiver samples ranged from 4 to 2,400 (M = 166.13, SD = 285.73). The median sample size for a study was 85. Undergraduate samples (including undergraduate-aged samples that did not specify they were undergraduate samples) comprised almost half of the studies (44.44%), and Mechanical Turk (MTurk) samples were the next most frequently used (26.98%). The majority (70.63%) of studies explicitly collected data from U.S. participants.

Methodology Coding

Studies were coded for key moderators: operationalization of multiracial, perceiver race, target race, target gender, and categorization measurement.[6] Percentages reported below reflect percentage out of 106 studies included in the meta-analysis; studies could use more than one feature, or not receive a code for a feature, so total percentages may not equal 100.

Operationalization of multiracial. For each effect, operationalization of multiracial was coded as follows: racially ambiguous faces (i.e., picture, 76.42%), explicitly identified as having 50/50 ancestry (no picture, 16.04%), or ancestry with picture (10.38%). Some studies had effect sizes from more than one feature (e.g., a condition where participants only saw faces and a condition where participants saw faces paired with ancestry), so total exceeds 100%. In studies using racially ambiguous faces, faces were created by morphing two faces together (e.g., a White and a Black face, 48.11% of studies), computer-generated faces (e.g., FaceGen software, 18.87%), and photos of racially ambiguous individuals (21.70%). A 50/50 ancestry included presentation of information about parents or grandparents, an explicit biracial label (e.g., Black/White biracial), or explicit biracial background (e.g., indicating Black and White on a form).

Perceiver race. Perceiver race was extracted from reported demographics and was coded as follows: effects resulting from samples with only White perceivers (46.23%), only racial minority perceivers (20.75%), and samples collapsing across White and minority perceivers (39.62%). Some studies had effect sizes from more than one feature (e.g., a condition with only White perceivers, and a condition with only Black perceivers), so total exceeds 100%. Codes were also produced for outcomes from specific racial groups, unfortunately, the small number of studies using specific racial minority subgroups prevented meta-analyses to differentiate effects from different minority groups (e.g., five with Asian participants, see Table 2).

Target race. Target race was coded as the probable racial identities the researchers intended the target to have. For example, a target created by morphing a White face and a Black face was coded as a Black/White target. Similarly, a target who indicated Asian and White ancestry was coded as an Asian/White target. Final codes were as follows: Black/White (79.25%), Asian/White (24.53%), and Other/White (5.66%). Some studies had effect sizes from more than one feature (e.g., perceivers rated both Black/White and Asian/White targets), so total exceeds 100%.

Target gender. For each effect, targets were coded as exclusively male (38.68%), exclusively female (8.49%), and collapsing male and female targets (27.36%). Coding also indicated if targets were created by morphing male and female faces (5.66%), if a manuscript did not explicitly indicate target gender (4.72%), the target was not gendered (e.g., an essay that did not mention gender, 12.26%), or if target gender was not explicitly indicated but example stimuli

Table 1. Outcome-Level Reporting of Effect Sizes and Key Moderators.

ID no.	Citation	Study no.	Outcome no.	Perceiver race	Target race	Target gender	Categorization measurement	*N*	*g*
1	Benton and Skinner (2015)	1	1.1.1	White	Asian/White	Continuum	Binary	20	1.36
			2.1.1	Asian	Asian/White	Continuum	Binary	20	0.50
2	Carpinella et al. (2015)	1	1.1.1	Both	Asian/White	Continuum	Options	110	−0.07
			1.2.1	Both	Asian/Black	Continuum	Options	110	NA (MMT)
			1.3.1	Both	Black/White	Continuum	Options	110	0.16
		4	1.1.1	Both	Asian/White	Continuum	Options	65	−1.02
			1.2.1	Both	Asian/Black	Continuum	Options	65	NA (MMT)
			1.3.1	Both	Black/White	Continuum	Options	65	−0.04
3	Castano et al. (2002)	1	1.1.1	White	Black/White	Male	Binary	16	−0.47
			2.2.1	White	Black/White	Male	Binary	19	1.05
4	Chen and Hamilton (2012)	1	1.1.1	Both	Black/White	Both	Options	112	−1.66
		2	2.2.1	Both	Black/White	Both	Options	19	−0.59
			1.1.1	Both	Black/White	Both	Options	19	−2.66
		3	1.1.1	Both	Asian/White	Both	Options	54	−0.06
			2.2.1	Both	Asian/White	Both	Options	54	−0.59
		4	1.1.1	Both	Black/White	Both	Options	46	−0.98
			2.1.1	Both	Black/White	Both	Options	49	−1.44
		5	1.1.1	Both	Black/White	Both	Options	19	−1.62
			1.2.1	Both	Black/White	Both	Options	20	−1.71
		6	1.1.1	Both	Black/White	Both	Options	36	−1.73
			1.2.1	Both	Black/White	Both	Options	39	−2.41
5	Chen, Couto, et al. (2018)	1	1.1.1	Both	Black/White	Both	Options	48	0.62
			2.2.1	Both	Black/White	Both	Options	49	0.02
			3.3.1	Both	Black/White	Both	Options	48	−0.50
			4.1.1	Both	Black/White	Both	Options	41	−0.50
			5.2.1	Both	Black/White	Both	Options	41	−0.57
			6.3.1	Both	Black/White	Both	Options	40	−0.51
6	Chen et al. (2014)	2	1.1.1	Both	Black/White	Both	Options	56	0.71
			1.2.1	Both	Black/White	Both	Options	56	1.00
		3	1.1.1	Both	Black/White	Both	Options	53	0.67
			1.2.1	Both	Black/White	Both	Options	53	1.00
7	Chen, Pauker, et al. (2018)	2	1.1.3	Both	Black/White	Male	Options	41	1.61
			1.1.6	Both	Black/White	Male	Options	41	−0.95
			1.2.3	Both	Black/White	Female	Options	41	0.03
			1.2.6	Both	Black/White	Female	Options	41	−1.79
		3	1.1.3	Both	Black/White	Male	Binary	111	−0.12
			1.2.3	Both	Black/White	Female	Binary	111	−0.53
8	Citrin et al. (2014)	2	3.3.1	Both	Obama	Male	Options	638	NA (Obama)
			4.4.1	Both	Obama	Male	Options	567	NA (Obama)
		1	1.1.1	Nationally representative	Obama	Male	Options	342	NA (Obama)
			2.2.1	Nationally representative	Obama	Male	Options	649	NA (Obama)
			3.3.1	Nationally representative	Obama	Male	Options	626	NA (Obama)
	Citrin et al. (2014)	2	1.1.1	Both	Black/White	Male	Options	621	Data NA
			2.2.1	Both	Black/White	Male	Options	579	Data NA
9	Cooley et al. (2017)	1	1.1.1	White	Black/White	Male	S_Likert	191	0.09
			1.2.1	White	Black/White	Male	S_Likert	191	0.25
		2	1.1.1	White	Black/White	Male	S_Likert	195	0.98
			1.2.1	White	Black/White	Male	S_Likert	195	1.00
		3a	1.1.1	White	Black/White	Male	S_Likert	179	−0.84
			1.2.1	White	Black/White	Male	S_Likert	179	−0.71
		3b	1.1.1	White	Black/White	Male	S_Likert	95	−0.76
			1.2.1	White	Black/White	Male	S_Likert	95	−0.60
			2.1.1	White	Black/White	Male	S_Likert	95	−0.68
			2.2.1	White	Black/White	Male	S_Likert	95	−0.60
		S1	1.1.1	White	Black/White	Male	S_Likert	186	0.88
			1.2.1	White	Black/White	Male	S_Likert	186	0.86
		S2	1.1.1	White	Black/White	Male	S_Likert	197	0.53
			1.2.1	White	Black/White	Male	S_Likert	197	0.49

(continued)

Table 1. (continued)

ID no.	Citation	Study no.	Outcome no.	Perceiver race	Target race	Target gender	Categorization measurement	N	g
10	Corneille et al. (2004)	2	1.1.1	White	Asian/White	NA	Options	16	0.58
			1.2.1	White	Black/White	NA	Options	16	0.23
		1	1.1.1	White	Black/White	NA	Options	96	Data NA
11	Davidenko et al. (2016)	1	1.1.1	NA	Asian/White	Continuum	S_Likert	54	−0.37
			1.2.1	NA	Asian/White	Continuum	S_Likert	54	0.16
		2	1.1.1	NA	Asian/White	Continuum	S_Likert	91	−0.62
			1.2.1	NA	Asian/White	Continuum	S_Likert	91	0.12
		3	1.1.1	NA	Asian/White	Continuum	S_Likert	54	−1.08
			1.2.1	NA	Asian/White	Continuum	S_Likert	54	0.20
12	Dickter and Kittel (2012)	1	1.1.1	White	Black/White	Male	Binary	27	2.71
13	Dunham et al. (2013)	1	1.1.1	White	Black/White	Male	Binary	342	−0.27
			1.2.1	White	Black/White	Male	Binary	341	−0.04
		2	1.1.1	White	Asian/White	Male	Binary	163	−0.43
			1.2.1	White	Asian/White	Male	Binary	163	−0.09
		3	1.1.1	Asian	Asian/White	Male	Binary	281	−0.08
			1.2.1	Asian	Asian/White	Male	Binary	281	−0.14
		4	1.1.1	Black	Black/White	Male	Binary	97	−0.17
			1.2.1	Black	Black/White	Male	Binary	97	−0.16
14	Dunham et al. (2015)	1	1.1.1	Both	Black/White	Male	S_Likert	0	Data NA
		2	1.1.1	Both	Black/White	Male	S_Likert	0	Data NA
15	Elliott et al. (2017)	1	1.1.1	White	Black/White	Female	Binary	37	Data NA
			1.2.1	White	Black/White	Female	Binary	37	Data NA
			1.3.1	White	Black/White	Female	Binary	37	Data NA
			2.1.1	Black	Black/White	Female	Binary	20	Data NA
			2.2.1	Black	Black/White	Female	Binary	20	Data NA
			2.3.1	Black	Black/White	Female	Binary	20	Data NA
16	Freeman et al. (2016)	1	1.1.1	White	Black/White	Male	Binary	194	0.46
		2	1.1.1	White	Black/White	Male	Binary	148	0.48
17	Freeman et al. (2010)	2	1.1.1	Both	Black/White	Both	Binary	32	0.92
18	Freeman et al. (2011)	1	1.1.1	Both	Black/White	NA (Male)	Binary	34	0.65
		2	1.1.1	Both	Black/White	NA (Male)	Binary	22	0.83
19	Gaither et al. (2016)	1	1.1.1	White	Black/White	Both	Binary	62	0.20
		2a	1.1.1	White	Black/White	Both	Binary	32	−0.57
			2.2.1	White	Black/White	Both	Binary	32	−0.87
		2b	1.1.1	White	Black/White	Both	Binary	52	0.57
			2.2.1	White	Black/White	Both	Binary	52	0.18
			3.3.1	White	Black/White	Both	Binary	53	0.24
			4.1.1	Black	Black/White	Both	Binary	49	0.84
			5.2.1	Black	Black/White	Both	Binary	48	0.29
			6.3.1	Black	Black/White	Both	Binary	48	0.30
		3	1.1.1	White	Black/White	Both	Binary	38	0.63
			2.2.1	White	Black/White	Both	Binary	38	0.00
			3.3.1	White	Black/White	Both	Binary	37	0.24
20	Gaither et al. (2013)	1	1.1.1	White	Black/White	Male (Obama)	M_Likert	169	NA (Obama)
			2.2.1	Black	Black/White	Male (Obama)	M_Likert	121	NA (Obama)
21	Garcia and Abascal (2016)	1	1.1.1	Both	Latino/White	Both	Options	560	0.34
			1.2.1	Both	Latino/White	Both	Options	560	−0.25
22	Gwinn and Brooks (2013)	1	1.1.1	White	Asian/White	Both	Binary	14	−1.22
			2.2.2	White	Asian/White	Both	S_Likert	14	0.09
23	Halberstadt and Winkielman (2014)	3	1.1.1	White	Asian/White	NA (Female)	Binary	32	0.09
		4	1.1.1	NA	Asian/White	NA (Female)	Binary	12	Data NA
24	Halberstadt et al. (2011)	1	1.1.1	White	Asian/White	NA (Female)	Binary	46	−0.07
			2.1.1	Asian	Asian/White	NA (Female)	Binary	36	−0.49
25	Ho et al. (2017)	1a	1.1.1	White	Black/White	NS	S_Likert	212	0.16
			1.1.2	White	Black/White	NS	Binary	183	0.34
			2.1.1	Black	Black/White	NS	S_Likert	199	0.45
			2.1.1	Black	Black/White	NS	Binary	174	1.41

(continued)

Table 1. (continued)

ID no.	Citation	Study no.	Outcome no.	Perceiver race	Target race	Target gender	Categorization measurement	*N*	*g*
		1b	1.1.1	White	Black/White	NS	S_Likert	266	0.27
			1.1.2	White	Black/White	NS	S_Likert	265	0.29
			2.1.1	Black	Black/White	NS	S_Likert	251	0.31
			2.1.2	Black	Black/White	NS	S_Likert	249	0.31
		2	1.1.1	Black	Black/White	NS	M_Likert	458	0.56
		3	1.1.1	Black	Black/White	NS	M_Likert	498	0.55
			2.2.1	Black	Black/White	NS	M_Likert	498	0.55
			3.3.1	Black	Black/White	NS	M_Likert	498	0.43
		1S	1.1.1	Black	Black/White	NS	S_Likert	457	0.36
			1.1.2	Black	Black/White	NS	S_Likert	456	0.41
			1.1.3	Black	Black/White	NS	Other	425	0.61
			1.1.4	Black	Black/White	NS	Other	455	−0.49
		2S	1.1.1	Black	Black/White	NS	M_Likert	267	0.03
			1.1.2	Black	Black/White	NS	M_Likert	267	0.36
			1.1.3	Black	Black/White	NS	M_Likert	206	0.02
			1.1.4	Black	Black/White	NS	M_Likert	240	−0.48
		3S	1.1.1	Black	Black/White	NS	M_Likert	248	0.39
			2.1.2	Black	Black/White	NS	M_Likert	248	0.49
			1.2.1	Black	Black/White	NS	M_Likert	238	0.26
			2.2.2	Black	Black/White	NS	M_Likert	238	0.40
26	Ho et al. (2015)	1	1.1.1	White	Black/White	Male	S_Likert	149	0.25
			1.1.2	White	Black/White	NS	Binary	0	Data NA
		2	1.1.1	White	Black/White	NS	Options	121	−0.10
27	Ho et al. (2013)	1	1.1.1	White	Black/White	NS	S_Likert	163	0.21
		2	1.1.1	White	Black/White	NS	S_Likert	57	0.45
28	Ho et al. (2011)	1	4.2.1	Minority	Asian/White	NS	S_Likert	57	0.21
			3.2.1	White	Asian/White	NS	S_Likert	57	0.42
			1.1.1	White	Black/White	NS	S_Likert	51	0.36
			2.1.1	Minority	Black/White	NS	S_Likert	50	0.31
		2a	1.4.1	White	Black/White	Male	Binary	19	−0.17
			1.2.1	White	Asian/White	Female	Binary	19	−0.23
			1.3.1	White	Black/White	Female	Binary	19	−0.27
			1.1.1	White	Asian/White	Male	Binary	19	−0.37
		2b	1.3.1	White	Black/White	Male	Binary	24	−0.01
			1.4.1	White	Black/White	Female	Binary	24	−0.11
			1.1.1	White	Asian/White	Male	Binary	24	−0.15
			1.2.1	White	Asian/White	Female	Binary	24	−0.22
		3a	1.1.1	Both	Asian/White	Male	Other	49	0.34
			1.2.1	Both	Asian/White	Male	Other	49	0.98
			1.3.1	Both	Black/White	Male	Other	50	0.31
			1.4.1	Both	Black/White	Male	Other	46	1.70
		3b	1.1,2.2	Both	Asian/White	Male	Binary	80	3.51
			1.3,4.2	Both	Black/White	Male	Binary	80	3.88
			1.1.1	Both	Asian/White	Male	Other	84	0.22
			1.2.1	Both	Asian/White	Male	Other	84	0.41
			1.3.1	Both	Black/White	Male	Other	86	0.33
			1.4.1	Both	Black/White	Male	Other	84	0.75
29	Hugenberg and Bodenhausen (2004)	1	1.1.1	White	Black/White	Male	Binary	20	Data NA
			1.2.1	White	Black/White	Male	Binary	20	Data NA
		2	1.1.1	White	Black/White	Male	Binary	57	Data NA
			1.2.1	White	Black/White	Male	Binary	57	Data NA
			1.1.2	White	Black/White	Male	S_Likert	57	Data NA
			1.2.2	White	Black/White	Male	S_Likert	57	Data NA
30	Hutchings and Haddock (2008)	1	1.1.1	White	Black/White	NA	Binary	82	0.15
			1.2.1	White	Black/White	NA	Binary	82	−0.13
			1.3.1	White	Black/White	NA	Binary	82	−0.20
31	Ito et al. (2011)	3	1.1.1	Both	Black/White	Male	S_Likert	24	0.07
			2.2.1	Both	Black/White	Male	S_Likert	24	0.31

(continued)

Table 1. (continued)

ID no.	Citation	Study no.	Outcome no.	Perceiver race	Target race	Target gender	Categorization measurement	N	g
			1.1.2	Both	Black/White	Male	S_Likert	24	−0.56
			3.3.1	Both	Black/White	Male	S_Likert	25	−0.77
			2.2.2	Both	Black/White	Male	S_Likert	24	1.22
			3.3.2	Both	Black/White	Male	S_Likert	25	−1.83
32	D. R. Johnson et al. (2014)	1	1.1.1	Both	Arabic/White	Male	S_Likert	35	Data NA
			2.2.1	Both	Arabic/White	Male	S_Likert	33	Data NA
		2	1.1.1	Both	Arabic/White	Male	Options	38	Data NA
			1.2.1	Both	Arabic/White	Male	Options	38	Data NA
			2.1.11	Both	Arabic/White	Male	Options	37	Data NA
			2.2.1	Both	Arabic/White	Male	Options	37	Data NA
			3.1.1	Both	Arabic/White	Male	Options	35	Data NA
			3.2.1	Both	Arabic/White	Male	Options	35	Data NA
33	Kang et al. (2015)	2	1.1.1	Both	Asian/White	Female	Binary	449	0.06
34	Knowles and Peng (2005)	3	1.1.1	White	Black/White	Male	Binary	60	0.13
35	Krosch and Amodio (2014)	1	1.1.1	Both	Black/White	Male	Binary	70	0.33
		2	3.3.1	Both	Black/White	Male	Binary	31	0.85
			1.1.1	Both	Black/White	Male	Binary	32	1.25
			2.2.1	Both	Black/White	Male	Binary	31	1.62
36	Krosch et al. (2013)	1	1.1.1	White	Black/White	Male	Binary	31	0.29
		2	1.1.1	Both	Black/White	Male	Binary	71	0.29
		3	1.1.1	White	Black/White	Male	Binary	31	0.04
			1.2.1	White	Black/White	Male	Binary	31	0.16
37	Lewis (2016)	1	1.1.1	Black	Black/White	NA	Options	18	−1.71
			2.1.1	White	Black/White	NA	Options	19	2.35
38	MacLin and Malpass (2001)	1	1.1.1	Latino	Black/Latino	NA (Male)	Options	25	NA (MMT)
			1.2.1	Latino	Black/Latino	NA (Male)	Options	25	NA (MMT)
39	Michel et al. (2007)	1	1.1.1	NA	Asian/White	Both	Binary	34	−0.06
40	Miller et al. (2010)	5	1.1.1	White	Black/White	Male	S_Likert	57	Data NA
41	Nicolas et al. (2019)	1	1.1.1	Both	Black/White	Male	Binary	48	−0.10
			1.2.1	Both	Black/White	Female	Binary	48	−0.61
			2.1.2	Both	Black/White	Male	Options	49	−1.11
			2.2.2	Both	Black/White	Female	Options	49	−2.52
			3..3	Both	Black/White	Male	Options	48	0.48
			3..3	Both	Black/White	Female	Options	48	0.04
			4..4	Both	Black/White	Male	Options	66	−0.20
			4..4	Both	Black/White	Female	Options	66	−0.41
		2	1.1.1	Both	Black/White	Both	Options	117	−1.04
			1.2.1	Both	Black/White	Both	Options	117	−0.44
42	Noyes and Keil (2018)	4	1.1.1	Both	Black/South Asian	NA	M_Likert	0	NA (MMT)
			1.2.1	Both	Black/Native American	NA	M_Likert	0	NA (MMT)
			1.3.1	Both	Black/Aboriginal-Australian	NA	M_Likert	0	NA (MMT)
			1.4.1	Both	Black/East Asian	NA	M_Likert	0	NA (MMT)
			1.5.1	Both	Black/White	NA	M_Likert	129	0.40
			1.6.1	Both	Black/Latino	NA	M_Likert	0	NA (MMT)
			1.7.1	Both	Black/Arabic	NA	M_Likert	0	NA (MMT)
			1.8.1	Both	South Asian/Native American	NA	M_Likert	0	NA (MMT)
			1.9.1	Both	South Asian/Aboriginal-Australian	NA	M_Likert	0	NA (MMT)
			1.10.1	Both	South Asian/East Asian	NA	M_Likert	0	NA (MMT)
			1.11.1	Both	South Asian/White	NA	M_Likert	120	0.34
			1.12.1	Both	South Asian/Latino	NA	M_Likert	0	NA (MMT)
			1.13.1	Both	South Asian/Arabic	NA	M_Likert	0	NA (MMT)

(continued)

Table 1. (continued)

ID no.	Citation	Study no.	Outcome no.	Perceiver race	Target race	Target gender	Categorization measurement	*N*	*g*
			1.14.1	Both	Native American/ Aboriginal-Australian	NA	M_Likert	0	NA (MMT)
			1.15.1	Both	Native American/ East Asian	NA	M_Likert	0	NA (MMT)
			1.16.1	Both	Native American/ White	NA	M_Likert	119	0.16
			1.17.1	Both	Native American/ Latino	NA	M_Likert	0	NA (MMT)
			1.18.1	Both	Native American/ Arabic	NA	M_Likert	0	NA (MMT)
			1.19.1	Both	Aboriginal Australian/East Asian	NA	M_Likert	0	NA (MMT)
			1.20.1	Both	Aboriginal Australian/White	NA	M_Likert	120	0.32
			1.21.1	Both	Aboriginal Australian/Latino	NA	M_Likert	0	NA (MMT)
			1.22.1	Both	Aboriginal Australian/Arabic	NA	M_Likert	0	NA (MMT)
			1.23.1	Both	East Asian/White	NA	M_Likert	119	0.30
			1.24.1	Both	East Asian/Latino	NA	M_Likert	0	NA (MMT)
			1.25.1	Both	East Asian/Arabic	NA	M_Likert	0	NA (MMT)
			1.26.1	Both	White/Latino	NA	M_Likert	119	0.32
			1.27.1	Both	White/Arabic	NA	M_Likert	120	0.37
			1.28.1	Both	Latino/Arabic	NA	M_Likert	0	NA (MMT)
43	Pauker et al. (2018)	1	1.1.1	Both	Asian/Black	Both	Options	71	NA (MMT)
			1.2.1	Both	Asian/White	Both	Options	71	0.08
			1.3.1	Both	Black/White	Both	Options	71	0.22
			2.1.1	Both	Asian/Black	Both	Options	60	NA (MMT)
			2.2.1	Both	Asian/White	Both	Options	60	0.20
			2.3.1	Both	Black/White	Both	Options	60	−0.26
		2	1.1.1	Both	Asian/Black	Both	Options	64	NA (MMT)
			1.2.1	Both	Asian/White	Both	Options	64	0.32
			1.3.1	Both	Black/White	Both	Options	64	0.04
			2.1.1	Both	Asian/Black	Both	Options	65	NA (MMT)
			2.2.1	Both	Asian/White	Both	Options	65	0.02
			2.3.1	Both	Black/White	Both	Options	65	−0.07
44	Peery and Bodenhausen (2008)	1	1.1.1	Both	Black/White	Both	Options	52	0.24
			1.2.1	Both	Black/White	Both	Options	52	0.32
			1.3.1	Both	Black/White	Both	Options	52	0.39
			1.4.1	Both	Black/White	Both	Options	52	0.65
		2	1.1.1	Both	Black/White	Both	Options	47	0.21
			1.2.1	Both	Black/White	Both	Options	47	0.48
			1.2.2	Both	Black/White	Both	Options	47	−1.08
			1.1.2	Both	Black/White	Both	Options	47	−1.86
45	Rhodes et al. (2010)	1	1.1.1	White	Asian/White	Both	Binary	16	4.03
			1.2.1	White	Asian/White	Both	Binary	16	4.86
46	Roberts and Gelman (2015)	1	1.1.1	White	Black/White	Female	Options	24	0.10
			2.1.1	White	Black/White	Female	Options	24	−0.27
			3.1.1	White	Black/White	Female	Options	24	−2.14
			4.2.1	White	Black/White	Female	Options	24	0.30
			5.2.1	White	Black/White	Female	Options	24	0.23
			6.2.1	White	Black/White	Female	Options	24	−0.03
			7.2.1	White	Black/White	Female	Options	24	0.58
			8.1.1	White	Black/White	Female	Options	24	−0.64
		2	1.1.1	Black	Black/White	Female	Options	18	−1.18
			2.1.1	Black	Black/White	Female	Options	19	−1.37
			3.1.1	Black	Black/White	Female	Options	24	−2.14

(continued)

Table 1. (continued)

ID no.	Citation	Study no.	Outcome no.	Perceiver race	Target race	Target gender	Categorization measurement	N	g
			4.2.1	Black	Black/White	Female	Options	18	−0.21
			5.2.1	Black	Black/White	Female	Options	19	−0.21
			6.2.1	Black	Black/White	Female	Options	23	−0.30
			7.2.1	Black	Black/White	Female	Options	24	0.31
			8.1.1	Black	Black/White	Female	Options	24	−0.68
47	Roberts and Gelman (2017)	1	1.1.1	Multiracial	Black/White	Female	Other	15	−0.09
			2.2.1	Multiracial	Black/White	Female	Options	19	0.42
			3.1.1	Multiracial	Black/White	Female	Options	16	0.04
			4.2.1	Multiracial	Black/White	Female	Options	18	0.18
			5.1.1	Multiracial	Black/White	Female	Options	22	−0.73
			6.2.1	Multiracial	Black/White	Female	Options	21	0.51
48	Roberts & Gelman (2017)	1	1.1.1	White	Black/White	Both	S_Likert	43	0.83
			1.2.1	White	Black/White	Both	S_Likert	43	0.87
			1.3.1	White	Black/White	Both	S_Likert	43	0.83
			2.1.1	Black	Black/White	Both	S_Likert	42	0.89
			2.2.1	Black	Black/White	Both	S_Likert	42	1.17
			2.3.1	Black	Black/White	Both	S_Likert	42	1.10
49	Rodeheffer et al. (2012)	1	1.1.1	Both	Black/White	Both	Binary	34	−0.23
			2.2.1	Both	Black/White	Both	Binary	36	−0.68
		2	1.1.1	Both	Black/White	Both	Binary	27	−0.08
			2.2.1	Both	Black/White	Both	Binary	27	−0.69
			3.3.1	Both	Black/White	Both	Binary	27	−0.84
50	Sanchez et al. (2011)	1	1.1.1	White	Black/White	Male	M_Likert	159	0.49
			2.1.1	Black	Black/White	Male	M_Likert	158	0.50
51	Skinner and Nicolas (2015)	1	1.1.1	Both	Black/White	Male	S_Likert	61	0.66
			1.1.2	Both	Black/White	Male	Binary	61	−0.97
		2	1.1.1	Both	Black/White	Male	S_Likert	36	0.19
			1.1.2	Both	Black/White	Male	Binary	36	0.35
52	Slepian et al. (2014)	2	1.1.1	Both	Black/White	Both	Options	20	−0.84
			2.2.1	Both	Black/White	Both	Options	20	−0.06
		3a	1.1.1	Both	Black/White	Both	Options	17	−0.12
			2.2.1	Both	Black/White	Both	Options	18	−0.06
			3.3.1	Both	Black/White	Both	Options	17	−0.57
		3b	1.1.1	Both	Black/White	Both	Options	28	−0.39
			2.2.1	Both	Black/White	Both	Options	30	0.10
			3.3.1	Both	Black/White	Both	Options	26	0.02
53	Stepanova and Strube (2009)	1	1.1.1	White	Black/White	Male	S_Likert	59	0.69
			1.1.2	White	Black/White	Male	S_Likert	59	Data NA
		posttest	1.1.1	NA	Black/White	Male	S_Likert	28	2.73
			1.1.2	NA	Black/White	Male	S_Likert	28	3.58
54	Stepanova and Strube (2012)	1	1.1.1	Both	Black/White	NA (Male)	S_Likert	250	Data NA
55	Stepanova et al. (2013)	1	1.1.1	White	Black/White	NA (Male)	S_Likert	54	Data NA
			1.1.2	White	Black/White	NA (Male)	S_Likert	54	Data NA
56	Stepanova and Strube (2018)	1	1.1.1	Both	Black/White	Male	Options	0	Data NA
			1.2.1	Both	Black/White	Male	Options	0	Data NA
57	Sun and Balas (2012)	1	1.1.1	White	Black/White	NA	Binary	21	−0.31
			1.2.1	White	Black/White	NA	Binary	21	−0.18
			1.3.1	White	Black/White	NA	Binary	21	−0.21
58	Tskhay and Rule (2015)	2	1.1.1	Both	Latino/White	NA (Male)	Binary	37	−0.42
		3	1.1.1	Both	Black/White	NA (Male)	Binary	102	1.44
			2.2.2	Both	Black/White	NA (Male)	Binary	105	0.48
			3.3.3	Both	Black/White	NA (Male)	Binary	104	0.98
		1	1.1.1	Both	Black/White	NA (Male)	Binary	48	1.14
			2.2.1	Both	Latino/White	NA (Male)	Binary	25	0.73
			3.3.1	Both	Latino/Black	NA (Male)	Binary	48	0.96

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Table 1. (continued)

ID no.	Citation	Study no.	Outcome no.	Perceiver race	Target race	Target gender	Categorization measurement	*N*	*g*
59	Webster et al. (2004)	1	1.1.1	Asian	Asian/White	NA (Male)	Binary	32	Data NA
		2	1.1.1	Asian	Asian/White	NA (Male)	Binary	38	−1.46
			2.1.1	White	Asian/White	NA (Male)	Binary	42	0.69
60	Willadsen-Jensen and Ito (2006)	1	1.2.1	White	Asian/White	Male	Binary	22	−0.91
			1.1.1	White	Asian/White	Male	Binary	22	0.81
		2	1.1.1	White	Black/White	Male	Binary	18	0.02
			1.2.1	White	Black/White	Male	Binary	18	0.05
61	Willadsen-Jensen and Ito (2008)	1	1.1.1	Asian	Asian/White	Male	Binary	17	−0.08
			1.2.1	Asian	Asian/White	Male	Binary	17	1.11
62	Willenbockel et al. (2011)	1	1.1.1	White	Black/White	Male	Binary	18	0.81
63	Wilton et al. (2017)	2	1.1.1	White	Black/White	Male	S_Likert	30	0.86
			2.2.1	White	Black/White	Male	S_Likert	30	−0.21
			3.3.1	White	Black/White	Male	S_Likert	30	0.68
			4.4.1	White	Black/White	Male	S_Likert	30	0.89
64	Xiao et al. (2015)	1	1.1.1	Asian	Asian/Black	Both	Binary	69	NA (MMT)
			1.2.1	Asian	Asian/Black	Both	Binary	69	NA (MMT)
			1.3.1	Asian	Asian/Black	Both	Binary	69	NA (MMT)
			1.4.1	Asian	Asian/Black	Both	Binary	69	NA (MMT)
		2	1.1.1	Asian	Asian/Black	Both	Binary	61	NA (MMT)
			1.2.1	Asian	Asian/Black	Both	Binary	61	NA (MMT)
			1.3.1	Asian	Asian/Black	Both	Binary	61	NA (MMT)
			1.4.1	Asian	Asian/Black	Both	Binary	61	NA (MMT)
65	Young et al. (2013)	1	1.1.1	White	Black/White	Male	M_Likert	20	0.73
			1.2.1	White	Black/White	Male	M_Likert	20	1.19
			1.3.1	White	Black/White	Male	M_Likert	20	1.11
66	Young et al. (2016)	1	1.1.1	White	Latino/White	NS	M_Likert	29	−0.78
			2.2.1	White	Latino/White	NS	M_Likert	25	0.46
		2	1.1.1	Both	Latino/White	NS	M_Likert	33	−0.20
			2.2.1	Both	Latino/White	NS	M_Likert	28	0.26
67	Young et al. (2017)	1	1.1.1	White	Black/White	Male	M_Likert	34	0.61
			2.2.1	White	Black/White	Male	M_Likert	39	1.45
			3.3.1	White	Black/White	Male	M_Likert	31	1.39

Note. Positive effect sizes indicate support for hypodescent patterns. NS = not specified; NA = not available; Data NA = data not available; NA (MMT) = not applicable, multiracial minority target.

indicated male or female faces (7.54%). Some studies had effect sizes arising from more than one feature (e.g., a condition where male targets were categorized, a condition where female targets were categorized), so total exceeds 100%.

Categorization measurement. Categorization measure codes included binary, or a choice between two racial categories such as “Black” and “White” (49.06%); multiple options, which included measurements such as a choice between three or more racial categories (e.g., “Black,” “White,” and “Multiracial”) and spontaneous categorization (26.42%); and single Likert-type scales (e.g., indicating a racial categorization between 1 = “White” and 7 = “Black,” 22.64%) and multiple Likert-type scales (e.g., combining two scales with anchors 1 = “very White,” 7 “not at all White” and 1 = “very Black” and 7 = “not at all Black,” 9.43%). Some studies had effect sizes from more than one feature (e.g., perceivers categorized targets using both binary and Likert-type scale options), so total exceeds 100%.

Coding for Hypodescent Patterns

Effect size coding for explicit racial categorization. To test whether patterns of hypodescent exist in the collected data, evidence of hypodescent was defined as when, all else being equal, a novel target (e.g., not President Obama) presented as 50/50 minority/White ancestry, a 50/50 minority/White morph,[7] or a pre-tested racially ambiguous target, was categorized as (1) the single-category minority that comprised their ancestry or phenotype more often than would be expected by chance or (2) in the context of Likert-type scales, categorized as *more* minority than White. Points of subjective equality estimates (PSEs) that indicate less contribution from a minority face was needed to see the face as 50/50 was also considered evidence for hypodescent.

Table 2. Breakdown of Participant Racial Groups.

Participant race	Number of studies
Asian	5
Black	14
Both	50
Latino	1
Minority	1
White	49
Multiracial	1
Nationally representative	1
Not available	6

Note. Both indicates that study did not contain a purposeful participant racial group; minority indicates analysis collapsed across minority racial groups; studies could include more than one single-race participant group so number of studies will exceed the total number of studies.

Data were extracted to create effect sizes reflecting hypodescent. For each outcome, the mean of the categorization measure, the expected value of the categorization measure if a target were categorized as equally minority and White, the standard deviation for the categorization measure, sample *N*s, one-sample *T*-test statistics, and the associated *p* values were extracted. Recorded means of categorization measures included raw counts (e.g., number of Black categorizations), percentages and proportions (e.g., percentage of Asian categorizations), PSE (i.e., when a face was equally likely to be categorized as Black or White), scale means (e.g., Likert-type scale categorization measures), and difference between scale means (e.g., taking the difference between Black and White Likert-type scale categorization measures). Whenever possible, if information was not present, it was estimated from available data (e.g., if *n*s were not reported for each condition, *n*s were estimated from the *N* of the larger sample). If a published paper did not report the necessary information to compute an effect size, we contacted authors to obtain needed data. In total, we contacted 23 first authors (17 responded). Not all eligible studies could be included in the meta-analysis due to an unsuitable target (e.g., Obama) or missing data (see Table 1).

Once extracted, explicit categorization outcome data were transformed into an appropriate effect size. Effect sizes were calculated for outcomes with mean and standard deviation data (see Equation (1)):

$$g = \frac{(M_{outcome} - M_{\exp exted})}{SD_{outcome}}. \quad (1)$$

Effect sizes were directly calculated from *t*-values for outcomes with only *t* statistics reported (Borenstein et al., 2009). For samples less than 50, effect sizes were transformed to account for small sample bias (Schwartz & Efklides, 2015). All effect sizes were coded so that positive, larger effect sizes reflected hypodescent patterns. Calculation of effect size variance used the standard dependent samples *t*-test formula, assuming $r = .5$ (see Equation (2); Borenstein et al., 2009):

$$SD_g = \frac{1}{n} + \frac{g^2}{2n(n-r)}. \quad (2)$$

Of the collected papers, 106 studies from 55 papers could address hypodescent and statistics needed to calculate effect sizes were available, resulting in 280 effect sizes (see Table 1). Even though the current study focuses on published work, 40% of effect sizes ($n = 111$) were extracted from papers that did not explicitly mention hypodescent, removing some concern around publication bias. Indeed, analysis demonstrated no difference in effect sizes between manuscripts that mentioned hypodescent[8] and those that did not. However, counter to what might be expected, effect sizes from manuscripts explicitly mentioning hypodescent did *not* support hypodescent patterns (i.e., were not larger than zero), whereas studies that did not mention hypodescent *did* support hypodescent patterns. Many manuscripts mentioned their pattern of results did not follow hypodescent patterns (e.g., Chen & Hamilton, 2012), so this result is not entirely surprising (see Table 3 for full results). A funnel plot (see Figure 1) conducted using the "meta" package in R (Balduzzi et al., 2019), and Eggers' regression analysis conducted using the "eggers.test" function in R (Mathias et al., 2019), also did not suggest publication bias, $p = .18$. Note that unlike the main analyses, publication bias analyses did not take into account effect size dependence.

Results

Meta-Analysis Overview

Table 1 provides an outcome-level view of levels and effect sizes. Below we provide a brief summary of meta-analytic results, with full results, including overall regressions (collapsed across moderators) in Table 3, results of individual moderator regressions in Table 4, contrast analyses in Table 5, and an exploratory meta-regression analysis using all moderators in Table 6. Tables include overall number of studies (*k*), number of studies in each level, and measures of between-cluster variance (τ^2) and between-effect within-cluster variance (ω^2 or I^2).

For all analyses, we employed robust variance estimation (RVE) using the robumeta package in R (Fisher & Tipton, 2015) to model effect dependence hierarchically within a study (modeling manuscript-level dependence is reported in the Online Supplement) unless specified otherwise. First, we test for the presence of overall patterns of hypodescent. Second, five models included a single key moderator as a predictor to estimate the mean effect size predicted for each level (e.g., subgroup) of the moderator, and to test whether this estimate differed significantly from zero. Wald tests (analogous to an omnibus analysis of variance [ANOVA])

Table 3. Results From Overall Meta-Analysis Regressions Using Robust Variance Estimators.

												Wald test		
Model	*k*	E.S.	τ^2	ω^2	Estimate	*SE*	*t*	*df*	*p*	95% CI.L	95% CI.U	*F*	*df*	*p*
Overall	106	283	0.26	0										
Intercept					0.127	0.069	1.83	75	.07	−0.0111	0.264	–	–	–
Mention hypodescent	106	283	0.26	0								2.74	57	.07
Intercept (No)*	49				0.2437	0.103	2.36	37	.02	0.0345	0.453			
Yes	58				0.0546	0.091	0.6	41	.55	−0.1291	0.238			

Note. Studies could use multiple features, so sum can exceed total number of studies; *SE* = standard error; CI.U = confidence interval upper; CI.L = confidence interval lower.
*Indicates that results support hypodescent patterns.

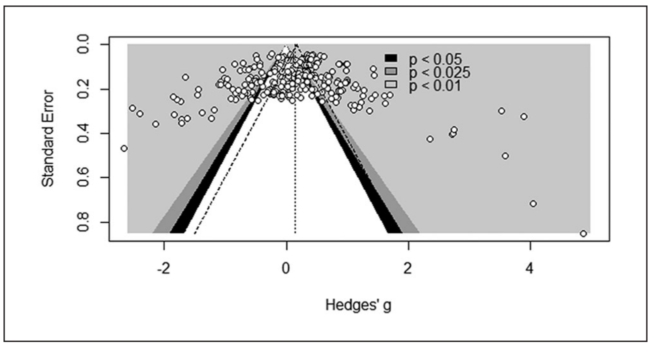

Figure 1. Contour enhanced funnel plot to inspect effect sizes (Hedges's *g*) for publication bias.
Note. The funnel plot was created using the "meta" package in R and represents each effect size individually. It does not take into account dependence of effect sizes.

conducted using the clubSandwich package in R (Pustejovsky, 2017) determined whether effect sizes for the moderator levels were different from each other (i.e., improved the model's prediction; see Table 4). Contrast analyses were conducted to test key questions (see Table 5). Finally, an exploratory multivariable regression considered all key moderators simultaneously. This model also tested whether key features significantly change the reference category's predicted effect size (see Table 6). An exploratory Meta-CART model (Li et al., 2019) identifying interactions between moderators is reported in the Online Supplement.

Hypodescent Patterns

Overall effect size. Effect sizes across all studies did not differ from zero, suggesting no overarching support for hypodescent patterns (see Table 3). However, a large amount of heterogeneity suggests that subgroup analysis is still appropriate.

Operationalization of multiracial. Recall that effect sizes were coded as directly indicating biracial ancestry (e.g., 50% White/50% Asian ancestry), using a racially ambiguous face, or displaying ancestry information with a racially ambiguous face. Effect sizes from categorizing targets with explicit biracial ancestry (no visual cue) supported hypodescent patterns. Effect sizes from categorizing racially ambiguous targets (no ancestry), and racial ambiguity paired with biracial ancestry did not support hypodescent (see Table 4). A Wald test suggested overall effect size differences between different operationalizations of multiracial; however, focused contrasts found that ancestry-only effect sizes did not differ from visual ambiguity and pairing a face with ancestry, nor did visual ambiguity differ from a face/ancestry pairing (see Table 5). Contrast null results could be due to insufficient power to test comparisons. Overall, studies that used only racial ancestry, but not other multiracial operationalization, supported hypodescent patterns.

Perceiver race. Recall that perceiver populations for each effect size were coded as participation populations that comprised only White perceivers, only racial minority perceiver, and populations with White and minority perceivers collapsed. Effect sizes from White perceiver populations were consistent with hypodescent patterns. However, effect sizes from populations where White and minority perceivers were collapsed, and from populations with only minority perceivers, did not differ from zero. Wald's tests did not support differences between subgroup effect sizes (see Table 4) and focused contrasts supported this analysis, with White perceivers' effect sizes not differing from other subgroups (see Table 5). Studies with only White perceivers, but not those that included minority perceivers (either independently or collapsed with White perceivers), supported hypodescent patterns when examined in isolation. However, these effects were not significantly different from each other. Because this null effect could reflect a true similarity between the subgroups, or a low power to detect differences (Borenstein et al., 2009), more research including perceiver race in its design is needed to determine whether perceiver race moderates hypodescent.

Target race. Calculable effect sizes were associated with Black/White targets, Asian/White targets, and Other/White (e.g., Latino/White) targets. Most dependence between

Table 4. Results From Meta-Analysis Regression for Individual Moderators Using Robust Variance Estimators.

					Regression estimates							Wald test		
Model	*k*	E.S.	τ^2	ω^2	Estimate	*SE*	*t*	*df*	*p*	95% CI.L	95% CI.U	*F*	*df*	*p*
Operationalization	104	270	0.26	0								4.37	25.9	.013
Ancestry[a]	17				0.2336	0.065	3.58	12.3	.004	0.0918	0.375			
Visual ambiguity	82				0.0998	0.089	1.13	58.69	.264	−0.0773	0.277			
Ancestry and visual ambiguity	11				−0.0323	0.271	−0.1	9.24	.908	−0.6427	0.578			
Perceiver race	101	274	0.26	0								2.13	40.5	.111
Minority	22				0.1768	0.151	1.17	14.2	.262	−0.1472	0.501			
Minority and White	42				0.0082	0.119	0.07	29.3	.945	−0.2342	0.251			
White[a]	49				0.226	0.092	2.46	34.9	.019	0.0396	0.412			
				I^2										
Target race	106	283	0.29	96								1.29	20.7	.304
Asian/White	26				0.0483	0.115	0.42	22.41	.680	−0.19075	0.287			
Black/White[a]	85				0.1579	0.079	2	80.44	.049	0.00044	0.315			
Other/White	7				0.0679	0.148	0.46	4.87	.665	−0.31501	0.451			
				ω^2										
Target gender	74	205	0.35	0								5.32	19	.008
Female[b]	9				−0.3761	0.141	−2.7	5.15	.043	−0.735	−0.0169			
Male[a]	41				0.3998	0.134	2.98	29.78	.006	0.126	0.6739			
Female and male	30				−0.0775	0.145	−0.5	20.87	.598	−0.379	0.2236			
Categorization measurement	106	283	0.25	0								6.27	31.7	<.001
Binary[a]	52				0.262	0.105	2.48	36.36	.018	0.048	0.475			
Multiple Likert[a]	10				0.473	0.163	2.89	6.81	.024	0.0841	0.861			
Multiple options[b]	28				−0.281	0.095	−3	19.93	.008	−0.478	−0.083			
Single Likert	24				0.285	0.146	1.95	16.74	.068	−0.0231	0.593			

Note. Studies could use multiple features, or be uncodable for a feature, so sum can be less than or exceed total number of studies; k = no. of studies; E.S. = no. of effect sizes; *SE* = standard error; CI.U = confidence interval upper; CI.L = confidence interval lower.
[a]Indicates that results support hypodescent patterns. [b] Indicates that results support alternative patterns.

categorizations for different race targets would arise from within subject, so effect dependence for this analysis was modeled using correlational, not hierarchical, relationship assumptions (Tanner-Smith et al., 2016).

Black/White targets were associated with an effect size different from zero, while Asian/White targets and Other/White targets were not (see Table 4). However, focused contrasts did not support differences between Black/White target effect sizes and Asian/White or Other/White targets (see Table 5). Because it is unknown whether this null effect represents a similarity between the subgroups or low power to detect subgroup differences (Borenstein et al., 2009), more research on non-Black/White targets is needed to determine whether target race moderates hypodescent. Studies using Black/White targets, but not Asian/White or Other/White, were associated with hypodescent patterns.

Target gender. Each effect size could be the result of utilizing male, female, or collapsing results from male and female, targets. Outcomes where target gender was not specified (n = 10), not clear (e.g., does not specifically mention target gender but provides photos of one gender; n = 8), on a continuum (n = 6), or not included (e.g., essay studies; n = 13) were excluded from this analysis. Male targets were associated with an effect that supported hypodescent patterns. Interestingly, studies using only female targets had a negative effect size, suggesting that female targets were associated with a tendency to categorize targets as a member of racial groups other than their lower social status group. Studies that collapsed results across male and female targets did not have effect sizes different from zero (see Table 4). Wald tests and focused contrasts support male-only targets differing from female-only targets and effect sizes that collapse across male and female targets (see Table 5). Hypodescent patterns were supported when all-male targets were categorized, with opposite patterns emerging for all-female targets.

Categorization measurement. Categorization measures were coded as binary options, multiple options, single Likert-type scales, or multiple Likert-type scales. Both binary outcomes

Table 5. Exploratory Contrast Results.

Model	*K*	E.S.	τ^2	ω^2	Estimate	*SE*	*t*	*df*	*p*	95% CI.L	95% CI.U
Operationalization	104	270	0.26	0							
Intercept					0.1	0.098	1.02	20.6	.318	−0.104	0.305
C1 (Ancestry vs. Other Subgroups)					0.2	0.158	1.27	22.7	.218	−0.126	0.526
C2 (Ambiguity vs. Ancestry and Ambiguity)					0.132	0.283	0.47	11.8	.649	−0.485	0.75
Perceiver race	101	274	0.26	0							
Intercept					0.137	0.074	1.85	43.5	0.07	−0.0126	0.287
C1 (White vs. Other Subgroups)					0.133	0.125	1.07	53.7	0.29	−0.1167	0.384
C2 (Minority vs. Minority and White)					−0.169	0.192	−0.9	28.1	0.39	−0.5622	0.225
				I^2							
Target race	106	283	0.29	96							
Intercept					0.0914	0.069	1.32	8.81	0.22	−0.0656	0.248
C1 (Black/White vs. Other Subgroups)					0.0998	0.119	0.84	11.82	0.42	−0.1605	0.36
C2 (Asian/White vs. Other/White)					−0.0197	0.188	−0.1	7.89	0.92	−0.453	0.414
				ω^2							
Target gender	74	205	0.35	0							
Intercept					−0.018	0.083	−0.2	14.8	.831	−0.195	0.159
C1 (Male vs. Other Subgroups)[a]					0.627	0.164	3.83	27.1	.001	0.291	0.962
C2 (Male and Female vs. Female)					0.299	0.202	1.48	10	.170	−0.151	0.748
Categorization measurement	106	283	0.25	0							
Intercept					0.17	0.062	2.75	54	.008	0.0459	0.294
C1 (Multiple Options vs. Other Subgroups)[a]					−0.6007	0.121	−5	37.8	.000	−0.8447	−0.357
C2 (Binary vs. All Likert Scales)					−0.0878	0.114	−0.8	39.7	.446	−0.3185	0.143
C3 (Multiple Likert vs. Single Likert)					0.1876	0.219	0.86	15.2	.405	−0.2785	0.654

Note. *SE* = standard error; CI.U = confidence interval upper; CI.L = confidence interval lower.
[a]Indicates that there are differences between these comparison groups.

and multiple Likert-type scales supported hypodescent patterns. However, multiple categorization options were associated with negative effect sizes. Single Likert-type scales were associated with effects that were not different from zero (see Table 4). Wald tests and focused contrasts supported a difference between multiple categorization options and all other categorization measures (see Table 5). This suggests that studies using multiple options were associated with a tendency to categorize targets as a member of groups other than their lower social status group. Other categorization measures did not differ from each other; however, binary and multiple Likert-type scale measures were associated with hypodescent patterns.

Exploratory meta-regression. As studies contain all of the above key moderators, it may be of interest to explore all moderators simultaneously. To examine the simultaneous prediction of all potential moderators, we modeled an exploratory meta-regression. Based on initial analyses, predictors with the lowest effect size estimate (ancestry with photo, collapsed across White and minority perceivers, Asian/White targets, female targets, and multiple options categorization) were coded as reference categories. The Other/White target subgroup was dropped from this analysis. Estimates then represent how individual levels (e.g., male targets) of a key feature (e.g., target gender) changed the effect size estimated in the reference category. Only binary and multiple Likert-type scale categorization options were associated with effect size changes from the reference category (see Table 6). However, moderator multicollinearity and overfitting are concerns of meta-regression models (Borenstein et al., 2009). This model does not escape these concerns. Specifically, negative coefficients (reducing the effect size) for two predictors previously associated with effect sizes greater than zero suggest issues with multicollinearity, and the number of predictors raise concerns about overfitting. However, exploratory metaCART analysis reported in the Online Supplement also suggests the importance of the categorization measure in explaining heterogeneity of effect sizes between studies.

Discussion

Looking at key moderators individually, meta-analysis demonstrates that hypodescent patterns (e.g., Black/White target categorized as Black) are observed when (a) multiracial is operationalized as ancestry, (b) targets are male, and (c)

Table 6. Results From Exploratory Multiple Meta-Analysis Regression Using Robust Variance Estimators.

Predictor	Estimate	*SE*	*t*	*df*	*p*	95% CI.L	95% CI.U
Reference category (intercept)	−0.450	0.288	−1.563	22.570	.132	−1.047	0.146
Operationalization: ancestry	−0.328	0.221	−1.482	5.830	.190	−0.874	0.217
Operationalization: visual	0.140	0.201	0.695	11.270	.501	−0.302	0.581
Perceiver race: White	0.045	0.233	0.192	21.790	.849	−0.439	0.529
Perceiver race: minority	0.156	0.253	0.614	13.220	.549	−0.391	0.702
Target race: Black/White	−0.187	0.209	−0.895	16.850	.383	−0.629	0.254
Target gender: male	0.275	0.239	1.149	11.900	.273	−0.247	0.796
Target gender: combined male/female	0.202	0.252	0.801	13.110	.437	−0.342	0.746
Measurement: binary[a]	0.500	0.231	2.160	21.050	.042	0.019	0.981
Measurement: single Likert	0.454	0.347	1.307	15.370	.210	−0.285	1.193
Measurement: multiple Likert[a]	1.311	0.333	3.941	5.390	.009	0.474	2.149

Note. Reference category represents a study with ancestry paired with a photo, combined White and minority perceivers, Asian/White targets, targets that are both male and female, and multiple options for racial categorization; *SE* = standard error; CI.U = confidence interval upper; CI.L = confidence interval lower.
[a]Indicates that the moderator level is significantly different from the intercept (reference category).

categorization measures are binary (e.g., Black or White) or use multiple Likert-type scales. However, when targets are female, or when categorization measurement has multiple options, other patterns emerged (e.g., Black/White target categorized as White or Multiracial). Importantly, though both White perceivers and Black/White targets are also associated with hypodescent patterns (e.g., effect sizes greater than 0), these effect sizes did not differ from other moderator levels. Interpreting these results is difficult, as null results in subgroup comparisons can be due to low precision in effect size estimates (as evidenced by large standard errors), or low power to detect differences (Borenstein et al., 2009). These concerns prevent us from drawing conclusions about the similarity of these effect sizes (e.g., that Black/White targets produce similar effect sizes to Asian/White targets). However, null effects in subgroup analysis do lead us to be cautious in our interpretation of hypodescent patterns. Finally, when considering all potential moderators together, binary and multiple Likert-type scale categorization measures predicted changes in effect size from the reference target (i.e., ancestry with photo, collapsed across White and minority perceivers, Other/White targets, female targets, and multiple categorization options). Taken together with the overall null finding for hypodescent across all studies, these results suggest caution in making claims about categorization patterns of multiracial and racially ambiguous targets without considering the gender of the target, the operationalization of multiracial, and the way categorization is measured.

More specifically, hypodescent patterns were present when multiracial was operationalized through ancestry, but not when ancestry was paired with racially ambiguous faces, or when multiracial was operationalized through presenting racially ambiguous faces with no ancestry information. While an omnibus test suggested differences in effect sizes across subgroups, contrast analysis did not identify differences between ancestry and other operationalizations, making interpretation difficult. Although we should be cautious in interpreting this result, these findings still highlight the need for researchers to consider their methods extensively when studying multiracial categorizations.

That hypodescent patterns occurred most clearly in studies that only used ancestry information to operationalize a multiracial identity suggests several points for further consideration. Hypodescent may only apply when ancestry is the sole racial categorization cue. This raises important questions about the power of visual cues in racial categorization. Furthermore, ancestry information in the context of a categorization task may cue the use of biologically driven assumptions of racial categorization. Thus, this finding highlights the importance of specificity in defining constructs when conducting research with multiracial targets and suggests more research is needed on the impact of different operationalizations of what is a multiracial target.

Target gender also moderated hypodescent patterns. Effects with all male targets supported patterns of hypodescent, while effects from all female targets were associated with categorizing targets as other than their lowest social status group (e.g., categorizing an Asian/White target as White or multiracial). Contrast analysis further supported effect size differences between male targets and all other target gender subgroups. This finding extends early work suggesting that hypodescent patterns were stronger for male than for female targets (Ho et al., 2011), though meta-analytic evidence suggests that hypodescent patterns may apply only to male targets. Furthermore, female targets may be seen as less prototypical of minority groups. Interestingly, no support for effect size differences emerged between targets that were only female, and target samples that collapsed male and female. However, as only nine studies used female-only targets, we encourage future researches to empirically test this gendered effect. These results suggest that when considering hypodescent, and all racial categorization, gender of target must be considered.

One possible explanation for hypodescent patterns for male, but not female, targets is how race and gender prototypicality and categorization interact (Carpinella et al., 2015; Goff et al., 2008). Given the meta-analytic results, compared with female targets, multiracial male targets may be seen as more prototypical of a minority racial group, less prototypical of a White majority racial group, or both. It is also possible that the effect of target gender may depend on target race and associated overlapping stereotypes. For example, Asian men can be seen as *less* prototypical of the categories "Asian" and "male" than Asian women (Schug et al., 2015; Todd & Simpson, 2017). The collected data could not provide an accurate test of this idea, due to the low number (three) of effect sizes associated with Asian/White female targets. Clearly the impact of gender on racial categorization needs further investigation, and future research should carefully consider target gender in study design and interpretation.

Results highlight the importance of categorization measurement in racial categorization research. While binary and multiple Likert-type scale categorization options are associated with categorization patterns consistent with hypodescent, multiple categorization options are associated with categorizing multiracial and racially ambiguous targets as other groups (e.g., Asian/White targets categorized as multiracial or White). Indeed, contrast analysis suggests effect sizes associated with multiple categorization options are different from all other categorization measurements. This suggests that, when given the opportunity, perceivers categorize multiracial and racially ambiguous targets as belonging to a group other than their lower status racial group. However, when constrained via binary choices or Likert-type scale anchors, perceivers categorize targets in line with hypodescent patterns. In other words, observed hypodescent patterns may result the categorization measurement itself. This finding furthers work suggesting that categorization measures influence racial categorization patterns (Nicolas et al., 2019; Tskhay & Rule, 2015) and highlights the need to consider measures when constructing both study design and theory.

There are many possible mechanisms through which categorization measure influences categorization patterns. For example, binary categorization and Likert-type scale options may cue an either/or approach to categorization (Lee et al., 2014), conceal a general minority bias (Chen, Pauker, et al., 2018), or an ingroup overexclusion effect (IOE; Yzerbyt et al., 1995) by erasing other possible categorizations, or may guide categorization through available label cues (Tskhay & Rule, 2015). On the other hand, broad categorization measurement (e.g., including multiple categorization options) may further cue a more complex understanding of racial categorization, may allow for capturing more nuanced categorization than binary categorizations (Nicolas et al., 2019), and may sidestep problems of labeling anchors (Tskhay & Rule, 2015). Regardless of the mechanism, evidence suggests that the way categorization is measured is associated with categorization patterns, and we must reflect on how researchers' choices about measuring categorization shape what is known about multiracial perception, and person perception in general. Although the use of certain categorization measures may be required by the nature of the task (e.g., a rapid categorization task), it is problematic when particular measures or methods dominate research and dictate our understanding of social perception (Dunham & Olson, 2016).

There was mixed evidence surrounding whether perceiver race and target race were associated with hypodescent patterns. While estimated effect sizes for some subgroups (White perceivers, and Black/White targets) supported hypodescent patterns when examined in isolation, effect sizes associated with White perceivers and Black/White targets did not differ from other subgroups. For both perceiver and target subgroups, this may reflect true similarities between subgroups, or unequal and often small subgroups could have prevented documenting differences. Overall, this leaves unanswered if none (or all) of these subgroups support hypodescent, or if the extant data were underpowered to find differences between the subgroups.

The influence of perceiver race on categorization patterns continues to be an important question. If White perceivers, considered high status in the United States, are associated with hypodescent categorization patterns, it may be that they are most motivated to preserve the social hierarchy by excluding minority targets from the high status category (Ho et al., 2013; Kteily et al., 2014). Similarly, if hypodescent patterns are present in some participant populations (e.g., White), but not others, other explanations, like the IOE (i.e., perceivers tend to categorize ambiguous targets as an outgroup but not necessarily a specific minority group; Yzerbyt et al., 1995), are better predictors of racial categorization patterns. As there was no evidence for differences between White and other perceiver subgroups, these musings are speculative.

The results for target race also leave many questions unanswered. The social category of Black is considered low status in the United States, and the term hypodescent is historically associated with Black Americans, which may account for why hypodescent patterns emerge for Black/White but not other multiracial targets. On the other hand, similarities in hypodescent patterns across target race could mean that hypodescent represents a more general psychological shortcut applied to a variety of multiracial backgrounds (at least those with a part-White identity), and not reliant on the context of Black–White relations in the United States. As there was no support for different effect sizes across target race, we cannot make any firm conclusions about the impact of target race.

Importantly, the existing limitations in the reviewed research leaves substantive questions around the role of perceiver and target race unaddressed. Consider, for example, that both hypodescent and the IOE (Yzerbyt et al., 1995) predict that White perceivers will categorize an Asian/White target as Asian. Hypodescent predicts that Black and Asian perceivers will also generally categorize this target as Asian, whereas the IOE predicts Asian, but not Black, perceivers will generally categorize an Asian/White target as not-Asian (outgroup). In the limited studies with perceiver race as part of study design, Black perceivers only categorized Black/White targets, and Asian perceivers only categorized Asian/White targets, prevent exploring this question. Future research should directly test categorization patterns, including hypodescent and the IOE, to determine what overarching patterns, if any, guide racial categorization.

Limitations

This meta-analysis incorporates, for the first time, important information (e.g., sample size, standard error) into an overview of the extant multiracial categorization literature not available through other types of review (e.g., systematic and theoretical reviews). However, as meta-analyses arise from available observations (i.e., previous studies), variables are often confounded (Lipsey, 2003). This meta-analysis is no exception, and concerns arising from a correlational study with overlapping features apply. Although the meta-regression partials out the variance due to each moderator, the naturally arising cofounds and concerns about multicollinearity limit strong claims based on this model.

Some limitations arising from the available data curtail substantive questions that this meta-analysis can answer. Constrained perceiver and target populations limit the conclusions of this body of research and this meta-analysis. As stated previously, substantive questions about the interaction of target gender and race, and target and perceiver race, cannot be addressed with the available data. Furthermore, the small number of minority-specific groups led us to collapse Asian and Black perceivers into an overall minority group, leaving open questions about how different minority groups categorize multiracial targets (see Online Supplement for exploratory analysis). Furthermore, 80% of studies use Black/White targets, who make up between 11% (Pew Research Center, 2015) and 20.4% (Jones & Bullock, 2012) of the multiracial population indicating two or more races in the United States. Although 26 studies include Asian/White targets, only seven studies examine other/White multiracial targets, and five examine multiple minority multiracial targets, further limiting what can be known about multiracial categorization in and between other multiracial groups.

Finally, the majority of the samples are United States based. Hypodescent developed in the United States, and this focus is fitting for testing an idea rooted in a specific cultural and historical context. However, this focus obscures potential cultural similarities and differences, and cross-cultural research should address this in the future (Chen, Couto, et al., 2018).

Practical Recommendations for Future Research

The results of this meta-analysis suggest two major pathways for future research, and one recommendation that cuts across both. The first pathway is to explore the mechanisms behind the relationship between the key moderators and categorization patterns revealed in the meta-analysis. Although several questions are raised in the "Discussion" section, it is worth noting that this article only tests if hypodescent patterns are present, or not, depending on key moderators. The present paper cannot explain why. We suggest continuing to explore how and why ancestry cues influence multiracial categorization. Furthermore, additional research is needed on the role of target gender in multiracial categorization. Finally, it is imperative to understand why categorization measurement shifts categorization patterns, as well as the validity of categorization measurements. That is, why does the measurement used influence categorization, and what measurement best captures racial categorization? Exploring these questions in the context of multiracial categorization will also expand our knowledge of how racial categories and social norms guide person perception.

The second pathway involves expanding work on other theoretically relevant moderators. Despite the moderators explored in the current analysis, there remains a large amount of heterogeneity in effect sizes between studies, which may be explained by individual differences. Hypodescent patterns of categorization may emerge when people endorse ideologies that support hierarchies, such as White identity (Knowles & Peng, 2005; Wilton et al., 2014), social dominance orientation (Ho et al., 2013; Kteily et al., 2014), and essentialism (Chao et al., 2013; Gaither, Schultz, et al., 2014; Plaks et al., 2011). In addition, social and geographic contexts (Chen, Couto, et al., 2018; Freeman et al., 2016; Pauker, Carpinella, et al., 2018) and development (Gaither, Chen et al., 2014; Pauker et al., 2016; Roberts & Gelman, 2015, 2017) may be fruitful avenues of exploration. Although there is evidence to support all of these factor's impact on categorization patterns, there is not enough research to support meta-analytic inquiry. We suggest researchers not consider these settled questions, but instead to continue to explore and test what individual and social factors contribute to racial categorization.

Finally, a cross-cutting recommendation is that future research must carefully consider how methods used in categorization studies impact observations. The meta-analysis illustrates how studies have focused on specific questions (e.g., binary categorization) and provides evidence that different questions lead to different answers. Moving forward, researchers could carefully select their categorization measure, keeping in mind its limitations, or systematically select several categorization outcome variables. Moreover, target stimuli must also be broadened—including racially diverse male and female multiracial targets. Attention must also be paid to target sources. For example, FaceGen, a program often used to create computer-generated faces, 26 facial scans (out of 272) are of Black individuals, and only six of those scans are of women (FaceGen, n.d.), raising concerns about the generalizability and validity of those stimuli. Researchers can also apply analysis techniques to consider the unique effect of individual targets (Judd et al., 2012). Studies should also move beyond all-White perceivers and stop collapsing across White and minority perceiver groups (Richeson & Sommers, 2016). At the very least, researchers need to address the limitations study designs impose on the conclusions drawn from their data. Expanding the use of these study features will not only increase the generalizability of multiracial and racially ambiguous research, it will also build theory around person perception and personal construal more broadly. We cannot, after all, understand how social norms influence person perception if we do not understand the norms embedded in research designs.

Conclusion

By critically examining key moderators as part of this meta-analysis, we illuminate several important gaps and assumptions in current research regarding the categorization of multiracial and racially ambiguous targets. This review highlights some of the challenges inherent in social categorization research. These results further emphasize the need for social categorization researchers to take categorization measurement and target gender into consideration and to expand both the perceiver and target racial groups examined to enable researchers to ask questions about person perception as a whole. As the world is becoming more diverse and globally mixed, it is timely for research to consider the generalizability of their findings particularly as it relates to the perceptions of minority groups.

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Supplemental Material

Supplemental material is available online with this article.

Notes

1. The initial search was 2000–2015 and updated in July 2018. In the interim between the initial search and the update, the first author's institution switched from Academic Search Elite to Academic Search Premier.
2. Six authors responded to this request; however no additional articles that met criteria were added.
3. This excludes studies that exclusively investigate memory, evaluation (e.g., liking or attractiveness), categorization adjacent evaluations (e.g., "acts like"), or skin tone–related judgments.
4. In addition, a forward citation search to locate other articles published since 2016 was conducted on each article included in the original search via the "Cited by" function in Google Scholar. Citing articles were screened via titles/abstracts.
5. A backward citation search would have captured this article.
6. Coding was completed by at least one trained research assistant, or the first author. Research assistant coding was verified by the first author. Any discrepancies in coding were discussed until resolved. Methods were also coded for if targets were completely computer generated, computer morphs, or photographs, and the geography of participants.
7. All minority/minority targets were excluded from the meta-analysis. This includes all effect sizes from two studies (one Asian/Black, one Black/Latino), and minority/minority effects from three additional studies (one Asian/Black, one Black/Latino, and one including all combinations of Arab, Aboriginal Australian, Black, East Asian, Latino, Native American, South Asian). Hypodescent does not have clear predictions for the racial categorization of these targets as there are no consistent status differences between these racial groups.
8. Referencing hypodescent once in a manuscript was coded as explicitly mentioning hypodescent.

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