More than Meets the Eye: A Multimodal Approach to Science-Popularizing Discourse and Representation of the 'Other' in a Selection of National Geographic Feature Articles

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Abstract

National Geographic Magazine (*NGM*) is an American cultural icon renowned for the dissemination of geographic knowledge, the exhilaration of cultural explorations, the popularization of science discourse, and the cultivation of visual imaginaries. Among popular science magazines, its distinctive force in the popular imagination squarely lies in the manipulation and division of labor among individualized and sensationalized textual and visual signifiers. While *NGM* is said to reproduce familiar iconic visual systems, representations of the 'Other' seem to constitute a unique configuration through which latent geopolitical ideologies impinge on the feature article multimodal ensemble. Extending past scholarship on *National Geographic Othered* representations, science-popularizing discourse, and multimodality, while mobilizing multiple tools drawn from several theories, this research proposes a genre-based multimodal framework to the analysis of feature articles as dialectically connected to the collective, the historical, and the generic dimensions of the cultural practices therein. As a point of departure, the paper examines two feature articles retrieved from the online version of *NGM*, particularly from the *Reach for the Stars* content hub the magazine created for UAE space endeavors in partnership with the Mohammed Bin Rashid Space Centre (MBRSC), home to the UAE's National Space Programme. Specifically, the study scrutinizes the representations of Arab space scientists (the Other) in manners that tie closely to the geopolitical culture of the US (the Self). Findings showcase that despite the magazine's metaphor *a window on the world*, the multimodal ensembles of science-popularizing discourse in *NGM* emerge as complex cultural processes fashioned in response to the ever-changing US geopolitical ideologies.

> In science, it is when we take some interest in the great discoverers and their lives that it becomes endurable, and only when we begin to trace the development of ideas that it becomes fascinating
>
> **— James Clerk Maxwell**

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Introduction

National Geographic Magazine (henceforth *NGM*) is an American cultural icon renowned for the dissemination of geographic knowledge, the exhilaration of cultural explorations, the popularization of science discourse, and the cultivation of visual imaginaries tethered to historically specific norms and values (Hawkins 2008, 2010; Lutz and Collins 1991). Since its inception in 1888, *NGM* set out to cruise the entire globe turning it into a field site, affording in the process "geographical information, broadly construed to include commercial, botanical, geological, and anthropological angles, among others, with emphasis on knowledge derived from exploration," (Rothengberg 2007: 26). The magazine is "not…a single artifact but a powerful voice," (Lutz and Collins 1993). As a key inhabitant of the global mediascape and readily accessible in 33 languages across several platforms in digital and print formats, the magazine is considered an educational journal worthy of collection (Abramson 1987; Pauly 1979; Schulten 2000).

In recent decades, *NGM*'s parent, the *National Geographic Society* (Bryan 1997), established a web presence allowing for "greater visibility" (Morris and Mendelson 2016). With the distinctive yellow border, *NGM* introduced a fresh design, which, according to Susan Goldberg the editor-in-chief, showcases its "stunning thought-provoking visual storytelling, new sections, and new features with the same dedication to science, facts, and the planet" (*National Geographic* 2018).

NGM feature articles are aesthetic representations with stories in a photo story/essay format allowing journalists and photographers to report on the world's peoples, landscapes, and cultures, particularly in the captions that situate and construct the visual narratives. Arguably, the articles therein are substantial sources of the 'new sciences' through geopolitical representations of the spatial Others (i.e. non-Westerners residing all over the globe). 'Othering' is a broadly inclusive concept that captures expressions of prejudice.

To Staszak (2008), 'the Other' is a notion that rests on the presence of two groups: 'the norm' (Us) with a valued identity and 'the other' (Them) that is exotic and different. From a postcolonial perspective, the West has predominately stigmatized the Other as 'Savage', 'Primitive', and 'Uncivilized' in perpetuation of 'the Self and Other' dichotomy (Said 1983) circulating dominant power relations and processes in both textual and visual cultural texts (Staszak 2008). Within this purview, 'Othering' not only encompasses the 'semio-discursive' (the verbal, visual, acoustic, gestural, etc.) expressions of prejudice based on gender, identity, or race, but inculcates a set of dynamic processes and conditions that promote social cleavages and engender inequality and marginality as well. The inherent expressions of 'Othering' considerably vary in these cultural texts, yet subsume a similar set of underlying geopolitical ideologies.

A core argument in the present paper is that whereas *NGM* is said to reproduce familiar iconic visual systems, the representations of the 'Other', particularly in science-popularizing discourse, constitute a unique configuration through which latent geopolitical ideologies impinge on the feature article multimodal ensemble. The feature article of *NGM* is best considered a genre of a "hybrid discourse" (Molek-Kozakowska 2017a, 2017b, 2018, 2019) that combines features of science communication and popular journalism. Journalists and photographers constantly mine for new ways to inspire audiences through high-definition, captivating visual storytelling (Pflaeging 2017) in formats that conflate "science and spectacle in a way that is purposely reassuring rather than challenging," (Thompson 2000). Among popular science magazines, the distinctive force of *NGM* seems to lie more squarely in the popular imagination that stems from the manipulation of and the division of labor among individualized and sensationalized textual and visual signifiers, particularly in the science-popularizing feature articles. *NGM* is, therefore, a rich terrain for the investigation of how science-popularizing discourse is *multimodally* constructed in the feature articles.

To this end, in extension of past scholarship on *National Geographic* Othered representations, science-popularizing discourse, and multimodality, the paper proposes a genre-based multimodal framework to the analysis of feature articles as dialectically connected to the collective, the historical, and the generic dimensions of the cultural practices therein. As a point of departure, the study is part of an ongoing research project that critically examines the feature articles posted in the *Reach for the Stars* content hub *NGM* created for UAE space endeavors since September 2019 in partnership with the Mohammed Bin Rashid Space Centre (MBRSC), home to the UAE's National Space Programme. The research endeavor scrutinizes the representations of Arab space scientists (the Other) in manners that tie closely to the geopolitical culture of the US (the Self) as reflected in *NGM* feature articles, engaging in a fully-fledged critical analysis in light of the proposed analytical framework.

Science-Popularizing Discourse and the Multimodal "Other" Representation

Throughout its 130-year history, *NGM* has maintained a trajectory of growth and popularity and has received considerable scholarly attention. Extant scholarly works dwell upon several geographical locations, namely: Black Africa (Lieskounig 1997); the Phillipines (Hyndman 2002); the Middle East (Lutz and Collins 1993); Canada (Beaudreau 2002); US New South (Jansson 2003); Puerto Rico (Perivolaris 2007); Japan (Darling-Wolf and Mendelson 2008); Saudi Arabia (Mendelson and Darling-Wolf 2009); Afghanistan (Schwartz-Du Pre 2010); Spain (Alvarez, Lozano, and Santamaria 2013); Colombia (Pérez-Marín 2016); the Eskimo (Wheelersburg 2017); and Hawaii (Conner 2019), to name a few. Within the recent spate of cultural studies, several global issues covered in *NGM* have also undergone critical examination, particularly globalization (Parameswaran 2002), Orientalism (Hensley

2010) and its relevance to the Arab world (Gokmen and Haas 2007), advertizing (Ahern, Bortree, and Smith 2012; Anshary 2019), environmental responsibility (Bortree et al. 2013), collective identity in the digital age (Morris and Mendelson 2016), and climate change (Born 2019).

In a similar vein, significant bodies of communication research have turned their lens to the portrayal of the Other (Darling-Wolf and Mendelson 2008) illuminating the frontiers of the world for American consumption and interpretation (See, for example, Schwartz (2006) on the representations of the Afghan girl, Rozycka (2008) on the visual portrayal of Latin Americans, and Steet (2000) on Arab women). Extant scholarship, however, does not fully capture the complexity and vitality of digital storytelling of the 'Other' in *NGM* feature articles.

On a different note, in popularization discourse scientific findings are disseminated outside the realm of the communities that produce, and to a certain extent 'own', such knowledge (Giannoni 2008: 212). As a re-contextualization of knowledge (Caliendo 2012; Calsamiglia 2003; Calsamiglia and López Ferrero 2003; Calsamiglia and Van Dijk 2004; de Oliveira and Pagano 2006; Gotti 2014; Gruber and Dickerson 2012; Luzón 2013), popularization is "a matter of interaction as well as information" (Myers 2003: 273), entailing dynamic alignments between authors and intended audiences. Informed by "market-driven journalism" (Dahlgren 1992; McManus 1994), science-popularizing discourse as a social phenomenon (Ren and Zhai 2014) entails *editorial practices* and *discursive strategies* (Calsamiglia 2003; Jensen 2012) that frame scientific endeavors for non-specialized audiences (Giannoni 2008; Perez-Llantanda 2012) in a manner that blurs the boundaries between them (Brundidge 2010; Deuze 2003, 2008).

Popularization has been examined from discursive and rhetorical standpoints across different genres (Calsamiglia 2003; Gotti 2003; Myers 2003; Calsamiglia and Van Dijk 2004; Giannoni 2008). Existing scholarly studies place special emphasis on *personalized narratives* (Ekstrom 2002; Seguin 2001); *dramatized soundbites* (Chovanec 2014); *idioms* (Bauer and Bucchi 2010; Conboy 2006, 2011; Leon and Erviti 2015); *metaphors* (Gülich 2003); *visual imagery* (Miller 1998); and *emotion-laden imagery*, *evaluative language, newsworthiness* and *stylistic devices* employed in collegiality to leverage audience appeal (Bednarek and Caple 2010, 2012a, 2012b, 2014, 2016, 2017; Chovanec 2014; Molek-Kozakowska 2013, 2015, 2017a, 2017b, 2018, 2019; Montgomery 2007; Richardson 2007)

Science communication genres have evolved over the years (Hyland 2000, 2008, 2010; Perez-Llantada 2012) posing several challenges for multimodal discourse analysts (Hiippala 2013; Parodi 2010; Wodak and Myers 2009). Multimodal discourse analysis sheds light on how dynamic and transformative semiotic resources are, particularly through their division of labor, that is, the level and

degree of interaction between image and text in the process of meaning making in mediated cultural texts (O'Halloran et al. 2011).

A burgeoning literature addresses a variety of genres that include, but are not restricted to, visual images (Kress and Van Leeuwen 2006), music and sound (Van Leeuwen 2007a, 2007b, 2011, 2012), popular discourse (Djonov and Zhao 2014); visual thinking (Fernández-Fontecha et al. 2018); and TV commercials (Svetanant and Okuizumi 2019), to name a few. Additionally, multimodal research delves into social media, not excluding numerous practices on Facebook (Bezemer and Kress 2014; Eisenlauer 2010) and Instagram photos (Manovich 2016). With a paucity of scholarly attention to science-popularizing discourse across different genres, there is a further lack of research focusing its attention on the multimodal construction of *NGM* feature articles.

The critical multimodal interrogation of emergent, hybrid, semi-institutional, and mediated genres that tend to take over popular communication like *NGM* is mandatory to account for the dialectal tensions among the imperatives of production, text, and audience reception. Arguing on a related note, 'Othering' has been examined by scholars in numerous cultural, journalistic, sociological, anthropological and linguistic studies. To date, the concept has not been approached from a multimodal vantage point. Against this backdrop, the need arises for diverse, yet complementary, theoretical models to be scavenged for a synthesis capable of empirical testing.

Methodological Framework

Characteristically, *NGM* feature articles are shaped by the magazine's editorial policy in collaboration with journalists, layout specialists, caption writers, among others, that all influence the final contours of the stories to the intended readers. Discursively, the context of these cultural texts is indexed mostly through 'interdiscursivity', that is, the interplay of diverse, historically contingent semiotic resources.

To map out the strategic potential of the *NGM* feature article for challenging dominant ideologies and critiquing social and political narratives, the proposed analytical framework lays bare four levels of analysis (displayed clockwise in the Feature Article Multimodal Analytical Framework (FA-MAF) Figure 1 below). The framework draws on the *grammar of visual design* (Kress and Van Leuween 2006), *appraisal theory* (Martin and White 2007), *newsworthiness framework* (Bednarek 2015; Bednarek and Caple 2010, 2012a, 2012b, 2014, 2016, 2017), and *social actor representation* (Van Leuween 2008). What follows is an account of each level and the heuristic value each contributes to analyzing the feature article of *NGM*.
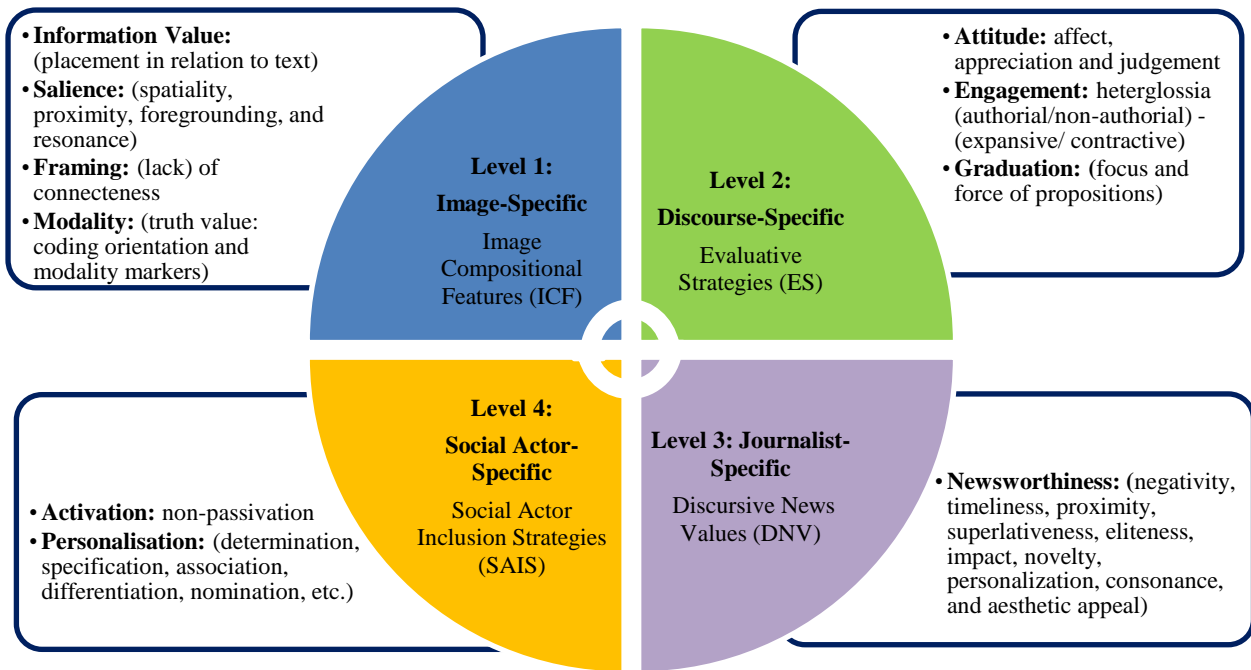
- **Information Value:** (placement in relation to text)
- **Salience:** (spatiality, proximity, foregrounding, and resonance)
- **Framing:** (lack) of connecteness
- **Modality:** (truth value: coding orientation and modality markers)

Level 1:
Image-Specific
Image Compositional Features (ICF)

Level 2:
Discourse-Specific
Evaluative Strategies (ES)

- **Attitude:** affect, appreciation and judgement
- **Engagement:** heterglossia (authorial/non-authorial) - (expansive/ contractive)
- **Graduation:** (focus and force of propositions)

- **Activation:** non-passivation
- **Personalisation:** (determination, specification, association, differentiation, nomination, etc.)

Level 4:
Social Actor-Specific
Social Actor Inclusion Strategies (SAIS)

Level 3: Journalist-Specific
Discursive News Values (DNV)

- **Newsworthiness:** (negativity, timeliness, proximity, superlativeness, eliteness, impact, novelty, personalization, consonance, and aesthetic appeal)

Figure (1)
Feature Article Multimodal Analytical Framework (FA-MAF)

The ***image-specific level*** pertains to the inherent *image compositional features,* that is, the sociocultural and geopolitical features of representation that engender image 'effectiveness'. In visual cultures, "images might in fact take precedence in the relationship between iconic, linguistic and audio messages by revealing hidden meanings, amplifying certain ideas, providing interpretative frames, and priming viewers toward preferred discourse paradigms" (Wojcieszak 2009: 477). With this in mind, the compositional meaning in the context of this study concerns the disposition of elements within the visual space as well as the emphasis given to the representational and interactive elements that compose the meanings of an image or verbal text to achieve a sense of coherence to the whole unit. Following Kress and Van Leuween's (2006) grammar of visual design, these features subsume: *information value* (the placement of the image in the visual display of the article); *salience* (in terms of spatiality, proximity, foregrounding, and resonance); *framing* (connectedness in the environment into which the image is diffused); and *modality* (truth value of the visual images).

Informational value sets up relationships of polarization (left/right, top/bottom) and centralization (center/margin). Depending on whether an element is placed within the three dichotomies of pictorial zones (i.e. left/right, top/bottom and center/margin), it is believed to endow the picture with a specific meaning. *Salience* creates a hierarchy of importance and power relationships among the surrounding elements. The presence of *framing* signals individualism and segregation, and absence of *framing lines* stresses group identity. Finally, *modality markers,* or reality values, are visual cues that run along a spectrum of possibilities and include eight

gradable markers: *color saturation, color differentiation, color modulation, contextualization, representation, depth, illumination,* and *brightness.* Each of these dimensions can be seen as a scale running from the absence of any rendition of detail to maximal representation of detail, or from the absence of any rendition of depth to maximally deepen perspective.

The discourse-specific level unravels the *evaluative strategies* employed in the cultural texts and is informed by Martin and White's (2007) *appraisal theory.* Martin and White's (2007) appraisal theory provides a fine-grained taxonomy of lexical realizations for the analysis of evaluation in language. Instantiations of appraisal in discourse concurrently articulate three types of meaning, namely: ATTITUDE, ENGAGEMENT, and GRADUATION. The three systems and their sub-systems are typically written in uppercase whereas the lower levels of refinement are written in lowercase.

In this study, the ATTITUDE system attends to the resources journalists uses in the negotiation of solidarity with audiences in relation to science-popularized narratives. Instantiations of ATTITUDE can be positive, or negative and can further be inscribed (explicit), or evoked (implicit). In this manner, journalists have the potential to foreground their subjective presence through the construal of three main semantic domains: AFFECT, JUDGEMENT, and APPRECIATION. AFFECT represents the linguistic resources appraisers utilize to express their emotional states and/or responses to some emotional trigger. JUDGEMENT subsumes the linguistic resources writers use for the evaluation of themselves and other people in terms of character and social behavior in relation to culturally established sets of moral, legal, and personal norms. APPRECIATION comprises the interpersonal resources utilized by writers for expressing evaluations of entities, processes, natural phenomena, and situations by reference to aesthetic principles and other systems of social value.

The ENGAGEMENT system is concerned with the linguistic resources journalists use to adopt a particular stance toward the propositions or values he advances as well as the intended audience they address by acknowledging authorial voice and/or other prior voices. A clear distinction stands out between two dialogic orientations: *monogloss* (dialogic contraction) in the form of bare assertions and *heterogloss* (dialogic expansion) which signals an alternative position or source. The former engagement choice *contracts* the dialogic space, thus projecting a compliant reader who is aligned with the authorial voice. The latter choice, on the other hand, allows for competing voices and assumes the reader may resist the position advanced by the text. The *expansive* dialogic resources further subsume utterances that *entertain* (whereby the writer is represented as the *source* of the propositions or values, thereby making space for alternative viewpoints), and those which *attribute* (which present propositions and values as arising from some external sources).

The third and final system is GRADUATION, which operates across two axes of scalability: FORCE and FOCUS. While *force* attends to the gradeability of experiential attitudinal meanings (in terms of intensification and quantification), *focus* in attitude and engagement affects strength of feeling and level of commitment to value positions (they either *up-scale,* or *down-scale* evaluations).

The journalist-specific level is concerned with how newsworthiness is *discursively* constructed in the science-popularizing discourse of *NGM* with direct reference to the emerging feature articles on Arab space astronauts who have not received scholarly attention in multimodal discourse analysis studies. The literature on news values is extensive (for a thorough review, see Caple 2018), with various aspects and classifications of news values from material, cognitive, social, and discursive vantage points (See, for example, Bednarek 2006a, 2006b, 2014, 2015; Bednarek and Caple 2010, 2012a, 2012b, 2014, 2016, 2017; Galtung and Ruge 1965; Lippman 1992, 1999). In the context of this study, *news values* is understood as "the *(imagined)* preferences of the expected audience" (Richardson 2007: 94, italics in original) about what is newsworthy from a discursive perspective (Benarek and Caple 2012b). Each value is perceived as socioculturally assigned, rather than being natural or inherent in the news reports (Bednarek and Caple 2017).

With Bednarek and Caple's (2017) *Discursive News Values Analysis* (DNVA) framework as a point of departure, this layer lays bare the multiple instantiations of newsworthiness that work in tandem with evaluative resources to make science "discursively constructed as newsworthy" (Bednarek and Caple 2012a: 44). The current study pays attention to: first, which news values are *discursively* construed via deftly employed semiotic resources (Bednarek and Caple 2012b; Molek-Kozakowska 2013; Myers 2003), that is, through linguistic and visual resources, with varying degrees and frequencies; second, how the geopolitical context of the articles affects the precedence of specific new values and to what end this is performed. The ten news values, albeit intimately interlocked, are demarcated below for operationalization purposes (See Table 1).

Table (1)
News Values in the Discursive News Values Analysis (DNVA) Approach

News Values	Definition
Negativity	The negative aspects of an event/issue
Timeliness	Relevance of the event/issue in terms of time
Proximity	The cultural/geographical nearness of an event/issue
Superlativeness	The large scope/scale of an event/issue
Eliteness	The high status of individuals/institutions/nations involved in an event/issue
Impact	The significance of an event/issue in terms of consequences
Novelty	The new/unexpected aspect of an event/issue
Personalization	The personalized aspects of an event/issue
Consonance	The adherence to expectations with regard to an event/issue
Aesthetic appeal	The aesthetics of an event/issue

The social actor-specific level pertains to the *inclusion strategies* manipulated in the representation and/or re-contextualization of social actor(s) and collective identity in science-popularizing discourse. In the context of the current study, a social actor is perceived as a person or an entity with complex characteristics, regardless of race, age, gender, or marital status. What relevant social actor representation are communicated in the media texts at the time of publication, how Arab space astronauts *multimodally* undergo significant agentive changes in representation, and why the Emirati collective identity is conceptualized in such a manner are all points of inquiry. In this study, agency is examined in light of Van Leuween's (2008) *socio-semantic inventory of Social Actor Representation* (See Figure 2). Van Leeuwen's (2008) framework is useful in articulating the role of social actors in the multimodal texts under scrutiny. In the process of representation, several complex processes of inclusion and exclusion are in operation for ideological reasons and that is what the current research endeavor purports to unravel. Only processes that lend themselves for analysis will be explored by virtue of their predominance in the sample at hand.
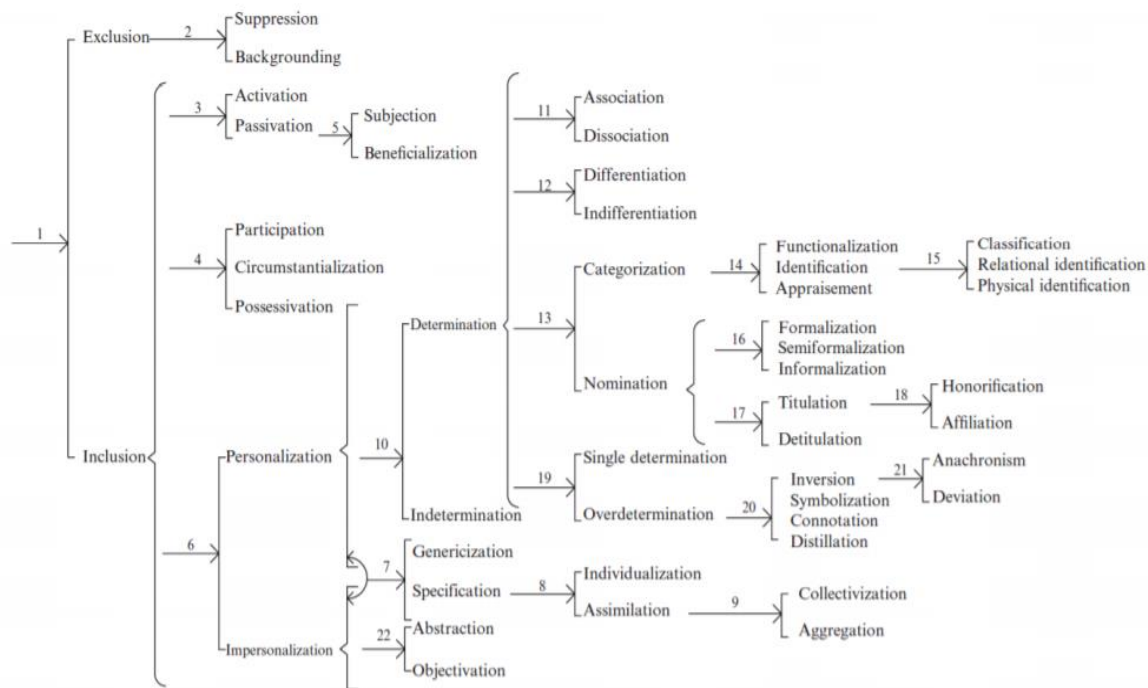

Figure (2)
Breakdown of Van Leuween's Inventory of Social Actor Representation Sample

This study rests on the purposeful convenience sampling technique for the information rich, in-depth analysis it affords (Perry 2011). Since this paper is part of an on-going project, analysis pertains to the science-popularizing feature articles available on the *Reach for the Stars* content hub since September 2019. To engage readers in a new era of Arab space exploration, whereby the UAE assumes a new position of power in the region, the hub sheds light on Emirati space scientists during the last quarter of 2019. Fundamentally, *NGM "*explores the UAE's growth as a serious player in the space sector, its contribution to a knowledge based economy and scientific development, as well its burgeoning relationships with

space agencies around the world" (*National Geographic* 2019a). To date, the articles accessible through the hub are: 'Emirati astronauts countdown to ISS scientific mission' (*National Geographic* 2019b) and 'First Emirati astronauts blast into space' (*National Geographic* 2019c).

Analysis

Image-specific and social actor-specific levels

The visual images of the Arab astronauts can best be described as multisemiotic stories or "image-nuclear news stories" (Caple 2008) that communicate interpersonal meanings by virtue of the foregrounded and dominant visuals along with the captions that elaborate on the space science news. The centralized layout places the represented participants as the nucleus of information to which surrounding elements are subservient (See Figures 3, 4, and 5). Set in large full-color, salient, and conspicuous images embedded in the cultural texts, Hazza AlMansoori and Sultan AlNeyadi are physically fit and well invested in. The special qualities of the visual representations in terms of 'iconicity' and 'indexicality' make the *offer gaze* an effective tool for framing and articulating the ideological messages communicated, engaging viewers 'affectively' (Gruber and Dickerson 2012; Zelizer 2010), connecting viewers on an emotional level through the exposure of personal experiences of perceived public value, and engendering sensationalism while capturing critical moments in the space science history of the UAE.

Figure (3)
(1) UAE astronauts Hazza AlMansoori and Sultan AlNeyadi during the last day of training and (2) AlMansoori selection as UAE's first astronaut from a pool of 4,000 candidates

Figure (4)
(1) UAE astronauts during training at the Yuri Gagarin Cosmonaut Training Center, Russia and (2) UAE astronauts during survival training in Russia's remote and frozen wilderness

Figure (5)
(1) UAE astronauts drilled on survival techniques in case re-entry
places them in inhospitable climates and (2) UAE astronauts have
undergone rigorous training regime as part of space travel preparation

The visual images, in conjunction with the surrounding news stories, construct "extraordinary events" (Ekstrom 2002) atypical of Othered Arab representation in the media to date. In tandem, the strategic manipulation of iconography (i.e. luminosity, compositional balance, photogenic perspectives, naturalistic training settings, positive social actor representations, etc.) forges meaning relations that are noteworthy. Additionally, the representation of social actor centers on the Emirati space astronauts who are regarded as members of the same group embedded in a male-defined society: Elite Arab space scientists. AlMansoori and AlNeyadi are explicitly 'included' in several ways. They are personalized in 'identification' terms (defined with regard to gender, provenance, class, and age); 'activated' from 'functionalization' and 'nomination' standpoints (depicted as hegemonic masculine figures in training attire and as dynamic forces undergoing training in several spots); and ascribed different degrees of agency. Relatedly, the astronauts are 'individualized' on the micro level, yet 'collectivized' at the macro level.

Journalist-specific and discourse-specific levels

The news values of Eliteness, Timeliness, Proximity, Personalization, and Novelty are the most frequently constructed in the science-popularizing of the feature articles through linguistic and visual resources. These frequencies contribute to the positive representation of Arab space astronauts. Arguably, it is in and through these semio-discursive choices that journalists encode their semantic and geopolitical stance toward the future Arab Other. In collegiality, at several junctures in the articles under scrutiny, news values are construed through the effective use of attitudinal, engagement, and graduation choices as detailed below.

Timeliness. The science-popularizing stories are represented as 'exclusive' and priority is given to space science news that are 'recent', 'intense', and 'wide' in scope and scale, not only in the MENA region, but the Arab world at large. More specifically, timeliness is construed by the visual display of the relevant chronotope (time-space configuration) in tandem with verbal cues in text indicating recency and ongoing events. The year 2019 is a pivotal one in the history of the UAE. On the

September 25th, Hazza Al-Mansoori, a 35-year-old astronaut, made history as the first Emirati and the third Arab to travel into space (*National Geographic* 2019c) and the launch-into-space marks an important milestone in Dubai's burgeoning space industry led by MBRSC.

Proximity. It is instantiated by the depiction of the iconic training center in Russia and the natural settings where space training is undertaken (as fully captured in the captions that parallel the science news stories of the represented participants) as happening 'geographically' or 'culturally' near the target audience (Bednarek and Caple 2017). Aligned with the visual images, inclusive '***we***' is used in a number of utterances in the media texts for the generation of affinity, solidarity, and communality, on the one hand, and the identification with the media frames infused in the media texts as far as the Arab spacemen are concerned, on the other. One example to cite is: "***We*** *have a laptop on board [the] International Space Station which* ***we*** *can use to predict when* ***we*** *will pass over the UAE.* ***We*** *can wait for that moment to take a picture with our flag.*"

Superlativeness. It is realized by the 'visual repetition' (Economou 2009) of the Emirati astronauts in the image frames in a maximized, intensified manner that, in turn, showcases their significance in the visual display. In unison with these images, several metaphorical expressions foreground the future *Arab Other* hence rendering the media texts highly sensational and symbolically powerful. Examples to cite are:

- *"AlMansoori and his backstop, AlNeyadi, will* ***form the nucleus*** *of the United Arab Emirates' astronaut corps,"*

- *"The goal is to inspire would-be astronauts and* ***capture the imagination*** *of Emirati youngsters,"*

- *"A battery of tests were used to* ***whittle down*** *a field of thousands of eager applicants,"* and

- *"The first Emirati astronaut will soon* ***blast-off*** *for a historic mission."*

Eliteness. Space science endeavors concern 'elite persons', 'powerful institutions', and a 'leading Arab nation'. Eliteness is materialized by virtue of the visual images of recognizable key figures in UAE of high social status garbed in training attires in settings associated with the elite profession (i.e. space astronauts). The low camera angle further indicates the high social status of the represented participants. This is complemented by JUDGEMENT values of the social esteem type, namely of *capacity* and *tenacity* related to present and future consequences. Example positive inscribed instantiations to cite are:

- *"On September 25,* ***AlMansoori will blast off*** *from Baikonur Cosmodrome in southern Kazakhstan with crewmates Oleg Skripochka."*

 [+JUDGEMENT: social esteem: Capacity],

- *"I had the chance to join Sultan to sit in the right seat with us and he is **an excellent crewmate** and he's **very good at what he does**. We very much appreciate having him in there."*

[+JUDGEMENT: social esteem: Capacity], and

- "After this mission, AlMansoori and his backstop, AlNeyadi, will **form the nucleus** of the United Arab Emirates' astronaut corps, members of which will one day hopefully visit the moon as well as walk on the surface of Mars."

 [+JUDGEMENT: social esteem: Tenacity].

Impact. High impact is vitalized through the spectacle of sequential images in the texture of the article highlighting the astronauts sense of national identity, solidarity, hope, pride, and success during and after training. This is likely to generate serious repercussions as well as having a national/ global impact. In tandem, positive APPRECIATION instantiations of the *valuation* and *reaction* type are discernible in relation to culturally or ideologically established conventions. Example to cite are:

- *"*His journey will **mark an important milestone** in the UAE's burgeoning space industry, led by the Mohammed Bin Rashid Space Centre (MBRSC)."

[+APPRECIATION: reaction: impact],

- *"*Getting to this point has been ***a journey in itself***."

[+APPRECIATION: valuation: significance], and

- *"*The hopes of ***a young and vibrant nation*** will go with him."

[+APPRECIATION: valuation: significance].

Novelty. It is triggered by the visual reporting of an unusual event, atypical of Arab representation in *NGM*, that is, the depiction of UAE astronauts and their training at the Yuri Gagarin Cosmonaut Training Center, Russia. The headline "Emirati astronauts countdown to ISS scientific mission" further references a rare happening. Particularly influential are GRADUATION resources put to a good effect. The use of wittily deployed attitudinal lexis and metaphoric expressions amplify the FORCE or the intensity and degree of the realities negotiated. Attitudinal lexis includes adjectives such as those in *"**grueling** training", "**historic** mission", "**burgeoning** space industry", and "**rigorous** training regime"*. All linguistic metaphors function as a medium for arousing emotions as the basis of evaluation, thus persuasion (as indicated in Superlativeness above). In these instances, the journalists upscale the force of meaning, hence show how maximally committed to the value position being advanced they are. Instances of sharpening the FOCUS in

this manner indicate that the writers are taking a strong positive position, thereby seeking to align the reader(s) with their propositions.

Personalization. It is enticed by the salient and foregrounded images of the Emirati astronauts in close-up shots with special emphasis on sensationalized and emotionally charged iconography, facial expressions, and demand gaze for praise. The astronauts are singled out yet exemplary of the *future Arab self*. In alignment with these images, instantiations of AFFECT seem to lie more squarely on *realis* (existing entities and states) and *irrealis* (future states) types of affect in perfect unison. Examples to cite are:

- "They are ***gracious and lovely*** human beings and we greatly enjoyed meeting them," the North Carolina native says.

[+AFFECT (realis/inscribed): satisfaction: pleasure], and

- "It will be ***a great honor*** to be the first Emirati astronaut to reach the ISS," he says.

[+AFFECT (irrealis/inscribed): happiness: honor/pride].

Consonance. In perfect fit with audience's typical expectations of scientific imagery, the space science news have consonance with standard schemas of coverage and bear some kind of socio-cultural relevance. With the "seductive allure" to materiality (Gruber and Dickerson 2012), consonance is realized by: first, the visual display of the training procedures stereotypical of the event in naturalistic settings and training center locations; second, the visual configuration of cultural icons and recognizable symbols (i.e. the astronauts), training gear and kit, and natural landscapes where rigorous training takes place. In parallel, ENGAGEMENT resources of the ATTRIBUTIVE type show non-authorial voices, namely those of evidential standing (e.g. *NASA astronaut Flight Surgeon*), in a position of alignment, hence reinforce the fabric of solidarity with the readership. One example to cite is: *NASA astronaut Flight Surgeon Thomas H. Marshburn says he has enjoyed getting to know the Emirati duo too. "They are gracious and lovely human beings and we greatly enjoyed meeting them," the North Carolina native says.*

Aesthetic Appeal. Aesthetization is visually instantiated by color as the most effective indicator of modality well-invested on the media texts to manipulate potential readers. The degree of color saturation; the diversified range of colors; the contextualized background; the representation of pictorial details; the deep perspective; the fullest representation of light; and the degree of brightness are all expressive of naturalistic visual modality. Aesthetic imagery and naturalistic visual modality suggest excitement and positivity, on the one hand, and evokes a sense of hybridity, on the other hand.

Conclusion

This research endeavor examined two feature articles retrieved from the *Reach for the Stars* content hub *NGM* created for UAE space activities since September 2019. Inspired by the work of Determann (2018) on space science and the Arab World, this research endeavor: first, scrutinized the multimodal representations of Arab space scientists (the Other) in manners that tie closely to the geopolitical culture of the US (the Self); second, examined how science-popularizing discourse serves as a catalyst for transformative collective praxis, on the other. The study argues that despite the magazine's metaphor *a window on the world*, the multimodal ensembles of such cultural texts emerge as complex processes fashioned in response to the ever-changing US geopolitical ideologies. In alignment with the contemporary cultural representations of space astronauts that tie closely to the current economic and geopolitical ideologies of the US and power relations with the UAE, the multimodal construction of science-popularizing discourse in conjunction with the two Emiratis undergoes remarkable shifts.

The study argues that the ideologically charged images open up alternative interpretations (not explicitly projected in text), and hence function as socializing agents that stimulate changes in existing values, stereotypes, and normative behaviors. Prior editions of *NGM* claimed to portray subjects in authentic environments, yet individual images disseminate stereotypes of non-Westerners for Euroamerican readers and often become representative of entire groups of people (Lutz and Collins 1993; O'Barr 1994). One might argue that repeated exposure to these immersive and subjective images might fundamentally result in a cultivation effect, underscoring notions of cultural change and scientific evolution.

This four-level analysis shows that while the UAE transitions through geopolitical and scientific realignments as a serious player in the space sector, Emirati space scientists undergo a re-making of 'the Self'. This seems to tie in well with the articles' overall purpose of challenging the process of 'Othering', embracing discourses of belonging. In this regard, belonging entails unwavering commitment to tolerance, institutionalized acceptance of the 'Other', and inclusion into the Western community. In total, these representations may ultimately facilitate the ideological legitimization and emergence of a new paradigm for Arab social actor representation.

This study is not without limitations, though. The first limitation is the nature of the paper being a case study. Caution should be exercised since the findings cannot be generalized beyond the selected articles until further research is carried out on a more representative sample. This paper is hoped to be a significant contribution to the study of *NGM* science-popularizing feature articles from multimodal vantage points. Future research on science-popularizing discourse can take the hybrid methodology proposed in this paper as a point of departure, tapping into the four-part documentary series *National Geographic* launched to present how the space industry established in the UAE plays a significant role in dealing with environmental challenges from climatic changes to depletion of natural resources. On a different note, lexicon-based sentiment analyses of the science-popularizing feature articles in

Reach for the Stars content hub, using a large-scale dataset that spans several years to come, are also encouraged to extend scholarly work on reader response, agenda setting, and journalistic framing.

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