

Transformational Resistance and Identity Development: A Case Study of an Asexual Woman Engineer

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DEI programming in recent years has focused significant efforts on fostering inclusion of visible identities, such as race/ethnicity, certain dominant gender identities, and certain dominant forms of sexual orientation. However, there is a lack of understanding of how DEI programs can target people with multiple, possibly invisible, marginalized identities, such as asexuality. Furthermore, while DEI programs tend to provide valuable and necessary support spaces for students from marginalized backgrounds, they may not consider how marginalized students create their own resistance practices. In this paper, we explore the liminal space of invisible identity and its intersections with other identities through a case study of an asexual cis-gender woman undergraduate engineering student through the lens of transformational resistance and identity development. Through her narrative, we see how transformational resistance can occur at any part of the identity development process, though certain identities during these parts may not be salient or significant to the individual. This paper addresses the complexity in creating diversity, equity, and inclusion (DEI) spaces for invisible marginalized identities and offers the experiences of the participant to question the bounds of inclusivity in these spaces.

Introduction

Understanding the lived experiences of invisible marginalized people in STEM (Science, Technology, Engineering, and Mathematics) is paramount to well-executed diversity, equity, and inclusion (DEI) programs. While crafting programs for marginalized people with visible identities is simpler, marginalized people with invisible identities also seek community [\[1\]](#) [\[2\]](#) [\[3\]](#) [\[4\]](#). One such group of invisible marginalized people in STEM are LGBTQ+ engineers, who navigate a chilly, heteronormative climate in higher education [\[5\]](#) [\[6\]](#). Additionally, prior studies highlight how students with multiple-marginalized identities face more barriers than those with one or fewer marginalized identities [\[7\]](#) [\[8\]](#). Students resist this chilly climate and can overcome these barriers by forming communities of support, gaining power within the department, and interacting with peers to create a more inclusive culture [\[2\]](#). Resistance to this environment can be influenced by the visibility of students' marginalized identities [\[1\]](#), which in turn affects their identity and developmental trajectory in affirming their LGBTQIA+ identities [\[9\]](#).

This paper uses a transformational resistance framework proposed by Solorzano and Bernal [10] to understand the identity and resistance attitudes of engineering students with multiple marginalized identities. Specifically, different types of resistances are used to understand the contradictions in students who suppress their LGBTQIA+ identities while pursuing transformational resistance around their other identities. Solorzano and Bernal [10] apply their framework specifically to Chicana and Chicano students; however, this framework can be extended to exploring students with multiple marginalized identities, because it articulates patterns of resistance that may be hidden. Although we center the narrative around a white student, the transformational resistance framework can still be applied to study how marginalized people resist oppressive institutions and form social justice critiques.

This paper also indirectly applies an identity development model framework to the participant's asexual and gender identities [11]. The identity development model is used to understand the different relationships one can have toward various aspects of their identities. By characterizing the relationships between identity development and resistance practices, we seek to elicit the connections between identity development, (non)visibility, and resistance.

By combining the transformational resistance framework proposed by Solorzano and Bernal [10] and applying the identity development model to the participant experience, this paper attempts to address the following questions:

1. How do students with multiple marginalized identities, some invisible, negotiate their identities in spaces where some of their identities are unseen?
2. How do resistance patterns change when one's identity is invisible?

Using the resistance framework by Solorzano and Bernal [10] and the identity development model, this paper attempts to understand the complex ways in which identity visibility influences patterns of resistance. Through a case study of an asexual woman undergraduate engineering student at a public four-year university, we argue that while without DEI programs there would not be a scaffold for the inclusion of multiple identities, current DEI spaces privilege visible identities. This paper aims to center the narrative around an asexual women engineer to highlight how identity visibility affects patterns of resistance.

Literature Review

Prior literature has examined the different ways in which marginalized groups oppose oppression. Namely, Solorzano and Bernal [10] categorize opposition to oppression into four categories through the Critical Race and Latcrit Theory framework: reactionary behavior, self-defeating resistance, conformist resistance, and transformational resistance. These types of opposition are introduced as categories which can be divided into four separate quadrants, distinguished by varying levels of societal critique and actionable social justice. Reactionary behavior, which is not resistance, is a reaction to oppression without critique of the oppressive

structure or investment in social justice. A LGBTQIA+ student, suffering from mental exhaustion from interacting with oppressive institutions, may choose to abuse substances without critiquing the oppressive structure as a reactionary behavior. Self-defeating resistance can be characterized by a LGBTQIA+ student who transfers to a humanities major after criticizing the heteronormativity of engineering. The transfer student understands the heteronormativity of engineering but does not seek to change the inherent structure of engineering. Conformist resistance can be characterized by a LGBTQIA+ student, desiring to change the masculine culture of engineering, joining a gender-based organization which only further reinforces masculinity in engineering. On the other hand, transformational resistance seeks to change the oppressive power structures themselves through an intentional act of resistance, which can be either external or internal. A LGBTQIA+ student protest for gender-inclusive bathrooms is an example of an external transformational resistance. A LGBTQIA+ engineer persisting through a cisgender heteronormative environment to increase the diversity of engineering is an example of an internal transformational resistance. Solorzano and Bernal [10] note that in traditional resistance discourse, internal modes of resistance are often invisible and therefore looked over in celebrating visible modes of resistance. While Solorzano and Bernal [10] developed the framework to understand Chicana and Chicano student resistance, we use the transformational resistance framework to gain new insights into how invisible, internal transformational resistance interacts with external, visible transformational resistance and how invisible marginalized people resist oppressive institutions.

This paper merges the transformational resistance framework with the identity development model to supplement our understanding of the case study participant's experiences. The identity development model used in this paper has been informed by a multitude of literature studying the stages and life cycle of gender and LGBTQ+ identity development. While a number of LGBTQ+ identity development models have been proposed, most of them share commonalities [12]. The first stage in non-heterosexual identity is identity confusion, where LGBTQ+ youth do not yet have the language or self-understanding to articulate their deviance from heteronormativity [13] [14] [15] [16]. The second stage, which is of particular importance to asexuality, is finding the existence and language for non-heteronormative sexualities [13] [17] [18] [19]. The third stage describes the exploration of these different sexualities, which primarily relies on the LGBTQ+ internet community [16]. The fourth stage occurs when the individual begins to accept their asexual identity and it becomes a more salient part of their identity. The fifth stage is the coming out stage, where the individual's asexual identity is salient enough to reveal the invisible sexuality to others. Finally, the sixth stage is when the individual integrates their asexual identity with their sense of self [13]. The identity development model's linearity implies that transformational resistance cannot be achieved unless the individual has moved beyond the prior stages, or for example, has not fully come to terms with aspects of their identity.

On the other hand, gender identity development that does not conflict with the heteronormativity of society at large undergoes a different process. Gender identity begins early on in childhood,

where developmental factors such as gender-typing, normative gender roles, and biological factors play a large role in shaping a normative, binary gender identity [20] [21]. Unlike gender and LGBTQ+ identity development, gender identity development that does not conflict with the heteronormativity of society does not go through the defined stages of an identity development model as mentioned above. As a result, normative gender roles can be more stable and provide a touchpoint for building community, particularly for cisgender women.

Methods

Setting/Sample/Data Collection

The authors released a Qualtrics survey sent via student organization communication channels and department emails to poll for interest to participate in an LGBTQ+ STEM study. Respondents were asked for demographic information, LGBTQ+ experience at the institution, student organization involvement, and preference in participating in either an individual interview setting or in a small focus group. The first and third author conducted one-hour interviews and focus groups to twelve undergraduate and graduate STEM students through Zoom, an online conference tool. All interviews were audio and video recorded and transcribed. Of the data collected, one participant's experience was selected to become a case study in this paper. Questions asked across all interviews included but were not limited to:

1. Where are some spaces you feel safe being yourself?
2. In what ways do you assert your queer identity in STEM spaces?
3. How does your identity affect your perspective on STEM?
4. What barriers do you see in equality in STEM? How might we challenge these barriers?
5. What role did your organization play in your identity formation?

Case Study Participant Selection

Out of the twelve interview participants, we selected one participant and conducted a case study to highlight her narrative. For the purpose of this paper, we will call the participant Kayla. We focused on her contrasting perspectives of her two marginalized identities as an asexual female in STEM, because her visible identity as a woman and her invisible asexual identity offered an opportunity to understand the experiences and implications of identity visibility. Additionally, we wanted to highlight her experiences, as there remains a gap in literature exploring the narrative of asexual people in STEM and beyond [18] [22]. Therefore, Kayla's narrative posed an opportunity to address the current gap in literature.

Data Analysis

The case study interview was qualitatively coded. In the first phase of coding, we pre-coded large chunks of the transcribed text using lump coding. These larger chunks of three to five lines

of text, which were deemed “codable moments,” [23] were selected to kick off the first round of codes. The first author wrote notes based on these codable moments that described the initial perceptions of Kayla’s experience. These notes then informed the first round of code generation. For example, when the Kayla defined the demographic of her classroom as largely being “the straight heterosexual male,” the notes notated this as her perception of the typical engineer [24]. Drawing from prior literature, we generated the code, “engineering culture” based on these notes. The lumped codes were then presented to the second and third author to discuss in detail. The first author then created multiple codes for each lump code and did a second pass of the transcript. The two passes of codes were then discussed at length with the second and third authors, and the first author conducted a final pass using line coding [25]. The interview was coded a total of three times, and emergent themes were extracted and discussed (Table I). To augment the trustworthiness of our findings, we used member-checking to verify with the participant that the statements in the paper were accurate and representative of her experiences [26]. A draft of the findings was sent to the participant for their review, and their feedback was incorporated into subsequent drafts.

Table I. Emergent Themes from Case Study

| Themes | Definition | Quote |
|--------------------------------|---|--|
| Engineering Culture | Describes the sum environment of engineering, influenced by the individual interactions from fellow engineering classmates, professors and their identities [5] [6] | “Obviously I've seen like the, you know, straight heterosexual white man.” “I felt a little bit more accepted and comfortable with my liberal arts friend than my engineering one. I guess that's maybe like a difference in culture there.” |
| Resistance (Coping Strategies) | How marginalized people resist chilly environments and overcome barriers [2] | “So I guess I've started to challenge that by intentionally being more forward and assertive and not letting myself be talked over.” |
| Community | Describes a self made environment consisting of chosen friends and physical spaces, such as a women in engineering student organization | “Yeah, I guess it hasn't been that important to me to like kind of group together every time I've been aware of someone's queer identity.” “Oh, there's an awesome network for women in STEM...And I just think it's an awesome community. It's really supportive.” |
| Identity Development | A complex process in which an individual’s identity salience changes through internal and external factors [13] [14] [15] [16] | “I remember distinctly once in middle school hearing the word [asexual], because it was like a needle in my brain...I don't know where I first heard “aero” either...It's mysterious. Maybe [those words] were always there.” |

Positionality Statement

The first author is a queer and non-binary first year master's student in engineering. Their main research interest lies in studying how marginalized students find community, specifically within student organizations. The lead author's overarching research objective is to center the voices of their marginalized peers. The first author disclosed their identities to the participant and shared experiences with the participant as a minority demographic, LGBTQ+, and woman engineer. They used these shared experiences to build rapport and connect with the participant during the interview. These shared experiences helped the first author interpret the data. The first author utilized their insider knowledge of the funding towards DEI initiatives and maturity of student organizations within engineering during the data analysis.

Findings

The dominant narrative that emerged from Kayla's experience in engineering was her contrasting perspective on asexuality and gender identity. This dichotomy was then reflected in her patterns of activism in her marginalized identities. Kayla's resulting acts of resistance for her gender identity was external, and her resistance for her sexual identity was internal. In both cases, her resistances included a social critique and an interest in social justice, making them both forms of transformational resistance. However, her patterns of resistance between her visible identity as a woman and her invisible asexual identity differed significantly.

It is important to note that Kayla's study university dedicated significant funding towards women in engineering by creating a women in engineering department, establishing a network of women engineers, and creating annual women in engineering events. The women in engineering student organization Kayla was involved in was mature, having been formed through the department before the 21st century. On the other hand, the university did not direct funding to create an LGBTQ+ engineering department, arrange for LGBTQ+ annual events, or make an effort to connect LGBTQ+ undergraduate engineers with alumni or visible role models. Additionally, the only two LGBTQ+ student organizations in STEM were immature, having been formed only two years prior to conducting the interview. This may have contributed to Kayla's perception of the value of her woman identity versus her asexual identity.

Kayla was an undergraduate engineering student at a large, public four-year university. She identified as an asexual cis-gender woman and used she/her pronouns. Throughout her undergraduate career, she was involved in a women in engineering student organization as a student leader. However, she did not do the same for her asexual identity, electing not to find a supportive community to validate her sexual identity. The following subsections will delve into her experiences as a cis-gender, female, asexual engineering undergraduate student.

Gender Identity

Through her involvement in the student organization, Kayla found a supportive community among her women engineer peers that validated her experiences of marginalization as a woman in STEM. When discussing her motivation behind her activism, she critiqued how in STEM, “there is a tendency for women to get talked over and dismissed, even if [others are] not doing it intentionally.” She reflected on her personal experiences growing up, stating that “a lot of women [like me] are conditioned from when they were younger to be more submissive, and so I had to really challenge that to get anywhere.” She described resisting this phenomenon in the classroom by “intentionally being more forward and assertive and not letting myself be talked over.” Kayla’s acts of resistance and involvement with her organization gave her a sense of fulfillment and purpose, as it made her “feel kind of good to be defying the odds - there’s something to that that feels right.” Her role in the women in engineering student organization was her primary method of resistance in engineering.

Asexuality

Unlike her gender identity, Kayla did not view her asexuality as an important aspect of her identity; therefore, she did not see any value in pursuing an LGBTQ+ community of people who shared her sexual orientation. She reflected:

“I don't think it's that important to me as a person to kind of identify and validate that part of myself. For me, it just kind of feels like a waste of my time. I don't really know why I could probably benefit from that - from meeting other people who are similar to myself.”

In both academic and personal settings, she discussed how she typically shied away from conversations relating to sexual orientation, romance, or non-heteronormative gender even if she is in a supportive and non-heteronormative space. She referenced an example that made her feel both guarded and accepted:

“I think one particular conversation that stands out to me was from our art history discussion. Our professor had been talking about how gender was more of a performance than anything...She had this rant about this one song from High School Musical. I've never seen the movie, but it's about how it's like a metaphor for bisexuality... Honestly, it makes me feel really on guard, because I don't know where that conversation is going if it turns personal. I don't know what I'm going to say.”

Despite this, she also appreciated the professor’s lecture, because it “let me know that [the professor’s] very open and accepting.” She also described how a few chance encounters that she had with other asexual people made her feel “comfort[ed], knowing that I wasn't alone.” The juxtaposition of Kayla’s discomfort when discussing non-heteronormative gender identity and sexuality and comfort in finding asexual people like her illuminates the internal struggle of her

invisible identity. On one hand, Kayla did not see the value in affirming her asexuality by seeking out a community who shares her sexual orientation. On the other hand, she admitted that she feels comforted around asexual people or those who are accepting of non-heterosexual identities. Reflecting on this dichotomy, she said that her relationship with her asexuality was complicated and that “it changes from day to day - like how I feel about myself - and my identity is a process. I think I'm still in it.” When asked to expand upon this further, Kayla discussed how she perceived the way that other people view asexuality:

“You know the one person who's like, ‘oh, [asexuality is] not a real thing,’ and I can't think of anything to say to that, because I don't know how to prove a negative, I guess. And so, you know, I like my friends and I'd like to think that they would believe and accept me, but I don't really know. And I don't want them [to think] that I'm making things up for attention. I know it seems like more trouble than it's worth.”

Kayla considered how she is unable and unwilling to prove the existence of her invisible identity, which is central to her lack of interest in finding a supportive community for her asexuality. She concluded that she did not have the energy or investment to open up the possibility of having to prove her asexuality to her friends. Kayla felt that her identity development for her gender identity and sexuality was correlated to how others perceived the marginalization and existence for these identities.

Gender Identity and Sexual Orientation

Kayla's gender identity was more salient compared to her asexual identity. This was due to several factors. Firstly, she experienced validation of her marginalization as a woman through her community. This is in stark contrast to her asexuality, where she references a possibility to someone denying the existence of her asexuality. Additionally, Kayla still feels discomfort around her asexuality. For her gender identity, Kayla has fully accepted and integrated her identity as a woman. On the other hand, in the identity development model, Kayla had yet to fully accept or integrate her asexuality. She admitted that her relationship to her asexuality changed from day to day and felt as though validating her identity was not worth the energy. Kayla emphasized how she felt a greater sense of belonging towards her gender identity:

“Honestly, like with my [gender] identity. I kind of feel like I'm more of a part of it, because, you know, women in STEM aren't as well represented. And I guess...You know, like the bad stereotypes for women in STEM are like super feminine and - I don't really know what I'm trying to say to be honest - could you repeat the question?”

And I guess..like again, I'm not very open with my [sexual] identity. So I've never really seen that put against me, and I've never seen that especially like at [college]. I've never really seen those kinds of stereotypes. Obviously I've seen like the, you know, the straight

heterosexual white man. Um, so yeah I don't really think I've ever acted against it, other than just by being myself.”

Kayla referenced how the dominating demographic in both academic and corporate environments is “the straight heterosexual white man.” However, she encountered different levels of marginalization between her gender and sexual identity. For her gender identity, where her perception of marginalization was stronger and efforts to promote inclusion were more visible, she felt that she could make a more significant impact. As such, she engaged in women in engineering activities and sought to actively resist gender stereotypes. In contrast, the invisibility of her asexuality and her perception of a lack of marginalization of asexuality at her college campus led her to a different kind of resistance: resistance by existence. Despite never “acting against” the marginalization of sexual identities, she highlighted that she mainly tried to “just be myself.” As mentioned in the previous subsection, Kayla’s asexuality was not central enough to her personhood to where she would want to expend the energy to craft a community around that identity. While she appreciated efforts by others to be inclusive of all sexual orientations, actively resisting in the LGBTQ+ space was not on her personal docket: simply existing was enough.

Furthermore, when asked if she had ever tried to actively seek out a supportive LGBTQ+ community in college like her community in her women in engineering organization, she said “Oh, I’ve definitely considered it...But you know, I would rather do things like my hobbies and fill my time that way, than join those kinds of organizations.” Kayla’s preference to pursue her hobbies rather than finding community in her asexuality showcased her unwillingness to be boxed in by her identities - and describing those organizations as “those kinds of organizations” reflected the boundaries she drew between her woman identity and her asexuality.

Summary

For Kayla, her identities as a woman and an asexual were separate and distinct. Her gender identity was central to her community and experience as an undergraduate engineer. It felt inherently good to her to resist against the archetype of a submissive woman. Meanwhile, Kayla felt uncomfortable around non-heteronormative gender or sexual orientation conversations, because she had not integrated her asexuality with her identity. As a result, she drew a line dividing her woman identity from her asexuality. The next section will discuss how Kayla’s experiences and patterns of resistance add to the layers of complexity in understanding how to execute DEI spaces for invisible identities.

Discussion

Kayla’s differing relationships with her gender identity and asexuality correlate to the visibility and her perception of the social acceptance of those identities. In literature, the marginalization of women in engineering has been studied for longer than asexuality in engineering [\[30\]](#), and the

existence of women in engineering at her university is legitimized through funded diversity programs and student organizations. At Kayla's study institution, the university actively combated the marginalization of women in engineering by funding a women in engineering program and supporting women-based engineering student organizations with resources and office space. On the other hand, it is unclear which staff, if any, have responsibility for supporting LGBTQ+ engineering students, and there is no formal program (although the university has an LGBTQ+ community center). Additionally, the two LGBTQ+ STEM organizations were relatively new organizations. This infrastructure aligns with that fact that asexuality remains an understudied and underfunded field (e.g. [22] [30]), especially in the context of the heteronormative climate of engineering. Kayla may have perceived that her university applied more effort towards improving the status of women in engineering compared to LGBTQ+ students. We postulate that this perception may have contributed to her undervaluing her asexual identity and perceiving her gender identity as relevant to her engineering experience in her university. Based on her perception of social attitudes towards marginalized identities and university funding efforts, there may be an onus for DEI efforts to increase their visibility.

Solorzano and Bernal [10] describe how transformational resistance can be internal or external, but internal resistance is harder to identify and is often overlooked. Kayla's perspective raises the question of how to understand internal resistance by invisible marginalized people. Kayla's lack of desire to validate her asexual identity is also tied to the perception of how others might invalidate its existence. This perception is supported by literature which indicates that asexuality "lack[s] social credibility" and suffers "social invisibility" across countries and cultures [30]. Since asexuality is characterized by social invisibility, Kayla's only desirable path forward to resisting was internal. She concluded that asexuality was not a useful or valid identity to externally resist through, partly because it was socially invisible, and partly because she still struggled with her asexual identity development. Kayla's nuanced view of her asexuality highlights in sharp relief Mollet's finding of the complexity of identity disclosure management, distinctly influenced by perceived structural and social benefits, or rather, lack thereof [31]. Despite this tension, she continued to resist through the resistance-as-existence tactic. As shown in Kayla's experiences, one does not necessarily need to have a fully developed identity to resist oppression.

Kayla's experience challenges the normative assumption held within DEI spaces that privileges visible identities. Current DEI spaces, such as Kayla's women in engineering student organization, are designed with what Sanchez and Schlossberg [30] call "the logic of visibility". They write,

"Theories and practices of identity and subject formation in Western culture are largely structured around the logic of visibility. We are subjects constituted by our visions of

ourselves and others, and we trust that our ability to see and read carries with it a certain degree of epistemological certainty.” [30]

The logic of visibility is disrupted by the invisibility of asexuality. Kayla described how other people do not perceive asexuality as real, and she is unable to prove her identity with the logic of visibility. In contrast, Kayla perceived her very visible gender identity as inherently valuable, in part because the institutionally-funded women in engineering student organization and other infrastructure provided her with a community and validated her experiences as a woman. The lack of fully legitimized, mature or funded LGBTQIA+ engineering student organizations may have contributed to her devalued perspective of asexuality. The logic of visibility and perception of value of Kayla’s asexuality compounded to further marginalize her invisible identity. The visibility of her gender identity overshadowed that of her asexuality - influenced by the DEI programming at her university targeted toward visible identities, Kayla found herself delegitimizing her own asexuality.

Implications

We acknowledge that the LGBTQ+ community covers a broad umbrella of potentially disparate identities. However, prior literature [31] and Kayla’s experiences indicate that asexual students still find comfort in knowing other students who share their identities, and one mechanism to achieve this is through legitimized and funded DEI spaces. Kayla’s narrative points to the fact that identifying and targeting marginalized people with invisible identities are, in many ways, more complex than doing so for visible identities. The lack of value that she sees in validating her asexuality is tied to her inability to prove her identity to naysayers. Kayla’s experience forces the question of who to design spaces for inclusion, or rather, whether the bounds of inclusion in traditional DEI approaches should be redefined. This paper makes visible the gap between traditional DEI programming and the needs of people with invisible marginalized identities. As a result, we raise several important questions on the nature of DEI programs:

1. Should the bounds of inclusion in DEI spaces only encompass people who actively want and see value in inhabiting those spaces?
2. How can communities centered around visible identity, such as women in engineering student organizations, also make space for intersectional invisible identities, such as asexuality?

While current efforts in designing DEI programming have made significant strides, researchers and practitioners alike must address these questions in designing truly inclusive and well-executed DEI spaces. Kayla’s experience illustrates that DEI spaces, while welcome, may not necessarily be desired by the target population. In other words, DEI spaces must be accessible to all, but not all marginalized people will want to access DEI spaces for their identities. With limited resources and funding, practitioners will have to make difficult choices on potentially prioritizing particular identities, but we encourage them to consider how funding

can also socially legitimize or delegitimize invisible identities, as visibility gives power to those who wish to be visible. While something is always better than nothing, we highlight the need to also consider various structures that may foster inclusion under an umbrella of difference.

Conclusion

By applying the transformational resistance framework of Solorzano and Bernal [\[10\]](#) to Kayla's resistances for her gender and asexuality, Kayla's resistances can be categorized as transformational. However, her patterns of transformational resistance and position in the identity development model varied between her visible identity as a woman and her invisible asexual identity. This indicates that there is a level of complexity to identity visibility that is overlooked by the transformational resistance framework proposed by Solorzano and Bernal. Kayla's differing relationship and resistance patterns for her visible identity compared to her invisible identity highlights the complexities in designing inclusive DEI spaces. Her narrative challenges the normative assumption held in DEI spaces that privileges visible identities and implies an onus for DEI efforts to increase their visibility. Kayla's experiences offer insight on how to redefine the bounds of inclusion in DEI programming.

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